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M D Agrawal
President, CSI

Prof. R K Shyamasundar
Editor-in-Chief, CSI Journal
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President’s Message

From: president@csi-india.org
Subject: President’s Desk
Date: 1st July, 2011

M D Agrawal

Dear Friends,

IT is relatively new field. Many new developments and benefits for mankind are yet to happen in field of ICT and by ICT as per study and predications by experts like Mr. Vint Cerf, TCP/IP inventor. First World War created a push for development of computing technology through electronic machinery. For many decades, development of computer technology was result of research by great companies like IBM and Digital. It was Sir Thomas J. Watson who laid the foundation of IBM some 100 years ago. All through this period, IBM with its innovative thinking, extensive research and new developments, impacted the society and the world at large by bringing about transformation through digital and electronic technology. During the Company’s Centennial Year, IBM designed a course of action to allow its employees, retirees, clients and business partners to donate their time and expertise towards technological development. 300,000 IBMers around the world — close to three quarters of its global workforce – are volunteering in more than 5,000 projects in 120 countries, meeting civic and societal challenges and serving millions in need. In the year 2015, CSI will be celebrating its Golden jubilee to commemorate the completion of its colorful half-century service to IT Professionals and Stakeholders. On this occasion, let us seek learning by IBM’s community initiatives and thoughtfully conceptualize community plans and promotions with help of government and interested organizations for achieving nearly 100% computer literacy among all literates.

This occasion reminds us of the evolution of a new era in our civilization: Information Age, where companies like IBM and later other companies like Digital, HP, Dell, Netscape, Microsoft, Oracle, with their innovative products helped to change the landscape of living, the way we do. Rapid changes in technological development raise a question about the relevance of the well established Moore Law: Doubling of Speed of Processors every two years. Speed of change, being witnessed in IT technology is sometimes much faster. Mobile, Web and other social media technologies are helping to overcome problems of digital divide and are bringing the world on a single communication highway of cyberspace. We have taken up the challenge of incorporation of these new technological developments and its socio-economic impact on our plans & events. It would be worthwhile to create a repository of technological developments in our CSI website and make it accessible as a knowledge base to our members. I thus invite volunteers to contribute their valuable time in creating this site.

Service to Members: The mission of CSI is to facilitate research, knowledge sharing, learning and career enhancement for all categories of IT professionals, while simultaneously inspiring and nurturing new entrants into the industry and helping them to integrate into the IT community. We need to evolve policies and practice to offer maximum benefits to members by involving them in CSI programs and events. Members can seek benefit of their association with society by seeking opportunities for knowledge gain. Participation in CSI events and technical programs, rich technical forums and taking leadership role as Speakers and mentors for technical programs are rich source of value preposition. There is need to send an invitation to members to come forward with their plans and we shall create a data base of availability of members for various CSI events and roles. Membership software is being revamped by HQ.

Our various conferences have set benchmarks and helped members to reap good benefits from their association with us. However, all organizers are not conversant with quality standards. There is need to define quality and relevance standard for our events and technical programs and create a knowledge base of speakers and relevant topics. Considering investment and logistics and marketing efforts, a good secretarial support with help of conference manager at HQ and region will be helpful. Efforts shall be made to build a mini establishment at HQ and major chapters. There is need to recruit experienced staff for this role to maintain continuity and quality.

IT professionals aspire for certifications in various disciplines. Our MOU International partner, professional bodies, ACS, BCS, SCS, IEEE, all have leveraged these options for benefit of members and made a strong revenue base. CSI has great advantage of high quality all India infrastructure - HQ (now 5500 sq feet built up area), ED (about 5000 sq feet area built up and 1 acre open space), at various chapters like Kolkatta, Bangalore, Delhi, Coimbatore, Hyderabad, Ahmedabad (each about 1000 sq. feet area). Majority of our members are from academics and in the profession of consulting and IT business. ED is inviting proposals for setting up of Centre for excellence in partnership with education institutions or with IT organizations for designing and offering certification programs. Options of partnership with other prominent education providers at Chapter/National level with strict MOU terms shall also be explored. Certifications shall be decided as per market requirements. As per National Skill Development Corporation study, there is a great potential for certification programs in hardware and electronic courses. Our focus should be industry-specific, covering few groups of subjects and industry-specific expertise in software application development, hardware/electronics and IT Services & Management/Governance areas and also few certifications in Verticals and sectors like SME/Social. Students in the weaker section of Society will get highly subsidized certification and skill enhancement for better employment opportunities. Considering opportunities and management challenges and for an effective service, it is desirable to have a suitable administrative set up, at the earliest, at HQ and ED, headed by a senior, in the rank of Director Operation or Executive Director at HQ. We shall look out for a very suitable profile for this role, not by choice. Example of good administrative set up for running of society affairs are widely available, difficult to have sustainability and quality through volunteers only.

Student Conventions: We are witnessing a very good synergy among our RSC/SSC, RVPs and Chapters. A new variety of student activities are being planned. Thanks to hard efforts and leadership put in by Mr. Ranga Raj Gopal. I would suggest utilizing our student conventions platform for providing directions, mentoring the young ones and motivating them for entrepreneurship and research oriented approach in their career. A study shall be carried out
provide guidance on this matter. **Annual National Convention at Ahmedabad:** Annual National Convention is the platform where CSI family members exchange their views on CSI plans and future course of activities. Technical programs conducted at the Convention give rich experience about new trends and developments and learnings from success stories of our peers and competitors. Awards and recognitions add value to CSI members and stake holders.

Recently, I had the privilege to meet our convention team, Prof. Soni, Dr. Nand Kumar, Prof. Bhatt, Mr. Bipin Mehta, Mr. Nikhil Jain and others in Ahmedabad along with our regional VP, Mr. Anil Srivastava. The convention is being patronized by Mr. Ravi Saxena, IAS, IT Secretary, Gujarat Government. This brings forth the commitment and importance the government is giving to this event. I am confident that our team efforts will add a new benchmark to CSI activities. I also had an opportunity to meet all the members at the AGM, wherein enthusiasm and eagerness to help each other loomed large. Chief Minister, Mr. Narendra Modi assured all help for success of this event. My hearty good wishes for all round success.

**CSI Computing Journal:** Prof. Shyamsundar and our Research Committee are finally launching the Research Journal online, the announcement of which is appearing in this issue. My good wishes to Prof. Shyamsundar and all fellow editors who agreed to give their valuable time for success of this event. This Journal will be fully supported by CSI staff, where Mr. Fahim Pasha will function as Research Manager.

Next year we would be witnessing the launch of CSI transactions.

Friends, CSI will play an important role in promoting research by making available such platforms and also by taking up initiatives for developing a rightful attitude and providing opportunities to our youngsters for a rich career. We shall arrange couple of research symposiums, research conferences and persuade our institutional members to promote research culture. Government may be approached for research grants and encourage participation of researchers in international conferences. Attempts are being made by our research committee to get help on this front. If you have some ideas and would like to contribute, please do write to us.

**Collaborations with Global organizations:** I was privileged to meet the President of Singapore Computer Society, Mr. Alphonsus Pang and his team during visit to Singapore recently. He & his team expressed their desire to work with CSI in the knowledge exchange programs, where SCS rich technical certifications can be offered in India under joint certification with CSI, and CSI technical workshops and certifications shall be made available to SCS members. An arrangement for joint membership for CSI members as well as SCS members shall also be explored. We shall have an understanding with all MOU partners of ACS, BCS and IEEE and approach them to revive understanding and activate mutually exchangeable programs. We need to create an establishment at HQ to execute these highly beneficial collaborations. We need to seriously decide how to leverage benefits with our association and membership with IFIP and SEARCC.

In the next few months, we shall try to strive hard to visualize a vibrant structure of administration and governance for smooth execution of CSI schemes and thus extend benefits to members. We shall create a proper revenue structure in CSI so that the source of income should not depend entirely on membership.

There will be other sources of income like workshops, conferences which shall be run in surplus mode enabling us to invest thoughtfully in development schemes. We shall try to employ a portion of our reserves both at Chapters and HQ for further growth and for extending benefits to members. It is not wise to keep funds in banks and allow to deplete its real worth in the face of inflation. CSR route of seeking finance is also a good option as you know all corporates are now supposed to invest 5% of their profits in CSR projects. CSI can devise a CSR scheme for attracting corporate bidding for CSI projects. NASSCOM and CII have already started similar programs.

**Winner of Tagline competition:** I am pleased to announce selection of best suitable tagline for CSIC, submitted by Mr. Sanjiv Agarwala : “Knowledge Digest For IT Community” as Winner of tagline competition. Total 224 entries were received. It was really a big task to zero down on best possible choice as tagline for CSIC, thanks to all suggestions received from editorial team. My hearty congratulation to Mr. Sanjiv Agarwala.

In a few days from now, ExecCom will meet to discuss the next course of action. Nation is looking up at CSI for providing guidance and support to youngsters and IT professionals in the area of knowledge enhancement and for better growth prospects. There is a need to examine open mindedly the success factors and identify the road towards success. If necessary, to make task easy, we shall also look into the issue of bringing about constitutional amendments for which I look forward for your valuable support.

Jai hind!

With love,

M D Agrawal

**Appeal to our Partners and affiliated Societies**

Following are some of our MOU partners and affiliated societies and supporting partners -

1. PMI – Project Management Institute
2. IEEE – Institution of Electrical and Electronics Engineers
3. BCS - British Computer Society
4. SEARCC- South East Asia Regional Computer Confederation
5. DOEACC – Department of Electronics and Accreditation of Computer Courses
6. C-DAC- Centre for Development of Advanced Computing
7. MIEL - MIEL e-Security Pvt. Ltd.
8. Microsoft
9. Jaypee University of Engg & Technology Raghogarh - GUNA (MP)
10. Institution of Engineers (India)
11. IETE – The Institution of Electronics and Telecommunication Engineers
12. IFIP – International Federation for Information Processing

We express our gratitude towards all our partners and affiliated societies - both National and International - and would like to invite and welcome them to work together for uplifting value and create enhanced knowledge community.

- M D Agrawal, President, CSI

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Dear Fellow CSI Members:

It is our pleasure to bring out an issue with a special focus on Object Oriented Development and Methodology. Object orientation, which brought about a major paradigm shift from procedural development, has radically changed the way, how we develop software programs.

Many software programs face obsolescence today because of poor adaptability or due to improper change management while making it suitable in the altered technology or platform environment. Various factors such as incomplete knowledge about the system – may be due to poor documentation or due to high attrition of the knowledge developers or due to low level of expertise in technology factor, unstructured coding and ad-hoc design attribute to this obsolescence. The tousled and complex use of unstructured control structures like GOTOs, exceptions, nebulous branching constructs make program design slip through unmanageable spaghetti architecture. Object Orientation caters to more structured-ness, compartmentalization and separation of responsibilities with reuse, patterns and methodology. Today, we have objects and objects everywhere and we live in the age of object orientation catering to every sphere of software development.

Object Orientation caters to more structured-ness, compartmentalization and separation of responsibilities with reuse, patterns and methodology. Today, we have objects, objects and objects everywhere and we live in the age of object orientation catering to every sphere of software development.

In spite of extremely busy schedule, some luminous and legendary thought leaders of object orientated development and methodology, have shared their exemplary insights and rich knowledge with our beloved CSI Communications, catering to the society. Prof. Grady Booch, the renowned Guru and father of object orientation often says, “The code is the truth”. He also says, “But the code is not the whole truth”. We feel privileged to present the enlightening cover story written by Prof. Grady Booch on “Object Orientation: The Core of Complex Software Architecture”.

Our Technical Trends section is cherished with the luminous thoughts of Prof. Ivar Jacobson, father of components and component architecture, use cases, the Unified Modeling Language and the Rational Unified Process. Prof. Jacobson has written on “Discover the Essence of Software Engineering”, where he has highlighted the new initiative SEMAT, Software Engineering Method and Theory, co-founded by Prof. Jacobson. In fact, the first SEMAT meeting held in Zurich in March, 2010 has been a historic occasion much like the 1968 NATO session in Garmish. The section Managing Technology under CIO Perspective is written by Prof. S. Ramanathan. It provides an interesting deliberation about adoption of Open Source software in the mainstream business environment. Dr. Anil Vaidya, in his series of articles on IT strategy, writes in this issue on The Technology Dilemma, and discusses the recent shift in the context of technology aspect of the IT strategy, wherein more focus is now on efficacy and business value of IT rather than only on various technology trends.

People in the organization are the back-bone as well as face of the organization. Retention of valuable employees is far more important than retention of customers because a loyal and productive employee can handle many customers well to bring value to the organization. Therefore, applying BI/ BA in the HR field has wide scope and analytical HRM is as important as analytical CRM. Article in the HR column brings out this aspect and provides a process model for analytical HRM. A short article on Vedic Mathematics explores ‘Nikhilam Sutra’, which is one of the sixteen formulae of the vedic mathematics techniques, and shows its application in digital computing.

As usual there are regular features such as ICT@Society, Brain Teaser, Ask an Expert, On the Shelf (Book Review), Happenings@ICT and CSI News. To our delight, CSI-C previous issue of June 2011 has been very well received. We thank all those, who have sent their valuable feedback on this issue. Please note that we welcome your feedback and suggestions at csic@csi-india.org.

With warm regards,

Rajendra M Sonar, Achuthsankar S Nair,
Debasish Jana and Jayshree Dhere
Editors
Building large software-intensive systems is complex. Coping with the views of different stakeholders and balancing the forces upon the system have inherent engineering challenges. It’s indeed a great challenge to maintain individual detailed snowflake-like contributions to the great avalanche of the entire building of complex software. Incremental and iterative development passing through the evolution and change management phases needs to be continuously measured and monitored. Behavioral abstractions with a separation of responsibilities blended with patterns and protocols glue together in complex domain-specific software. Object orientation has by far become the essential element in the process.

Software-intensive systems do not spring up whole from the primordial soup of bits. Rather, they are created through an astonishingly labor-intensive activity. Most software-intensive systems of value go through the incremental and iterative cycle of development, deployment, operation, and evolution, each phase of which transforms a system’s architecture. In that regard, the process of building software has certain parallels to the process of building things. Small software-intensive systems are like doghouses: they don’t require any blueprints and are largely disposable. Modest to large software-intensive systems are like

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Most software-intensive systems of value go through the incremental and iterative cycle of development, deployment, operation, and evolution, each phase of which transforms a system’s architecture.

houses or skyscrapers: they entail more cost and risk and therefore best practices demand more rigorous blueprints, better tools, significant testing, a risk-driven process, and accountability. Ultra-large, long-lived software-intensive systems exhibit obduracy, and thus are closer to the problem of the organic growth of a city and the attendant activities of urban renewal.

When facing the complexity of software-intensive systems, it is easy to be taken in by the latest programming language, platform, or development technique. We, as a species, are more attracted to change and difference than we are to sameness; the sparkle of shiny objects takes our attention away from the slower rhythms of the tides.

This is not to say that shiny objects do not have their place: there is an inescapable, essential complexity to ultra-large software-intensive systems, and I will use anything at my disposal to attack that complexity. I subscribe to the pragmatic engineering philosophy that if it works, it is useful.

However, the semantics of “it works” are relative to the stakeholder. A code warrior wants to write elegant code that does something interesting and useful. An organization that commissions that code does not see software as an end unto itself, but rather a means to the end of delivering business value. For any stakeholder you may choose, there are different forces that weigh upon their problem – and every such element of a software-intensive system is an engineering problem, one for which any given stakeholder must deploy a solution that reasonably balances the forces that they manage.

While there are important best practices that we can name for each stakeholder, or domain, or development culture, my experience suggests that there are a only few fundamentals that transcend any particular language, platform, or methodology: build crisp abstractions; engineer a proper separation of concerns; craft systems with a balanced set of responsibilities; deliver such systems in an incremental and iterative fashion that focuses on continuous, measurable results.

Everything else is just details.

My experience also suggests that most interesting software-intensive systems are manifest as fragment of algorithmic code swimming in soup of objects. In many contemporary, web-facing systems, we write scripts to deliver specific functionality or to glue together parts. These bits tend to build upon domain-specific platforms that, for the most part, deliver up abstractions of classes (the vocabulary of the domain), protocols (for interacting with those object) and patterns (that provide the cross cutting abstractions that give us the texture of that particular platform).

In our industry, we too quickly forget the past, but I recall passionate debates in the 80’s and early 90’s regarding the value and meaning of object orientation. Reflecting on that time, I realize that back then, object were the shiny objects that were different than the prevailing tides. These days, object-orientation is simply part of the very oxygen that we as developers breathe. We don’t think about it much, we don’t must fuss about why we do it, but we, without much conscious effort, simply abstract. It wasn’t always way, mind you.

I think object-orientation will stick around; it is consistent with the fundamentals I described earlier, and in many ways, facilitates attending to those fundamentals. Except for the software historians of the world, we will hardly bother with thinking that it was ever any different.

I think we are in a related stage of transition as we were some two or three decades ago; we just don’t know it yet, for we are so wrapped up inside of it. The

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... object-orientation is all about forming crisp abstractions, instituting a proper separation of concerns, of making manifest a balanced distribution of responsibilities.

Legacy is an issue for long-lived systems (such as many defense systems) but for new ones as well (even Facebook has a legacy challenge).
future of software, I believe, is very much anchored up in its past.

You see, every software-intensive system is a legacy system: from the moment a line of code is written, it becomes part of that system’s legacy. Systems grow through the gradual accretion of such individual contributions, but the accumulated mass has properties of its own: as Voltaire notes, no snowflake but the accumulated mass has properties around: object-orientation is all about forming crisp abstractions, instituting a proper separation of concerns, of making manifest a balanced distribution of responsibilities. Everything else is, indeed, just details.

Legacy is an issue for long-lived systems (such as many defense systems) but for new ones as well (even Facebook has a legacy challenge). As Ward Cunningham has noted so eloquently, ignoring fundamentals creates a technical debt, one that we must eventually pay with interest. All things being equal, it is easier – and much more fun – to deal with the shiny objects around you rather than fix the sewers, except when they break (although that is rarely fun).

This is why I think that object-orientation works and why it will stick around: object-orientation is all about forming crisp abstractions, instituting a proper separation of concerns, of making manifest a balanced distribution of responsibilities. Everything else is, indeed, just details.

### About the Author

**Grady Booch** is recognized internationally for his innovative work in software architecture, software engineering, and collaborative development environments. He has devoted his life’s work to improving the art and the science of software development. Grady served as Chief Scientist of Rational Software Corporation since its founding in 1981 and through its acquisition by IBM in 2003. He now is part of the IBM Thomas J. Watson Research Center serving as Chief Scientist for Software Engineering, where he continues his work on the *Handbook of Software Architecture* ([http://www.handbookofsoftwarearchitecture.com/](http://www.handbookofsoftwarearchitecture.com/)) and also leads several projects in software engineering that are beyond the constraints of immediate product horizons. Grady continues to engage with customers working on real problems and maintains deep relationships with academia and other research organizations around the world. Grady is one of the original authors of the *Unified Modeling Language* (UML) and was also one of the original developers of several of Rational’s products. Grady has served as architect and architectural mentor for numerous complex software-intensive systems around the world in just about every domain imaginable. Grady is the author of six best-selling books, including the *UML User’s Guide* and the seminal *Object-Oriented Analysis and Design with Applications*. He writes a regular column on architecture for *IEEE Software*. Grady has published several hundred articles on software engineering, including papers published in the early ‘80s that originated the term and practice of object-oriented design (OOD), plus papers published in the early 2000’s that originated the term and practice of collaborative development environments (CDE).

He is the Maestro in the following fundamental pioneering milestones in the history of object orientation and software architecture:

- Created foundation for the theory and practice of software architecture.
- Created foundation for the theory and practice of collaborative software development environments (CDEs).
- Built the first prototype for Rational Rose and the architecture (with Dave Stevenson) for the first Rational modeling product.
- Led standardization of Unified Modeling Language (UML) through the OMG in collaboration with Jim Rumbaugh and Ivar Jacobson.

Grady is a member of the Association for Computing Machinery (ACM), the American Association for the Advancement of Science (AAAS), Computer Professionals for Social Responsibility (CPSR), and the Institute of Electrical and Electronics Engineers (IEEE). He is an IBM Fellow, an ACM Fellow, an IEEE Fellow, a World Technology Network Fellow, a Software Development Forum Visionary, and a recipient of Dr. Dobb’s Excellence in Programming award plus three Jolt Awards. Grady was a founding board member of the Agile Alliance, the Hillside Group, and the Worldwide Institute of Software Architects, and now also serves on the advisory board of the International Association of Software Architects. He is also a member of the IEEE Software editorial board. Additionally, Grady serves on the board of the Computer History Museum, where he helped establish work for the preservation of classic software and therein has conducted several oral histories for luminaries such as John Backus, Fred Brooks, and Linus Torvalds, and previously served on the board of the Iliff School of Theology.

Grady received his Bachelor of Science from the United States Air Force Academy in 1977 and his Master of Science in Electrical Engineering from the University of California at Santa Barbara in 1979.

When not traveling, Grady lives in Maui and in Colorado, but he also lives virtually - as the avatar Alem Theas - in Thorne Bridge ([http://slurl.com/secondlife/ThorneBridgeTown/59/154/28?title=ThorneBridgeTown&msg=IBM%20Research](http://slurl.com/secondlife/ThorneBridgeTown/59/154/28?title=ThorneBridgeTown&msg=IBM%20Research)). Grady’s interests include reading, traveling, singing, playing the Celtic harp, and kayaking.

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*Software is the invisible thread and hardware is the loom on which computing weaves its fabric, a fabric that we have now draped across all of life.*

– Grady Booch
Discover the Essence of Software Engineering

Object-oriented methodology is a well established technique in modern software development paradigm. However, looking back, with software engineering evolutions, we face some fundamental problems and concerns regarding development methods and process. A Global initiative Semat– Software Engineering Method and Theory tries to address the problems we face as a community. Semat is a community effort that attempts to discover the essence of software engineering.

Object-oriented methodology is a very important and very influential software development paradigm. Thus, no doubt it has a place in our history.

In this article, however, I would like to take one step back, and look at software engineering as a whole - from its inception about fifty years ago until nowadays - to discuss how we as a community are doing, what the fundamental problems are that we are facing, what the shared essentials of the different development methods are, and how we could discover and capture these essentials to make software engineering a discipline that is built on solid theory, proven principles and best practices. These questions and others eventually led to the formation of the global initiative Semat – Software Engineering Method and Theory.

1. The problems we face as a software engineering community

More than four decades ago, a meeting held in Garmisch in Germany gathered software leaders of that time to define the term “software engineering” and to lay out its future. Despite the previous effort in formalizing software development, it was not until the Garmisch meeting that the problems of software development were formally discussed.

Over the last forty years, software has ubiquitously infiltrated into every aspect of our society and people’s life. The software industry, which is perhaps the largest sector in the world, has become extremely successful. However, software engineering as a discipline is still challenged by similar problems as it was at its beginning.
Every adoption of a new method makes the old one obsolete. It is like throwing out the baby with bathing water. This is not the smart way of doing our work.

Unified Process, CMMI, XP, Scrum, and now Lean and Kanban, just to name a few.

There are no doubts, that as our discipline moves forward, more and more new methodologies continue to appear. The software industry to some extent is like the fashion industry in the way that we keep chasing fads or silver bullets, but keep ignoring the basic, fundamental things in our discipline. Over these years we have developed hundreds of thousands of methods, since basically every product development organization creates its own way of working. This is no surprise and this is the way it should be. The abundant number in itself is not the problem, but the fact that it is virtually impossible to compare the way different teams work (even within a single organization) is a serious problem. The knowledge gained from these methods is not preserved from system to system, from generation to generation. It is neither transferrable nor reusable among systems, among practitioners, and among organizations. Every adoption of a new method makes the old one obsolete. It is like throwing out the baby with bathing water. This is not the smart way of doing our work.

Furthermore, academia is in a constant catching up mode of chasing what is new. There is not a consistent and fundamental teaching platform across different instructors and different universities. Research topics and education curricula at universities are generally so remote from what the industry wants and needs. As a consequence, the research results mainly stay as research lab “orphan”, are difficulty to be adopted by industry; students who graduate from universities have a hard time to adapt themselves to the challenging industrial environment.

2. Semat – discovering the essence of software engineering

Against the backdrop of the problems we face today, the Semat community, www.semat.org, was founded in 2009 by Bertrand Meyer, Richard Soley and I. Ahead of the very first Semat meeting held in March 2010 in Zurich, late Watts Humphrey suggested: “This (SEMAT) meeting in Zurich (2010) is likely to be an historic occasion much like the 1968 NATO session in Garmish.”

Semat addresses the many challenges we face today in the software engineering field. In essence, the major challenge is to understand how to build great software, and why we need a theory for software engineering [1][2][3]. We suggested that we needed to resound software engineering based on a solid theory, proven principles and best practices that: Include “a kernel of widely-agreed elements, extensible for specific uses”. To be effective the kernel must be kept concrete, focused and small [4].

Semat’s primary goal “is to create a kernel and a language that are scalable, extensible, and easy to use, and that allow people to describe the essentials of their existing and future methods and practices so that they can be composed, compared, evaluated, tailored, used, adapted, simulated and measured by practitioners as well as taught and researched by academics and researchers [5]”.

Semat addresses the “human” side of software development as well as the technical side because after all, it is people who develop software, not methods and tools.

Some Semat key concepts include:
1. Every method is just a composition of practices, either human- or technology-related.
2. Practices are reusable over many application areas and technologies.
3. Underneath all practices is a small kernel of universals, things that we always have, do or produce when building software.
4. Practices and universals are described by a lightweight and intuitive language.

The kernel we are looking for is the common ground or the essence of software engineering. With such a common ground, including some 10-20 key elements, we will have a light but powerful vocabulary to describe any method. This will make it easier to compare and evaluate methods.

For more detailed information, please go to www.semat.org and read our publications to have a better understanding.

We have high expectations that Semat will change the software engineering arena. The basis for the change is the understanding that underneath all methods is a kernel.

3. Semat is a community effort

Semat results are a collective effort from the community for the community. Recently, in order to provide the necessary governance of the work on developing the kernel, the responsibility for this work has
Thus far, there are four universals being proposed – team, work, software system, and requirements. There will be more developed as the work goes on.

Moving forward we need competent people to actively participate in the different task groups. We need people with the following expertise: user experience design to give the language a graphical, intuitive syntax; formal language designers to make sure the concrete syntax is mapped to meaningful semantics; identifying and defining kernel elements (modeling expertise); metrics and measurement experts to help measure the impact of Semat on the external world and to help measure each of its practices; open source tool support for language and kernel; requirement specification of what Semat should do, and more.

Semat needs a broader community involvement to make its results more relevant to practitioners, academic and industry. Please go to Semat blog site: http://sematblog.wordpress.com/, to give comments and feedback. Your comments and feedback are crucial to keep Semat in the right direction.

Welcome to become part of the Semat community.

References

Gartner’s approval to reuse their Magic Quadrant:

Technical Trends column in CSI Communications June 2011 issue had an article on Mobile Business Intelligence by Kaushik Datta. The article had included Gartner’s Magic Quadrant and Gartner states following regarding its reuse - “The Magic Quadrant is copyrighted 2011 by Gartner, Inc. and is reused with permission. The Magic Quadrant is a graphical representation of a marketplace at and for a specific time period. It depicts Gartner’s analysis of how certain vendors measure against criteria for that marketplace, as defined by Gartner. Gartner does not endorse any vendor, product or service depicted in the Magic Quadrant, and does not advise technology users to select only those vendors placed in the ‘Leaders’ quadrant. The Magic Quadrant is intended solely as a research tool, and is not meant to be a specific guide to action. Gartner disclaims all warranties, express or implied, with respect to this research, including any warranties of merchantability or fitness for a particular purpose.”

Allison Fletcher, Gartner, Inc.
We propose a conceptual model of software development in two parts. One part (the frog) focuses on the common aspects across all software development projects, and software development processes, heavy and light, agile or not. It is complemented by second part (the octopus) used to describe the variability across the vast spectrum of software development endeavours. The purpose of the model is to better reason about the value and applicability of given practices, techniques or tools, in a hope to diffuse some of the dogmatism and polarization that we witness in the software engineering world.

1 Modelling the Software Development Process

Many models have been proposed to describe, reason, and even automate in part the software development process. Original models may have focussed mostly on the shape of the lifecycle, e.g., [1]. Since Lee Osterweil told us that “processes are software too” [2], these models started to use the same concepts and tools as the ones we use to develop software itself: programming languages, and object-oriented models [3]. This has culminated with two standards: the OMG’s Software Process Engineering Metamodel (SPEM) [4], and ISO’s Software Engineering Metamodel for Development Methodologies (SEMDM) [5].

There has been also some significant influence on our thinking about the software development process from the Guide to the Software Engineering Body of Knowledge (SWEBOK) [6] and the Guide to the Project Management Body of Knowledge (PMBOK) [7] and other standards, such as ISO 12207 [8].

The main difficulties with these approaches is that they rapidly become very heavy, the main criticism coming from the agile community, and that they imply or push organization to rather bureaucratic (and somewhat linear) processes. At the core, the old paradigm is, this is a kind of factory, where inputs are requirements and a program (the process), the output is software, and the machine is the humans. All we need is the proper gears and cogs, and using control systems to adjust the output. It assumes a high level of determinism and rationality of this human “machines” and an ability to measure accurately various elements in the process. Because of their complexity, these models tend to apply well to large, complex systems, and not to the wide range of situations and contexts in which software is developed [9]. We propose to replace the old, mechanistic paradigm of the software development team as some kind of factory or machine, by a new paradigm which makes more room for the human side of software development: communication, collaboration, cognitive and cultural aspects.

We are proposing here a much simpler model than that of the PMBOK, SPEM, SEMDM or ISO 12207, that uses
a much smaller number of concepts, is agnostic relative to the form of the lifecycle, and to the general underlying “philosophy” adopted (agile or other). This conceptual model, or ontology, has 2 parts, one part that captures the elements that exist in all software development, and one part that captures the factors that makes the actual process different across the spectrum of all software projects out there.

2. A Conceptual Model of Software Project

The conceptual model is organized in two orthogonal parts: the frog and the octopus.

2.1 The Frog

This part of the model of software projects is organized around 8 concepts that are universal across all software projects, and their relationships (cf. fig. 1). Indeed:

Intent, Product, Work, People, Time, Quality, Risk & uncertainty, Cost and Value, are found in some way or another in every software development project, whatever their size, type or color.

Fig. 1: Core concepts (the frog), common across all software development projects

2.1.1 Four core entities

1. Intent

The concept of Intent denotes what the project is trying to achieve. The Intent defines the scope of the project, the intentions and hopes of the key stakeholders, the objectives. While we think of the intent as “the requirements” or “the specification”, in practice Intent may take many diverse forms: a set of tests that the product must pass contributes to defining Intent. A set of software problem reports (i.e., defects) that must be dealt with also indirectly defines Intent. A set of acceptance tests also define Intent. Various constraints, implicit or explicit, internal or external activities, tasks, steps that need to be accomplished in order to turn Intent into Product. They often come defined by a process, or a method, which attempts to describe a systematic way to build a product; some elements of Work are defined “on-the-fly” in an ad hoc fashion. In many cases, a Work item produces or refines some artefact: a document, a model, an idea, a piece of code, a report, formal or informal. Some of these artefacts are only useful internally to the project, as stepping-stones, and do not appear in any form in the final product; they are not “deliverables”.

2. Product

The concept of Product denotes the outcome of the project, what has been achieved. This is the actual software, accompanied with any other artefacts that are needed to make it a complete product: an installer, a set of data, the user’s guide, some training material, etc. Why aren’t Intent and Product more or less equivalent? Why do we need to distinguish them in our model? Intent precedes Product: Intent is an abstraction, a virtuality that sketches the reality that the project is set to achieve. Even when the product is “done” there may be discrepancies between the Intent and the Product; the Intent may have evolved in the meantime, or the Product has come short in some ways of the original Intent. These discrepancies between Intent and Product are the key drivers for the project; they are the imbalance that makes it run. Imagine the relationship between Intent and Product as a bungee cord: the further apart and the more energy the project will expend to bring them closer.

3. Work

The concept of Work denotes the to the project will affect Intent. And one constant of software projects is that they are under pressure of a stream of change requests which modify the Intent.

We propose to replace the old, mechanistic paradigm of the software development team as some kind of factory or machine, by a new paradigm which makes more room for the human side of software development: communication, collaboration, cognitive and cultural aspects.

The purpose of the proposed model is to better reason about the value and applicability of given practices, techniques or tools, in a hope to some of the dogmatism and polarization that we witness in the software engineering world.
a range of reasons. In reality, we define Intent gradually, and it tends to evolve throughout the project under various pressures and demands for changes. We can therefore only define part of the Work at any point in time, and allocate it to People, who will therefore only build part of a Product. This partial product will influence back the Intent, through user feedback, or problem reports. It will also influence how people will conduct the work in the future. Other chunks of Intent are then carved out, more Work defined, and the Product will evolve until it reaches a deliverable stage. All modern software development approaches are iterative and incremental, and they define a project as a sequence over time:

\{ [Intent, Work, People, Product],
  [Intent, Work, People, Product], ...
\}

where Product is the final ‘deliverable’.

6. Quality

The concept of Quality is also an orthogonal notion to our fundamental quadruple [Intent, Work, People, Product]. We can see quality as an attribute of each of them. Quality of the Intent denotes how good we are at defining and planning a Product. Quality of the Work denotes the quality of the process we use to develop software and all the intermediate artefacts. Quality of the People denotes the competence and diligence and dedication of the staff assigned to the project, and finally quality of the product is a measure of how close to the expectation of the stakeholders the delivered product is.

2.1.3 Two key attributes

8. Value and 9. Cost

Finally, Value is associated with Intent and Product: we need to assign expected value to the Intent to guide development of the Product over time, while the Cost of the development is associated with the Work and the People. As software is essentially an intellectual, human-intensive activity, costs are directly derived of the cost of the People associated with the project and the Work they do: what, how much, for how long. This is a characteristic of software development not shared with other engineering disciplines, such as civil engineering.

2.1.4 Together to make a project

10. Project

Altogether a software development project is all the work that people have to accomplish over time to realize in a product some specific intent, at some level of quality, delivering value to the business at a given cost.

2.2 Factors shaping software development projects

There are 2 sets of factors that make up the context: factors that apply at the level of whole organization/company, and factors that apply at the level of the individual project (cf. fig. 2).

In small organizations, with few software development projects, this distinction does not apply, and all factors are on the same level.

2.2.1 Organization-level factors

The organization-level factors (environment conditions) do influence heavily the project-level factors, which in turn should drive the process and practices that should be used.

1. Business domain

For what domain of activity is this organization developing software? Web-based systems, aerospace embedded systems, small hand-held instrumentation?

2. Number of instances

How many instances of the software system (large or small) will be actually deployed? Are you building one system, a dozen, a thousand, or millions?

3. Maturity of organization

How long has that organization been developing software? How mature are the processes (and the people) relative to software development?

4. Level of innovation

How innovative is the organization? Creators or early adopters of new ideas and technologies? Or treading on very traditional grounds?

5. Culture

In which culture are the projects immersed, both national culture and corporate culture? What are the systems of values, beliefs and behaviours that will impact, support or interplay with the software development practices? Ethics is part of it.
2.2.2 Project-level dimensions - The octopus

1. Size

The overall size of the system under development is by far the greatest factor, as it will drive in turn the size of the team, the number of teams, the needs for communication and coordination between teams, the impact of changes, etc. Number of person-months, or size of the code, or development budget are all possible proxies for the size.

2. Stable architecture

Is there an implicit, obvious, de facto architecture already in place at the start of the project? Most projects are not novel enough to require a lot of architectural effort. They follow commonly accepted patterns in their respective domain. Many of the key architectural decisions are done in the first few days, by choice of middleware, operating system, languages, etc.

3. Business model (finance)

What is the money flow? Are you developing an internal system to support your internal processes, or a commercial product, or a bespoke system on contract for a customer, or maybe a component of a large system involving many different parties? Are you contributing to a free-libre open-source (FLOSS) project? How the various participants are ultimately compensated for their effort will also shape the development and management process.

4. Team distribution

Linked sometimes to the size of the project, how many teams are involved and are not collocated? This increases the need for more explicit communication and coordination of decisions, as well as more stable interfaces between teams, and between the software components that they are responsible for.

5. Rate of change

Though agile methods are “embracing changes”, not all domains and system experience a very rapid pace of change in their environment: Intent volatility. How stable is your business environment and how much risks and uncertainties are you facing?

6. Age of system

Are we looking at the evolution of a legacy system, bringing in turn many hidden assumptions regarding the architecture, or the creation of a new system with fewer constraints, a “greenfield” project?

7. Criticality

How many people die or are hurt if the system fails? Documentation needs increase dramatically to satisfy external agencies who will want to make sure the safety of the public is assured.

8. Governance

How are projects started, terminated? Who decide what happens when things go wrong? How is success or failure defined? Who manages the software project manager? Are there external rules and regulations imposed to the product?

This model of process variability is similar to Scott Ambler’s Agile Scaling Model [10], or the parameters of Alistair Cockburn’s Crystal methods [11].

3. Using the Conceptual Model

The model has been offered as an input to the SEMAT initiative [12] to develop the core ontology of software engineering. We have used this model to structure a course on software project management [13, 14], where we can better articulate the function and usefulness of this or that practice in a given context.

A scrum backlog is a representation of intent, so is a defect repository. A staffing profile is a representation of people over time. There are risks or uncertainties associated with intent, or with people. A Gantt chart attempts to visualize work and people over time. What practices need to be put in place when the software is safety-critical, or needs to comply with some regulatory constraints? Does a daily stand-up meeting work with a distributed team? Or a team of 57 people?

In [13], the reader will also find a table mapping our model to the PMBOK [7], to various ISO and IEEE standards, and to the ACM/IEEE Reference curriculum for software engineering (SE2004) [15]. Other papers, reflections, material and presentations can be found on [16].

References

14. Kruchten, P. 2011. The Frogs and the octopus- Experience teaching software project management to undergraduate engineering students. 2nd annual conference of the Canadian Engineering Education Association, (St. John’s, NF, Canada, June 6-8).
Vedic Mathematics:
The Future Computing Model

In today’s era of ever-increasing demands and challenges of fast and energy-efficient computing, Vedic mathematics may be seen as the next generation mathematical application for computing. Revived by Bharati Krishna Tirthaji (1884-1960), it consists of sixteen Vedic sutras (formulas) together with 13 Sub-Sutras (corollaries). These formulas provide a structured system which can be proved to be capable of solving problems, both at abstract as well as applied level. This article will explore one particular Vedic mathematics technique for multiplication called “Nikhilam Sutra”, which is one of the sixteen formulas and would show its application in digital computing.

The “Nikhilam Sutra”
Let us start with a simple 2 digit multiplication example:
Let's say that we want to multiply together two numbers both of which are a little bit less than 100. We'll use 97 and 94 as the numbers to multiply. 100 is our “base” for this particular multiplication. We write the following:

Steps Involved:
1) Find deviation from base i.e. deviation in our case are (-3 and -6 respectively).
2) Deviations are multiplied to form right part of our answer i.e. (-3 * -6=18)
3) Any one deviation is cross added for the left part of the answer i.e. (97+(-6)=91) or (94+(-3)=91). This is equal in all cases.

Note: The base of numbers is 100, so there should be two digits in right part of the answer. If it is less, we put a 0 and if it is more, we add the excess digit to the left part of the answer.

Application in computing
To apply this sutra in digital computing, we need to apply it recursively till we get either the multiplier or multiplicand as all 0’s.

Let’s take example in terms of BITS: Multiplying 997 and 998.

After successful implementation of multiplication, we would proceed with Vedic division in computing.

Looking ahead:
- Vedic computation requires lesser steps to achieve the result and hence is expected to perform better than the existing multiplication algorithms such as Booth’s algorithm.
- After successful implementation of multiplication, we would proceed with Vedic division in computing.
- If all those methods are effectively implemented in computers from hardware level to network level, it
will reduce the computational speed drastically.

- Vedic mathematical concepts can be considered a potent weapon to achieve Greener ICT both in theoretical and Practical domain.

**Conclusion:**

Vedic math (VM) offers a new and entirely different approach to mathematics that can help immensely to meet the current and future computing demands. VM has been seen as a form of fast calculative technique, due its reduced number of operations and its inherent nature of parallelism. Since the current and future trends indicate growing demands of high performance and energy efficient computing, parallelism is the way to go ahead. As inherent nature of Vedic techniques implement parallelism, it might be the next big thing to hit the digital world. The algorithm and hardware circuitry is currently under development phase. We hope to launch the finished product as soon as possible.

**References**


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**Special Drive for Membership Development - Call for Volunteers and Innovative Ideas**

1. **Special Membership Fee for New College Graduates:**
   With an objective of attracting the new college graduates (CLGs), the Computer Society of India is offering a highly discounted membership fee for its CSI Student Members of 2009-11 to enroll as Associate Members of CSI with rights to vote and stand for elections. In this special membership package, all the CSI student members of 2009-11 will be eligible to become CSI Associate Members for two years 2011-13 on payment of `800/- if they register on or before 30th September 2011. For more details, please write to rashmi@csi-india.org

2. **Call for Volunteers:**
   The Computer Society of India is exploring to use the voluntary services of its members across India with an objective of expanding its membership base and taking its programmes to the unrepresented cities/towns in various states and union territories. A few volunteers are to be identified for major cities. The members-volunteers will be entitled for the reimbursement of incidental expenses. They will also be suitably rewarded for their services and extraordinary contributions. The interested members may please write to shruti_rv@csi-india.org on or before 15th August 2011.

3. **Call for Ideas:**
   With a view to enhance CSI members services, there is a plan to design and deploy an exclusive CSI members portal, which can be customized for specialized information and services needs of the members. We request our members to come forward with their innovative ideas and creative contributions for the same. The best idea will be considered for the CSI President Award of Rs 5000 and a certificate. The ideas and suggestions may be sent to shruti_rv@csi-india.org on or before 31st August 2011.

**Prof. H R Vishwakarma**
Hon. Secretary, Computer Society of India
Brain Teaser

Crossword »

Test your Knowledge on Object Oriented Development and Methodology

Solution to the crossword will appear in the next issue. Send your answers to CSI Communications at email address csic@csi-india.org.

CLUES

Across
2. Atmost one instance of a class is created (9)
5. OMG’s Software Process Engineering Metamodel (4)
8. Generalised Class (4)
9. Class type having no object instance (8)
11. Universal standard of modeling language (3)
13. A class that inherits from one of more classes (8)
15. In C++, parameters can be passed by this technique (9)
17. Access to all (6)
19. The number of objects that participate in a class relationship (11)
21. Snapshot of data members of an object (5)
22. Captures requirements (7)
25. An object-based language (3)
28. Type of object that cannot be modified (9)
30. An invariant assumed by an operation (12)
32. Built-in datatype (5)
33. Provides Genericity (8)
34. An object oriented language (6)

Down
1. Cannot be changed (5)
3. Creates objects (3)
4. Refers current object within member function in C++/Java (4)
5. Class member functions (6)
6. Art of hiding details (11)
7. In Java, parameters are passed by this technique (5)
10. A behavioral object oriented design pattern (7)
12. Member access right allowed to subclasses (9)
14. A whole-part type association (11)
16. Accessible only to members (7)
18. Rumbaugh’s object modeling technique (3)
20. Inheritance relationship (3)
23. Global initiative on Software Engineering Method And Theory (5)
24. Dynamic memory allocation is done from here (4)
26. Entity that interacts with the system (5)
27. Function types in C++ supporting deferred binding (7)
29. Value that can be modified (6)
31. Used in conditional code block (4)

Nurse, I think he is asking for his Apple Mobile, not apple to eat !

Congratulations to
Ms. Anita Arora
Lecturer-IT, Apeejay College of Engineering, Sohna-Gurgaon, for getting all correct answer to June month’s crossword.
Programming.Learn(“Perl”) »
Control Structures in Perl

When we had a quick overview of Perl in the first part of this series, we revealed much about Perl’s control structures. There is no need to go into details of its mostly C-like control structures including if, if/else, if/elsif/if, while, do/while and for. We will make a brief mention of Perl’s specialities.

Perl has "Unless/else" usage that is the opposite of "if". It is used to execute a block of statement only when the associated condition is false. Here is not so useful example.

```perl
$a = 0;
unless($a != 0) {
$a += 1;
}
print "a = $a\n";
```

Perhaps the next example is more illuminating:

```perl
print "Program to find biggest of two numbers";
print "Please enter the first number :");
$a = <STDIN>;
print "Please enter the second number:);
$b = <STDIN>;
unless($a > $b){
    print "Smallest = $a";
} else {
    print "Smallest = $b";
}
```

If unless is there, can until be far behind? It is used when you want to reverse the condition of a while loop, in this case the output is 10,9,8 ...1.

```perl
$count = 10;
until ($count == 0) {
    print "$count ";
    $count--;
}
```

Like in while, until has a do/until usage also

```perl
$count = 10;
do {
    print "$count ";
    $count--;
} until ($count == 0);
```

For string processing, the special Perl control structure-foreach - is extremely handy. Rather than basing iterations on explicit counts or logical conditions, foreach iterates over all elements of a given array. The current element is referred to by a special variable, $_. Here is a simple example that sums up an element of an array (of course it doesn’t need all these, the sum( ) function is enough).

```perl
@marks=(34, 55, 78, 45, 89, 66);
$sum=0;
foreach(@marks)
{
    $sum+=$_;}
print $sum;
```

Tail Piece

Google Image search on control structures brings up this image of a Japanese city showing "control structures". Well! Instead of controlling flow of logic, they are attempting to control flow of water during floods. Can you see if/else unless and do/while control structures?
Prof. Bjarne Stroustrup is the creator of the most popular programming language, C++. He is the living legend, he is the maestro. His book “The C++ Programming Language” is the most widely read book of its kind and has been translated into 19 different languages around the world. In addition to his five books, Stroustrup has published more than a hundred of academic and popular papers.

Bjarne was born in Aarhus, Denmark in 1950. He received his Candidatus Scientiarum (Master’s degree) in Mathematics and Computer Science from the University of Aarhus, Denmark in 1975. He obtained his Ph.D. in Computer Science from University of Cambridge, England in 1979 for work on the design of distributed systems. He designed and implemented C++ while a researcher in AT&T Bell Lab’s Computer Science Research Center and was the head of AT&T Lab’s Large-scale Programming Research department, from its creation until late 2002. Stroustrup was elected member of the National Academy of Engineering in 2004.

He is a Fellow of the ACM and an IEEE Fellow. He currently works at Texas A&M University, United States, as a Distinguished Professor where he holds the College of Engineering Chair in Computer Science.
Evolution of C++ towards C++0x

Prelude

C++0x (pronounced “see plus plus oh ex”) is the new standard for the C++ programming language (earlier and existing standard is C++98 or ISO/IEC 14882, published in 1998 and minor amendment was done in 2003 as C++03). In their March 2011 meeting, the C++ Standards Committee voted C++0x (N3290) to Final Draft International Standard (FDIS) status. The final specification is expected to be published sometime in mid-2011. The implementation of the new standards (to be known as C++11 or C++2011) is already well underway in the GCC, Visual C++, and other C++ compilers.

C++ is a general-purpose programming language with close-to-machine fundamental semantics, suitable for kernel and systems programming with a mission of being a better C, supporting data abstraction, object-oriented programming and generic programming. C++ is used in a very wide range of applications and for systems programming: http://www2.research.att.com/~bs/applications.html. C++0x aims to improve C++ as a language for systems programming and library building with ease of learning while at the same time remaining fully backward compatible. C++0x is going to have nice features like uniform initialization, move semantics, lambda’s as first-class elements, automatic type deduction, and a simplified for statement. Also there are atomics, a defined memory model, and support for thread-level concurrent programming.

On key changes in C++0x

Prologue (Debasish Jana): Generic programming helps to write efficient general programs in terms of data structures or algorithms applicable to many different types. C++98 supports this style of programming in the form of templates that allows you to parameterize a type with another (for example vector<int> is a vector of integers and vector<char> is vector of characters). C++0x improves generic programming support with auto, template aliases, and more. In addition, C++0x standard enhances the core C++ language with increased performance, type safety, ability to work directly with the hardware and support of enhanced standard library. Stability and compatibility with C++98 and also C are strictly maintained.

Debasish Jana: C++0x aims better genericity, improved portability and support for newer domains. Would you please briefly elaborate about the key changes?

Bjarne Stroustrup: It’s hard to be brief about what is after all the result of years of work and consists of hundreds of individual changes. In fact, I suspect that the most important effect will be that all the pieces (language features and library facilities) fit better together now. The way to look at a programming language is not as a set of isolated features, but as a set of “building blocks” that can be used in combination to compose solutions.

Next, the most important aspect is not a change, but stability. With very minor exceptions, old code continues to work. This is the advantage of formally standardized languages, such as C, C++, and Ada, over proprietary languages: they provide stability over decades. This is essential if you are a developer of infrastructure – and infrastructure is one of C++’s key application areas.

The committee aimed at making C++ a better language for systems programming and library building, and to make it easier to learn and use; it largely succeeded. The individual features fit into patterns that support those overall aims. For example, the support for concurrency is type safe and therefore far easier to use than the C-style Posix and Microsoft thread ABIs that preceded the standard. Students can learn to use threads in an hour; there are no longer a need to use void*’s and casts to handle concurrency. New language features aim at making it easier to define and use efficient and flexible abstractions. Examples include move semantics, a range-for loop, lambda expressions, general initializer lists, and more flexible constant expression evaluation. The new features are not just for novices; they are designed by and for experts. As ever, C++ will be an excellent tool for professionals.

The standard library has improved through the addition of new components, such as unordered containers (hash tables), regular expression matching, and resource management pointers. The older standard components, such as vector and string have improved through the addition of move semantics, uniform
A simple example:

```cpp
// a name is a pair of strings
using Name = pair<string,string>
vector<Name> names {
  {"Christopher","Strachey"},
  {"Martin", "Richards"},
  {"Dennis","Ritchie"}
};
sort(names.begin(),names.end(),
[](Name& n1, Name& n2)
{ return n1.second<n2.second; })
```

The sorting criterion is a lambda expression comparing two Names by comparing their second element.

You can find brief description of the new features in my C++0x FAQ (ref. URL: http://www2.research.att.com/~bs/C++0xFAQ.html)

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### On range for statement

**Prologue (Debasish Jana):** A range for statement is a new feature in C++0x that allows to iterate through a "range". In C++98, we have for loops iterating through an array for example is done like this:

```cpp
for(int i = 0; i < 10; i++){ .... }
```

Here, the loop statements are executed ten (10) times. If we are iterating through an array, it iterates through the range of valid array index i.e. 0 to 9. One major disadvantage or sort of a problem is that we have to remember the valid range of index for array access, since array boundary check is not available in C++98 if the array is used in its raw form. However, if the array is encapsulated by a C++ class, and the index operator [] is overloaded, we may put the checks for the array boundary over or underflow. But the basic problem for an iteration lies in the fact of automatically determining the ranges of iteration.

**Debasish Jana:** C++0x offers feature of range for statement. Thus, while iterating through an array or list of elements, we can automatically determine the ranges and we don’t have to remember the range manually. Is it applicable only for arrays or any for all kind of situations? How does the range determined internally by the underling system?

**Bjarne Stroustrup:** The new range-for loop is one of the simpler additions to C++11. The general for-loop can do just about everything; that’s its strength and its weakness. The range-for loop make writing the simplest and most common loops simpler and less error prone. For example:

```cpp
void print(vector<int>& v)
{
  for(int x: v) cout << x << \n;
}
```

You can read this as “for each x in v, write it to cout.” The for loop in print() expands into something like

```cpp
for(auto p = v.begin(); p!=v.end(); ++p)
  cout << *p << \n;
```

That auto is a C++0x feature that deduces the type of an object from its initializer; here the type of p becomes `vector<int>::iterator`.

A range-for loop can be used to traverse any data structure that is a range in the STL sense; that is, it has a begin() and an end(), you can get from one element of the sequence to the next using ++, and you can get the value of the current element using *.

For example, the standard-library vector has members begin() and end() that returns an iterator to the first and the one-beyond-last element, respectively. The actual loop control has become an implementation detail. In particular, you can use a range-for loop for every standard container, for initializer lists, and for built-in arrays.

If a data structure does not have members begin() and end(), you can instead define global or namespace scope begin() and end() for it. For example, consider having your own "good old fashioned list":

```cpp
struct Link {
  Link* next;
  int val;
};
```

```cpp
struct My_slist {
  Link* head;
};
```

How can we get a My_slist (which may have been written 20 years ago) to behave like an STL sequence as required by the new for statement (and by all of the standard library algorithms? We just define the “missing” four operations (using `Link*` as the iterator type):

```cpp
Link* begin(List& lst) { return lst.head; }
Link* end(List& lst) { return nullptr; }
Link* operator++(Link* p) { return p->next; }
int& operator*(Link* p) { return p->val; }
```

Note that there is no overhead in using the range for loop compared to the older for loop.

We can generalize print() to handle any container for which begin() and end() is supported (such as My_slist):

```cpp
void print(C& v)
{
  for(auto x: v) cout << x << \n;
}
```

```cpp
void user(vector<int>& v, My_slist& lst)
{
  print(v);
}
```
New language features aim at making it easier to define and use efficient and flexible abstractions. Examples include move semantics, a range-for loop, lambda expressions, general initializer lists, and more flexible constant expression evaluation.

On continuity of member access control in C++0x

Prologue (Debasish Jana): The HAS-A relationship represents something like class A has-a object of class B. This can be either through tightly coupled container-containment or whole-part relationship (like a polygon has vertices) or loosely coupled with no strict ownership (like a teacher has students). In inheritance (IS-A relationship), the subclass normally exposes its own public interface along with the inherited interfaces (i.e. public behaviours inherited from the superclass). Thus, if a Stack class is inherited normally (public inheritance) from Array class, also exposes the array index operator from Stack (by virtue of inheritance) but that violates the definition of Stack since Stack is supposed to expose or allow access to only the topmost element of the stack and not any element within the stack. But if it inherits from Array and exposes the public interface of Array as public interface from Stack, then that’s a clear violation.

Debasish Jana: Private inheritance is a powerful concept in C++, I am not aware of any other programming language providing similar support. Through private inheritance, we are getting benefited of inheritance at the same time we are not exposing the public behavior of the inherited component, promoting the HAS-A relationship. For example a Stack class can be privately inherited from an Array class, thus not exposing the index operator from Stack class. Does this concept philosophically remain same in the new standard?

Bjarne Stroustrup: There has been no significant changes vis a vis access control in the new standard. None were needed. There are a few important uses of private and protected inheritance, but the main reason they are supported is to keep access control, scope, and inheritance orthogonal.

On rvalue reference and move semantics in C++0x

Prologue (Debasish Jana): In general, lvalue means what can be used on the left-hand side of an assignment (e.g. in x = f(y); x is an lvalue). The rvalues mean what can be used on the right-hand side of an assignment, such as f(y) is an rvalue. In C++, parameter passing to functions can be through reference (or rvalue). Also, there can be references to objects or fundamental types as well. There are two types of references: lvalue reference and rvalue reference. An lvalue reference is declared by putting an ampersand (&) after some type. For example,

```c++
int i = 10;
void f(int& j) { j = 20;}
f(i);  // will make i set to 20, as i and j work as alias
f(4);  // error: 4 is a constant and not an lvalue
```

An rvalue reference is declared by placing an && after some type and you can bind an rvalue to it. For example,

```c++
A funct();
A&& ar = funct();  // an rvalue reference
A& x = funct();  // error: the result of funct() is an rvalue
A xx;
A&& ar2 = xx;  // error: xx is an lvalue
```

Debasish Jana: C++0x talks about lvalue and rvalue references denoted by & and && respectively. Can you please illustrate this?

Bjarne Stroustrup: Let me first explain why we wanted rvalue references. “Rvalue references” is simply a language primitive that allows us to provide move semantics. What we want is to be able to “move” resources around without making copies. Consider a simple matrix addition:

```c++
Matrix operator+(const Matrix& m1,
            const Matrix& m2) {
    Matrix res;
    for (int i=0; i<m1.dim1(); ++i)
        for (int j=0; j<mi.dim2(); ++j)
            res(i,j) = m1(i,j) + m2(i,j);  // () defined to subscript
    return res;
}
// …
Matrix mm = mx+my+mz;
```

In C++98 this would almost certainly be a serious performance bug: If a Matrix has 1,000*1,000 doubles then naively copying the result out of operator+() would involve 1,000,000 word assignments. So, we should not be naïve about that return. What is going on here is that I have defined a move constructor for Matrix:

```c++
class Matrix {
    double* elem;  // points to elements
    // allocated on the free store
    int d1, d2;  // dimensions
public:
    Matrix(Matrix&& m) // move constructor
        :elem(m.elem), d1(m.d1), d2(m.d2) {
        m.elem=nullptr; }
    // …
};
```

A move constructor is a constructor that takes an rvalue reference, a T&&. A move constructor is a constructor that is used

The new features are not just for novices; they are designed by and for experts. As ever, C++ will be an excellent tool for professionals.
if the constructor argument isn’t to be used any more, an rvalue. Here, res isn’t going to be used again because it is going out of scope immediately after the return statement. Since the source of the Matrix move constructor is never going to be used again, the move constructor simply “steals” its representation. To make sure that the Matrix destructor doesn’t delete the elements, it replaces the elem pointer by the nullptr.

Move constructors solve the general problem of how to get lots of information out of a function without messing with complicated memory management strategies. The standard containers, such as a vector, map, and string have move constructors. In C++11, it now makes perfect sense to return huge vectors and strings “by value” – no copying of elements will be done.

Rvalues have other uses, but implementing move semantics is the most obvious and arguably the most important.

The range-for loop make writing the simplest and most common loops simpler and less error prone.

On constexpr in C++0x

Debasish Jana: How is the new ‘constexpr’ different from ‘const’ in C++0x?

Bjarne Stroustrup: const’s primary function is to express the idea that an object is not modified through an interface (even though the object may very well be modified through other interfaces). For example

```cpp
constexpr char* strtok(const char*, const char*);
```

It just so happens that declaring an object cost provides excellent optimization opportunities for the compiler. In particular, if an object is declared constexpr and its address isn’t taken, a compiler is often able to evaluate its initializer at compile time (though that’s not guaranteed) and keep that value in its tables rather than emitting it into the generated code.

```cpp
constexpr double pi = 3.14;  // can be used in constant expressions
```

constexpr’s primary function is to extend the range of what can be computed at compile time, making such computation type safe. Objects declared constexpr have their initializer evaluated at compile time; they are basically values kept in the compiler’s tables and only emitted into the generated code if needed.

```cpp
constexpr double abs(double x) { return x<0?-x:x; }
constexpr double abs_val[] = { abs(pi), abs(x1), abs(x2) };
constexpr double x = abs_val[2];  // x becomes abs(x2)
```

The function abs() is declared to be constexpr, meaning that it can be evaluated at compile time if given a constant expression argument. abs_val and x are declared to be constexpr; that means that their initializers must be evaluated at compile time. So if x1 or x2 are not constant expressions this code will be a compile-time error. I see constexpr as a boon to embedded systems programmers (think ROM) and people dealing with concurrency (you can’t get a data race if the value is computer by the compiler).

On continuity of const in C++0x

Debasish Jana: Does that mean the notion of ‘const’ would be no longer needed in C++0x?

Bjarne Stroustrup: No, const’s role in defining interfaces is not covered by constexpr and you need const for cases where a value cannot be computed until run-time but should be considered immutable after initialization:

```cpp
void f(int n)
{
   constexpr int size = n+n%%4;
    // ...
}
```

Now size is immutable, but not usable in constant expressions. You use constexpr when you want guaranteed compile-time evaluation.

On garbage collection in C++0x

Prologue (Debasish Jana): Garbage collection signifies automatic recycling of portions of memory that is not being referenced by anyone. C++98 and its amendment in 2003 did not have automatic garbage collection. Any memory allocated needs to be deallocated manually from within the program. If not, then there is a case of memory leakage resulting in wastage of memory.

Debasish Jana: Memory leaks are common source of program failure. Calling the delete operator at the right place and at right time is kind of tricky and needs lot of expertise. Probably that’s a reason for the urge of garbage collectors. How does C++0x deal with garbage collection?

Bjarne Stroustrup: First of all, if you use new and delete all over your code, you are asking for trouble. Doing so, you are probably writing C-style code (or Java-style code) and should reconsider your resource management strategy. This is true for both C++98 and C++11. I use the RAII technique (“Resource Acquisition Is Initialization”) for most resource management: acquire a resource (e.g. memory) in a constructor and release it in a destructor. Containers, such as vector, map, and string are good examples. When simple use of containers isn’t sufficient, I use resource handles, such as a vector of pointers to objects, a unique_ptr or a shared_ptr. That way, I again have ownership vested in one place and lifetime management is relatively easy. Note that this style of programming applies to all kinds of resources, such as locks, file handles, and thread handles, rather than just main memory. It typically leads to better locality and shorter resource holding times than GC (implying lower overall resource consumption). GC is not a general technique because it deals only deal with main memory.

So, I see garbage collection as a last alternative, rather than a first choice. The C++11 optional garbage collection is excellent for this kind of “litter collection” (of memory, not of general resources).

Epilogue (Debasish Jana): Garbage collection in C++0x is optional. For expert programmers, the preference would be to have a control on allocation and deallocation, or resource management in general. Automatic garbage collection on the other hand helps some programmers to have peace of mind although at the cost of
I see garbage collection as a last alternative, rather than a first choice. The C++11 optional garbage collection is excellent for this kind of “litter collection” (of memory, not of general resources).

some resources occupied for some time as the garbage collection would be running at some time intervals. This means that the automatically garbage collected programs will require some more memory (RAM) to run.

On optional garbage collection in C++0x

Prologue (Debasish Jana): Garbage collection helps in automatic recycling of unreferenced memory. In C++0x, a program can however explicitly request to enable garbage collection or disable garbage collection through use of specific keywords. Two such example keywords are gc_forbidden and gc_required. The gc_forbidden specifies that garbage collection is not to be used. The gc_required keyword specifies that garbage collection must be done to recycle and reclaim unused memory.

Debasish Jana: Can we mix up gc_forbidden and gc_required on case by case basis in same program?

Bjarne Stroustrup: I don’t think so, but I think we are getting far too detailed for this interview. I suspect that if you ask this question you should (instead of or before) be doing a close reading of the standard after a thorough review of your resource management strategy.

On nullptr vs NULL in C++0x

Prologue (Debasish Jana): C++ 98 used to define NULL as the value 0. NULL could be used for putting zero value in some integer variable space or to initialize a pointer to a null value (zero value) indicating that the pointer has not been allocated yet.

Thus,

    int i = NULL;
    char *p = NULL;

are valid propositions in C++98. As in C, the value 0 is implicitly converted to a pointer type as needed. However, this may cause surprises:

    void f(int);
    void f(void *);

Now, if we call f(NULL), then it means f(0) and invokes f(int), not f(void *).

Debasish Jana: How is nullptr different from the earlier definition of NULL which is either 0 or (type *) 0?

Bjarne Stroustrup: In C++, NULL cannot be (T*)0 for any T, so think of it as 0; nullptr differs from 0 in being a pointer

    int* p = 0;   // ok
    int x = 0;    // ok
    int* q = nullptr;   // ok
    int y = nullptr;  // error (good!)
    int z = NULL;    // ok (a problem)

Also, to use NULL you have to #include an appropriate header. I plan to use nullptr consistently and never use NULL or 0 for pointers again.

On design perspective of virtual base classes in C++0x

Prologue (Debasish Jana): In multiple inheritances for the following hierarchy,

class A: public X{}; // X is superclass of A
class B: public X{}; // X is superclass of B
class M: public A, public B {};

Object of class M gets two copies of X subobject, one via A, and another via B. This may result in ambiguities and the ambiguities can be resolved by using scope resolving to the particular subobject. For example, to refer X of A subject we refer as A::<member of X>.

To have single shared subobject of X, we declare and define the classes as follows:

class A: public virtual X{}; // X is virtual superclass of A
class B: public virtual X{}; // X is virtual superclass of B
class M: public A, public B {};

Now, M gets single subobject of X as a shared subobject. The constructor calling sequence from subclass constructor will call the superclass constructor in a topdown manner but in case of virtual super class, the virtual super class constructor is called not by the direct subclass, rather called by the grandchild level subclass i.e. M class constructor will drive the call to the grand parent super class i.e. X class constructor.

In C++, NULL cannot be (T*)0 for any T, so think of it as 0; nullptr differs from 0 in being a pointer

Debasish Jana: Virtual inheritance conceptualizes the notion of complete object or portion of an object for deciding the constructor calling sequence to be allowed to be percolated up to base class constructor or not. Is there any guideline possible or is it completely designer’s prerogative?

Bjarne Stroustrup: Actually, virtual bases are provided to allow sharing of information in a class hierarchy without having to place the shared information in an ultimate base class. This can be very useful for interfaces specified as abstract classes. I find that most of my virtual bases don’t hold data so that default construction is ideal and I don’t have to think about it at all. My rule of thumb is to use constructors with arguments for virtual bases only if you really have to, and in that case the language rules will force you to “bubble up” your calls to the highest level sharing the base.

To be continued...
The previous articles brought out nuances of IT strategy and elaborated the management and the organization strands. This article focuses on various technology characteristics moving on to selection and decision making.

The enterprise network is transforming the very nature of business today with web 2.0 and 3.0 applications from the long-standing old legacy applications. The period of hyperconsolidation and virtualization is resulting in physical and virtual servers in consolidated data centers offering access to consistent data set for all employees. Velocity of change in enterprise networks is accelerating need for application-aware network performance management (Brorovick and Perry, 2010).

There was a time when the CIOs used to discuss whether they had SAP or JDE or some other ERP. Similar conversations on the use of internet and the deployment of private networks were the order of the day. Technology business was used to be a favourite discussion topic in various IT fora. For more than two decades the ‘Technology trends’ used to be a well-attended subject for the IT conferences. Lately the interactions are more around technology efficacy and the business impact of IT. In a way the IT world has graduated from its love for technology to value generation. This transition has resulted in heavier responsibility of technology management in terms of making wiser new investments and better managing available resources. This article brings to the fore issues and challenges.

**Technology advances**

Most believe that the products and technology innovations drive the industry; however the keen observers note that the game changes come through business model innovations. Game changes are really disruptive in nature; they break the rules and change the status quo. Bernard (2009) has cited examples of Pharmaceutical industry drawing upon the events in IT sector. The IT industry has been familiar with the game changers and game makers and has witnessed the evolution over past decades. The productivity gains from virtualization, consolidating ERP and outsourcing have been well acknowledged. It is a drive to rethink IT strategy. Interestingly, while cloud adoption will soar, its first casualty is predicted to be the buzzword “cloud computing.” A parallel may be drawn from the earlier “extranet” trumpeting; the term is hardly noticeable these days although the concept has been well accepted.

For last number of years, articles and papers on technology focused on predicting trends and innovations. The technological advances have always been well received by IT community and even sold to their business counterparts. In recent times one notices somewhat different orientation. It is interesting to watch as more and more professionals talk about ultimate usage of technology. Combining the two, a senior IT professional expressed “enterprises are looking to improve on the gains from virtualization, ERP consolidation and outsourcing by leveraging social media, knowledge management, mobility and cloud computing” (Baker, 2011). People started differentiating between embedded technologies and exposed technologies. Embedded are the ones used in back-office work while the exposed ones are those used directly by customers. It is obvious that both exhibit differing characteristics.

Technology classification has always been a challenging task. Here Table 1 is an example of taxonomy of technologies deployed in poor and developing countries, based on deployment efficacy.

There was a time when IT was considered as ‘black box’. People did not know the processes taking place inside the black box. Over a period of time the IT world started opening up, providing more and more info and getting business people involved in decisions. With the ease of working with computers, internet resources and business pressures, the users and customers now focus on outcome.

The additional CIO challenge - The employee expectation

Usage of employee-owned non-standard devices in company network can result in security as well as compliance

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<td>Connect the excluded: provide information like market data, prices, bids and offers; mobile trading platform Dialog Tradenet in Sri Lanka</td>
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Source: Compiled from The Economist (2011)
Usage of employee-owned non-standard devices in company network can result in security as well as compliance issues.

The mobile workforce having a wider choice of end-user devices tend to plug-in these into till-now protected networks. The CSOs clamp tighter controls on such devices restricting downloads and access. Employees on other hand demand more and more relaxation and free usage of new generation gadgets. Mobile devices like iPhones and iPads help in improving productivity by providing mobility and the opportunity to work from off-site locations. However, CIOs are rightly concerned about this trend owing to the new security risks and a potential network management and helpdesk burden that is difficult to quantify but clearly significant (Aruba, 2011). The primary question is distinguishing an employee logging-in using a company-supplied computer from an employee logging in using an employee-owned device. The difference comes in as the company-supplied device usually is secured through regular updates while the employee-owned device may carry vulnerabilities. To win the war against mobile malware and information theft, organizations must develop and be able to enforce clear, in-depth policies regarding the use of removable devices and media within the organization. They must also deploy proactive solutions to this effect (InfoWorld.com, 2011).

Wide choice – the changing scene

Over last decade several alternatives have opened up. The IT companies campaigned for commoditizing the IT services offering wide variety in different forms. The current wave of cloud computing and the earlier drive on out-sourcing have been excellent path-breaking examples. The in-house email servers were decommissioned in favour of specialized email service providers like HP and Google. The ERP servers being hosted in public data centers helped in improving service availability. Such changes also made it possible for a wider user community to access the required application from around-the-globe locations. For some organizations external services posed security threats and Chief Security Officers had to work overtime to establish new controls in place. Adding to the complexity is the inevitable integration of voice, video and data transmission channels and technologies.

The out-sourcing/in-sourcing decisions change the shape and structure of internal IT organizations. The competency requirements have to undergo complete overhaul. At the same time the globalization of organizational business and mobility of users bring certain imperatives for technology infrastructure. The dynamic changes in business on the ground level coupled with choices available establish a new set of characteristics expected of technology.

The desired characteristics

The key to long-term success includes agility, responsiveness to markets and customers, and flexibility in pursuing partnership and acquisition opportunities. The requirement of business partners’ processes entwined through common platform is well met by using a combination of services offered by vendors. A mature EA (Enterprise Architecture) capability offers the potential to guide organizations in these efforts — to link business processes and technology more tightly with strategy, to make better investment decisions, and to adroitly measure the results of those decisions (Trepan and Newman, 2010). The earlier models of heavy in-house investments in servers and application software resulted in the organizations getting locked-in for a period of time.

The key to long-term success includes agility, responsiveness to markets and customers, and flexibility in pursuing partnership and acquisition opportunities.

In the current scene of global economic interfaces and tighter integration, no company wants to be committed to any specific technology or way-of-working. CIO has to build in his strategies in such a way as to break free from such obligations. He needs an infrastructure that is flexible, changeable, agile and cost effective. Cloud computing is touted to meet such requirements. However, CIOs will do well to read the fine-print of vendor contracts, since there are enough lock-ins present to protect vendor investments. This may be a reason the large global enterprises are slow to take to cloud computing whole-heartedly.

Technology assessment

The topic of technology evaluation has been on table for a long time. As early as the 80s the researchers offered technology assessment models based on opportunities for business. One may find examples in ‘opportunities matrix’ of Benjamin et al and ‘ITAA’ model of Huff and Munro. In recent times, Gartner offered a proprietary methodology of positioning technology vendors in ‘magic quadrant’ to help rate the IT vendors in a particular market based on Ability to Execute and Completeness of Vision (Gartner, 2011). Magic quadrant positions technology players into challengers, leaders, niche players and visionaries while plotted on ability to execute vs. completeness of vision. The technology companies make use of such tools for furthering their market positions. As an example SAP AG on March 10, 2011, announced that it has been positioned by Gartner in the leaders’ quadrant of the “Magic Quadrant for Corporate Performance Management (CPM) Suites”. SAP is recognized as a market leader for both its “ability to execute” and its “completeness of vision” (News Financial, 2011).

Huerta and Sanchez (1999) have demonstrated the use of the “evaluation-in-context” to encompass context, process and content as three aspects of technology evaluation. It is interesting to know that Hung and Tseng (2010) have proposed a technology evaluation framework integrating the environmental effects. It is expected that heightened social awareness will force consumers and governments to look for ways to protect environment. An effect of this is already seen under initiatives of ‘Green IT’. The ‘green data center’ has been discussed in the IT world in the recent past.

Technology strategy – guiding principles

Here are four basic principles that help in making decisions on technology.
The model depicted in figure 1 is the diagrammatic representation followed by a mention of IT management model.

1. **Acquisition** - for purchase of equipment and software, people choose either ‘follow the leader’ or ‘follow the cost’ strategy. Under ‘follow the leader’ only branded, very well-known vendor products are acquired. Such a choice is expected to minimize the risk and uncertainty; further decision-making becomes much simpler. ‘Follow the cost’ strategy gives an advantage of lower costs but also likely to increase risk factor due to having acquired somewhat lesser known products. Besides, the future support and availability of upgrades may become problematic.

2. **IT Support and upkeep** - organizations have attempted total internal support as opposed to complete outsourcing; some have adopted hybrid options as well. The decision is impacted by existing internal capabilities, external availabilities, the status of current equipment and applications and finally the cost factor.

3. **Vendor strategy** - there are enough examples on both sides, showing successes and failures of multi-vendor and one-vendor strategy. Gartner (2010) offers excellent discussion on multi-vendor network strategy to contain costs and improve network performance. Equally true is the convenience one gets from contracting with a single vendor; where the vendor carries management responsibility and accountability of getting other vendors involved as required. One may think of such strategic alternatives in other areas like equipment purchases and desktop support.

4. **Standardization** - for quite some time now CIOs have maintained that standard technology implementations lower costs and offer ease of maintenance. Challenging this mandate is the argument that the enforced standardization stifles innovation and creativity. It certainly helps to keep an ear to the ground for gaining information from the external world. Rhodes (2010) found that there is an impact on effective IT use, when decision makers use print and web sources of knowledge. Further he concluded that local consultants add value, as they keep in touch with broader markets covering vendors and customers. The management model is proving to be a vital aspect of technology strategy. Lately in the IT arena one notices a tendency to centralize equipment and authority. The global companies have been concentrating their equipment in data centers under the direct control of their headquarters and centralizing decision-making. To cite an example MacSweeney (2010) reports Blackrock’s mandate “to combine BGI’s technology onto one platform that supports a single, global operating model”. While it is true that the centralization/decentralization work pattern evolves from the guiding principles of the company, the spread of networks and seamless connectivity have prompted many to use the central model.

**Bibliography**

Managing Technology 

Close Encounters of the Open Kind

“A methodologist is like a militant except that you can negotiate with a militant”

Disclaimer:
Let me start with a disclaimer, lest I am misunderstood. I see a lot of merit in promoting open source and as a consultant have recommended to several companies to move to Open Office, which can be managed economically without any guilt of piracy. I admire the passion shown by open source enthusiasts, many of them young and quite committed to the cause. But the pitfalls are not far to see, when passion overrules reason. Quite a few interactions with open source enthusiasts had led me to write this article, though I would tend to believe that these encounters are more exceptions than the rule.

Can you charge for knowledge?

All open source missionaries uniformly tend to show proprietary software as bad in principle and look upon these vendors, primarily Microsoft and Bill Gates - as evil empires. An argument forwarded by one of the Open source experts in one of the CSI seminars was that “when a good is sold from one party to another, there is depletion of good in the hands of the giver and so it is understandable that a compensation needs to be paid to him; but when knowledge is shared, as in the case of software, the knowledge remains in the same quantum with the giver and so the giver has no right to charge”. If this argument is accepted, no teacher can take his salary and no consultant his fee. Through open source movement are we trying to spread the message that intellectual property does not have any value? Such a doctrine would render the entire knowledge economy worthless.

While the open source movement has rendered a large number of software utilities affordable by all, we cannot discount the commercial vendors, who in their pursuit of profit have maintained the quality levels of their offerings high. As if the people who designed Windows were so hare-brained that they did not have any idea of optimization, which open source professionals have mastered. No client can but remain unimpressed with such a promise of big leap forward till the time reality dawns on him after he tests the software. Hyping own product and condemning competition are the usual traits of commercial software industry. By aping the proprietary software world techniques to promote a supposedly healthy alternative, the open source community would be doing a great disservice to the cause.

Could we mandate Open Source by law?

The best was to come in a meeting in which an esteemed judge of Allahabad High Court addressed the audience - a mixture of computer professionals and lawyers - on Open Source. One of the members of the audience wanted to know whether use of open source could be mandated by law. Another member supplemented by saying that many chemical processes have been banned by the Government. Yes, usage of Windows can be banned by the Government, if its lethal effects on human health can be proven, but not until then. I hope the Government would not be ill advised to take up such a move. What surprises me is that we want coercive measures to promote a set of software we believe to be useful to the community. Open source can sustain itself only when it can stand up to the competition of commercial software and not with the help of the props and sops provided by the Government.

In conclusion

Am I exaggerating the fringe opinions? These may be in minority, but they represent a strand of thought in open source community and their voice is often heard more than the sane voices. We need a reasoned debate on the ways and means to make open source platform of choice for mission-critical applications. It would be a pity and a great loss to the software domain, if emotions were to cloud our judgment and in the process open source were to fall into the trap of cults.

About the Author

After three decades of extensive experience in Manufacturing and IT, Ramanathan is currently running his own management consultancy firm. He is an adjunct faculty at IIM, Indore and visiting faculty at Great Lakes Institute of Management, Institute for Financial Management and Research and Bharathidasan Institute of Management. He teaches Technology Management and IT Strategy related topics. He may be contacted at sram@paramconsulting.com
Modelling analytical HR services

Analytical HRM

Business intelligence and analytics have been one of the hot topics. Scope of BI/BA and their applications are wider. However, most of these applications are more customer and product centric and often more focussed on domains like customer relationship management (CRM). Typical CRM activities are divided into two types: operational and analytical. While organizations are extensively using BI tools and techniques such as data mining for analytical CRM to identify (target), attract, acquire, develop and retain their customers well [1][2], they do not use the same tools and techniques in other functional areas such as human resource management (HRM) that rigorously. Even most of the personalisation and recommender systems involve and are modelled on two entities or subjects: consumer (customer, user etc.) and item (product, content etc.) [3].

People in the organization are considered as valuable assets of the organization. They are the back-bone as well as face of the organization. They possess precious tacit knowledge about systems, processes, workflows, culture, experiences of dealing with customers and so on. As customers have issues with the organization so the people working in the organization. They need to be taken care of well in order to achieve higher productivity. Each individual is different. Everyone has his or own educational background, experiences, technical skill-sets, personal agenda, family conditions, temperament and soft-skills. The bottom line is, as the organization has to treat one customer at a time, the organization needs to deal with one employee at a time to offer every employee personalised and unique experiences [4]. For example, offering a job profile to the right employee (based on his or her experience, skills and various other factors) at the right place (e.g. his/her preferred/convenient office location) at right cost (e.g. salary he/she deserves) using the right resources (e.g. office space, equipments and support staff etc.) [5]. Retention of valuable employees is far more important than retention of customers because a loyal and productive employee can handle many customers well to bring value to the organization. So similar to analytical CRM, there is greater scope for analytical HRM.

Data model for analytical HRM

People, resources (including technology) and processes (services) are three major entities of any organization. Data objects that hold information about these generic entities in HR domain can be modelled using analytical data model (ADM) which is based on five basic entities: party, item, transaction, time and location discussed in [5] as shown in table I. Party entity represents and stores information about individual organization and people. Ideally both organization and people play dual roles: consumer as well as provider. Employees use organizational resources (so they are consumers of organization’s resources and organization is provider of those resources) to render services to organization (so they become provider of services and organization becomes consumer of their services). The services (e.g. job profiles) performed by employees and the resources provided by the organization are represented by generic entity item. There are various activities, interactions and operations are performed amongst and by the parties represented using entity transaction. Transactions involve various entities: consumer, provider, item, time and location to reflect who, what, when, how and where etc. Organization and employees have physical addresses, websites, contact mechanisms etc. together modelled by entity location. Apart from basic entities, there can be entities that hold meta-knowledge about the basic entities such categories, hierarchies, types, classes, relationships and roles. For example, each job profile

<table>
<thead>
<tr>
<th>Entity</th>
<th>Sub-type</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Party</td>
<td>Consumer</td>
<td>employee (people within organization, contract workers, prospective employees) organization (employer consuming services rendered by employees)</td>
</tr>
<tr>
<td></td>
<td>Provider</td>
<td>organization (provides resources to the people) employee (provides services to organization)</td>
</tr>
<tr>
<td>Item</td>
<td>Service</td>
<td>job: regular job, task, assignment, project, process</td>
</tr>
<tr>
<td></td>
<td>Resource</td>
<td>money, machines, stationary, office space, work place, documents, vehicles, data, information and knowledge</td>
</tr>
<tr>
<td>Transaction (activity)</td>
<td></td>
<td>hiring, firing, assigning, evaluating, awarding, assessing, providing feedback and rating, promoting, demoting, suspending, imparting training, getting training, sharing, collaborating, connecting, attending, resigning</td>
</tr>
<tr>
<td>Time and location (of resources, parties, activities etc.)</td>
<td>Physical</td>
<td>area, city, state, country</td>
</tr>
<tr>
<td></td>
<td></td>
<td>website, WAP, URL</td>
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<tr>
<td></td>
<td></td>
<td>phone no, email, fax</td>
</tr>
<tr>
<td></td>
<td></td>
<td>train, flight, bus, ship</td>
</tr>
</tbody>
</table>
can have hierarchy (e.g. top, middle and operational management), category (e.g. technical, scientific and administrative) and type (e.g. supporting, supervisory and managerial).

**Process model for analytical HRM**

HR processes can be divided into two basic types: purely operational and intelligent (analytical). There are various activities such as targeting and selecting the right individuals, evaluating performance, setting up right targets, assessment, mapping competencies can be called analytical tasks. These can be modelled using service based approach [6]. Figure 1 shows some of the questions that can help to understand what kind of analytical tasks are involved. The role of employer is assumed to be as consumer and people working in organization as provider. These tasks can be implemented using various intelligent, filtering and data mining techniques in same way as that of analytical CRM. For example, service: personalization can be implemented using content and demographic filtering to recommend the products to the online user based on his or her past buying spending patterns and demographic profile. In HR context, personalization means recommending the most relevant job profile(s) to the employee based on qualification, skill-sets, training acquired, past experiences and demographic characteristics. Similarly, service: targeting in CRM is used to select the right customers (may be prospective) for a specific item (product/service). In HR context, the service: targeting means selecting the right employees (may be prospective) for a specific item (job profile).

Similar to customer centric processes, the employee centric processes can be divided into five phases: identification, attraction, acquisition, development and retention as shown in figure 2. Each of these can involve analytical tasks as shown in figure 3. For example, service: targeting (or connecting) the right prospective employees for a job profile is part of phase: identification. These phases can be followed for specific type of job profile. It is possible an employee may not be suitable for a particular job but be identified for another kind of job where he or she is better fit and suited.

**Support of KM and Web 2.0**

People possess tacit knowledge. Organizations have been opting for knowledge-management systems to extract, store and retain valuable tacit knowledge. Apart from using external web 2.0 resources available worldwide, organizations are adopting to web 2.0 (more meaningful, standard, structured and people web) technologies internally to become enterprise 2.0 which facilitate to create, collaborate, share, exchange, search, disseminate, integrate and use...
information, knowledge and applications across the organization and stakeholders. These involve blogs, wikis, reviews, feedbacks, mashups, social networking and so on. These all provide valuable knowledge and supplement to analytical and collaborative HRM.

References
IBM is marking the 100-year anniversary of its founding on June 16, 1911, with a year-long global initiative. The company will reexamine the history of technology innovation and predict where the world will be in the next 100 years. IBM will use this milestone to engage with business leaders, academia, clients, and local communities in the 170 countries the company does business. (Read more about IBM centennial at http://www-03.ibm.com/press/us/en/presskit/32887.wss ) Following is a bird’s eye view of the illustrious journey of the technology company of our time over the past 100 years –

On IBM’s centennial, Wall Street Journal wrote, “Of the top 25 companies that existed on the Fortune 500 in 1961, only six remain there today. ... Demise of most came about because they were unable to simultaneously manage their business of the day and build their business of tomorrow.” To learn more about “How an organization outlives its founder?”, visit http://ibmsmartcamp.wordpress.com/2011/06/16/how-does-an-organization-outlive-its-founder/
Managing Email Stress and Addiction

One of my friends very effectively summarised the e-mail dilemma – he feels very stressed in the morning when he sees dozens of unread mail in his inbox. But he starts feeling blank and anxious if there are only a couple of unread emails in the inbox! There was a time when free email services such as hotmail had severe inbox restrictions limiting storage to a now paltry 5MB. In those days, email management was easy as it was only possible to have a few dozens of emails in your inbox at any time. For the younger generation enticed by email services such as gmail with the call not to delete emails, this is an unthinkable past. Inspite of the great utility of emails, if some of us feel that it has also complicated our life, we may not be far from reality. To complicate things further, many of us hold on to more than one email id and feel tempted to be managing both together.

Alerts, newsgroup posts, social networking site scraps and requests all descend down in your email box. Work, family, hobbies, friends, all compete for your attention and it is a perfect fail-situation for all. There are people, who try to frantically get on top of the problem. There are others, who settle down to become non-responsive and just become passive readers rather than being compelled to reply except in case of work related emails. There are votaries of a challenging proposition - to select all emails one fine morning and delete! Declare yourself an e-mail pauper! The proposers assure that you can live happily ever after! Frankly, even though I am tempted to try, I have not been able to muster enough courage to do this. More acceptable suggestions are the ones like Donaldson-Feilder’s advise of practising the 4 Ds of decision-making:

- **Delete**: half of the emails you get can probably be deleted immediately.
- **Do**: if the email is urgent or can be completed quickly.
- **Delegate**: if the email can be better dealt with by someone else.
- **Defer**: set aside time at a later date to spend on emails that require longer action.

Those, who always archive emails and are always tentative about deleting emails, end up filling up the GB limit in couple of years. Once the inbox starts filling up to near the brim, an additional stress builds up. Services like FindBigmail for Gmail is a big relief in this context. Yet another stress arises from the hidden fear that your email account is broken into by cyber criminals. That it could ruin your personal and professional life if your emails are forwarded to all in your contact list is a fearful thought.

Chain forwarding attention grabber mails is a great way of keeping in touch with minimum effort! This gives email overload for senders and receivers alike. These emails take rebirths again and again. Some of these have been around for almost couple of decades now.

Email checking habits are also very interesting to observe. For most professionals the first thing to do in the morning is to open up the email inbox. Very often it sets the agenda for the day, even when your work priority is already known. Thereafter it is not uncommon to turn from people and paper to the inbox in every few minutes. This adversely affects your ability to maintain long spans of attention. If possible, a preferable habit is to check emails only once an hour or so and also have e-mail-free days. If you are constantly expecting important mails and feel stressed when you cannot access email for relatively long periods, then e-mail addiction is growing in you. It is time to seriously consider managing it.
XBRL stands for eXtensible Business Reporting Language. XBRL is based on popular eXtensible Markup Languages, popularly known as XML. XBRL is a specification for describing XML-based business documents and it aims to exchange the data of financial statements and accounts. XBRL provides an identifying tag for each individual item of data. This becomes computer readable and extractable by computer programs. For example, company earnings per share (EPS) are represented by its own unique tag. The introduction of XBRL tags enables automated processing of business information by computer software, cutting out laborious and costly processes of manual entry and comparison. Intelligent processing of XBRL based data can be done using XBRL-aware computer programs, to extract information and present in a uniform format.

XBRL has gained momentum among business community as a common open standard language to express business reporting. The idea behind XBRL is that instead of putting financial information confined in a proprietary format of a document or software, make it inter-operable as well as based on open standards. The idea of XML is not new. XML introduces a tag based language to express some information. The idea of tags in texts is also not new. We have earlier and popular variants. XML is a variant of SGML (Standard Generalized Markup Language) or popular HTML. Some languages have rich utilities or libraries to parse XML based documents and assimilate the semantics of information and disseminate to the target information that needs to be represented. If not available in a particular language library as a utility, one needs to write code to parse and process XML based documents.

XBRL can handle data in different languages and accounting standards. It can flexibly be adapted to meet different requirements and uses. Data can be transformed into XBRL by suitable mapping tools or it can be generated in XBRL by appropriate software. XBRL is already in practical use for specific purposes in several countries and projects are under way to introduce it in others. XBRL is becoming a standard for the electronic exchange of data between businesses and on the internet for today and tomorrow.

Q How can you swap two integer numbers without using a third variable to store any intermediate result?

A The standard way to swap two variables (applicable for variables which can take assignments) x and y using a third variable working as a temporary variable, like the following:

```c
int tmp = x;
x = y;
y = tmp;
```

But, we need to swap two integer numbers without using a third. Ok, here is a solution.

Say, two variables are x and y

y = x - y (now x = x - (x - y) = y)
y = x + y (now y = y + (x - y) = x)

For example, say x was 8 and y was 7,

y = x - y, makes y = 8 - 7 = 1, x remains as 8
x = x - y, makes x = 8 - 1 = 7, y remains as 1
y = x + y, makes y = 7 + 1 = 8, x remains as 7 (swapped).

Another solution could be to use a programming trick to swap two integers without needing any temporary:

```c
x = x xor y
y = x xor y (now y = x xor (x xor y) = x xor x xor y )
x = x xor y
```

For example, say x was 8 and y was 7, that means bitwise representation of x is 00001000 (8-bit form for convenience) and y is 00000111

x = x xor y, applies bitwise xor with 00001000 and 00000111, x becomes 00001111 (x remains as 00000111 i.e. 7)
y = x xor y, applies bitwise xor with 00001111 and 00000111, y becomes 00001000 i.e. 8 (x remains as 00001111 i.e. 15)
y = x xor y, applies bitwise xor with 00001111 and 00001000, y becomes 00000111 i.e. 7 (y remains as 00000111 i.e. 8) (swapped).

Q What is XBRL? Is it a new standard for business reporting?

A XBRL stands for eXtensible Business Reporting Language. XBRL is based on popular eXtensible Markup Languages, popularly known as XML. XBRL is a specification for describing XML-based business documents and it aims to exchange the data of financial statements and accounts. XBRL provides an identifying tag for each individual item of data. This becomes computer readable and extractable by computer programs. For example, company earnings per share (EPS) are represented by its own unique tag. The introduction of XBRL tags enables automated processing of business information by computer software, cutting out laborious and costly processes of manual entry and comparison. Intelligent processing of XBRL based data can be done using XBRL-aware computer programs, to extract information and present in a uniform format.

Q Recently, I got an email from one of my very close friend that he was on a urgent trip to a foreign country for some assignment. Everything was fine until he got robbed on his way back to the hotel and he lost his wallet, mobile phone and some valuables during this incident. He had to block his account and his bank cards immediately the incident happened. He was facing a hard time there because he had no money to clear his Hotel bill and some expenses. And needed urgent financial help. Is this a fake email? I couldn’t contact my friend by any means, as I didn’t have his phone number with me, and when I replied to this email, no reply came. I suspect this is a fraudulent email. Please advise.

A You are right, this kind of email is generally forged. His email account must have been hacked, and this is a spam mail came from that hacked account. You must ignore this kind of fraudulent email. Your email host should normally detect that it’s a spam and may show you the warning that the content of the email is suspicious; so you should treat this as spam. Fraudsters send forged e-mails claiming all different things like that your bank account has been de-activated/suspended, and ask you to let them know your personal information in the name of security, information like credit card number, personal identification number (PIN), passwords etc. Sometimes, there could be phishing where internet cheaters send spam mails to tempt personal and financial information. A general advise is that you should not always trust the name or address in the “From” field alone, as this can be easily compromised. Clicking on fake links may take you to fake website to capture your confidential information. And, also don’t reply to such fake emails. Such e-mails attempt to express a notion of urgency or threat.

Send your questions to CSI Communications with subject line ‘Ask an Expert’ at email address csic@csi-india.org
The following India specific ICT news and headlines during the period May 23 - Jun 25 have been compiled from various news & Internet sources including the financial daily, The Hindu Business Line

**Voices & Views**
- According to IBM’s annual ‘X-Force 2010 Trend and Risk Report, India ranks top for phishing email origination in 2010 at 15.5%, followed by Russia at 10.4%. Over 8,000 new vulnerabilities were documented globally, a 27% rise from 2009.
- As per a report from Cisco, India’s Internet traffic will grow 9-fold by 2015, growing at 55% and will reach 1.1 exabytes a month in 2015, equivalent to watching 273 million DVDs. Mobile data traffic will grow 114-fold between 2010 and 2015. Globally, the number of network-connected devices will be more than 15 b, twice the world's population, by 2015. Internet traffic will quadruple to reach 966 exabytes a year. Internet video traffic will be 63% of all consumer traffic in 2015, up from 20% in 2010.
- According to Nasscom, India’s IT and BPO exports jumped 18.7% during fiscal 2011 to $59b representing 26% of overall exports and 11% of services revenue.
- “India should be ‘launching pad’ for product firms. We should have at least 500 product companies in the next five years and around 2,000 by the year 2020” -- Mr. Som Mittal, President, Nasscom.
- Indian software exports to aerospace industry have crossed the $500m mark in 2010-11.
- Out of the $59b software exports from India, engineering services segment contributed $ 9 b.
- According to a survey by Deloitte, about 74% respondents said they would change operator if their current operator did not provide 3G access.
- According to CyberMedia Research, the aggregate market size of domestic IT services and IT products sector is likely to touch Rs 2,33,930 cr by 2014, growing at 17.3%.
- The High-Level Committee on Financing Infrastructure estimates that the telecom sector would require an investment of Rs 6.5 lakh cr during the 12th Plan.
- It is estimated that the total subscriber base will increase to 1,200 million by 2017, from 846m at present.

**Government, Compliance**
- The tax authorities feel that onshore contracts that involve deployment of software professionals at client site overseas should not be eligible for tax benefits in India. Nasscom disagrees.
- After cross-border terrorism, India now plans to take up another form of incursion with Pakistan – that of cross-border spectrum interference.
- DOT is backing a proposal to reserve 30% of all electronic equipment procurement to those items that are manufactured in the country.
- Nasscom has hit back at a British parliamentary committee report that criticised the sector’s use of an entry route for its workers into the UK.
- Mr Sam Pitroda, and Mr Montek Singh Ahluwalia, to assist the JPC, probing the irregularities in telecom licensing, spectrum allocation and their pricing.
- After Blackberry and Nokia, an application Tiger Text (which allows users to send messages, text and video, without leaving any trail) running on iPhone has come under the scanner.
- 2G: JPC to summon all Telecom Ministers since 1998.
- Concerned over the adverse impact of the recent US visa restrictions on Indian companies, Govt. plans to take up the issue with US.
- The Govt. has set up a high level committee which includes Mr Sam Pitroda and Mr Nandan Nilekani, to monitor the implementation of the National Optic Fibre Network (NOFN) project.

**IT Manpower, Staffing & Top Moves**
- One-fifth of the total fresh hires (35000-40000) for IT services companies this year is likely to be from Tier 2 and Tier 3 towns.
- The middle level women IT professionals who had quit Mahindra Satyam are likely to be offered jobs again through a lateral recruitment initiative christened “Starting Over.”
- Mr Arun Jain, CMD and Founder of Polaris Software Lab, has set a precedent for other entrepreneurs to follow by not taking any salary or bonus.
- Hundreds of employees of DQ Entertainment have protested against alleged denial of hikes in salaries for 2011-12 as they had received only one hike in the last four years.
- BPO company Vertex plans to double Indian headcount to almost 13,000 by Sep 2012.
- Wipro Infotech plans to hire 7,000.
- “There are around 4m people in IT/ITES industry, and in the next five to six years, there will be 20m graduates in this industry, making this the largest employer of graduates in the country.”
- CA Technologies plans to recruit 800 employees for its India operations.
- Steria to scale up its India delivery headcount to 8,000-9,000 employees from 6000 by 2014.

**Company News: Tie-ups, Joint Ventures, New Initiatives**
- Intel plans to bring in security cover embedded at the chip level, making it difficult for hackers to barge into the systems.
- Google’s ‘Street View’ feature, starts operations in India starting from Bangalore. But Bangalore Police blocks Google’s Street View on security concerns.
- Navteq, a map and traffic data provider, plans to launch its version of a panoramic view of key locations in the country like Google Streetview.
- Tata DoCoMo launches an Internet access device that allows subscribers to jump 3G, CDMA & Wi-Fi.
- After iPod, iTunes, iPhone, iPad, Apple unveils ‘iCloud’ – the online sync service that will allow its customers to share music, photos and files across multiple Internet-linked gadgets.
- IBM celebrates its 100th birthday on 16th Jun 2011.
Over past couple of decades, software patterns have evolved as a major conceptual tool in aiding the process of software making while moving the process from art to science to ensure more elegant software, which is based on tried and tested software expertise and proven techniques and tactics. As the title of the book suggests, this book is focussed on patterns for making software that is intended to run on many processors. These processors may all be packed onto a single chip (multi-core processors), into one box (a multiprocessor or parallel computer) or may be separate autonomous machines connected by a network (a distributed system). In all these cases, each processor works on part of the problem, and they all proceed together towards a single objective exchanging data during the process. Thus, a parallel program or application is a set of steps that execute simultaneously, communicating among themselves to achieve a common objective. While designing such a program, one has to deal not only with problems and issues present in programming single processor computers, but also with those that arise from concurrent or simultaneous execution of processes. Due to this, designing parallel program can be difficult and sometimes frustrating. The book takes into account such difficulties and addresses complexity and aspects that arise due to partitioning of an algorithm and its data, as well as impact on performance due to overheads involved in synchronisation among processes and processors.

While first chapter provides basic concepts related to software patterns – their definition, description, mining, language and systems and categories, second chapter introduces common concepts and elements of parallel programming. Later patterns for parallel software are presented – first the Architectural Patterns for Parallel Programming, commonly used in the composition of parallel software design, next the Design Patterns for Communication Components, useful for designing subsystems that enable communication between and among parallel components and then the Idioms for Synchronisation Mechanism, which provides description of synchronisation techniques in some parallel programming languages. Two case studies are presented as broader examples to illustrate the use of various patterns described earlier for creating design for problems that require high-performance solution. One case study is about ‘Blood Vessel Segmentation’. It addresses the problem of retinal microvasculature measurement and analysis of patient’s retinal blood vessels, which is done for diagnosis of cardiovascular diseases or diabetes. Second case study is about developing ‘Adaptive 3D Grid-Based Eulerian (Gasdynamic) Program’, which is based on an adaptive Eulerian (grid-based) magneto-hydrodynamic application. Both the case studies present the steps involved in pattern-based software design method. Derived from these examples, a common general method for parallel software design is explicitly described in a separate chapter. It is based on concepts of co-ordination, communication and synchronization, which are the unifying elements of concurrent, distributed and parallel programming.

The book is a recommended text for those, who intend to develop better parallel software applications and infrastructure and also for those, who intend to have a thorough coverage of the key pattern-oriented software architectures that are shaping the next-generation of parallel software. The edition is a specially re-printed student edition restricted for sale only in India and some nearby Asian countries.

Pattern Oriented Software Architecture

This is also a re-printed edition as a special student edition with restriction on sale only in India and few nearby Asian countries. The original book was published in 1996 and is a well-known text and reference guide on Software Patterns – especially the Architectural Patterns. The book elaborately explains the concept of software patterns – which it calls as the ‘grass roots’ effort to build on the collective experience of skilled designers and software engineers. It supports both novices as well as experts in software development and helps novices to become experts on modest-sized projects, without having to gain several years of experience.

The book categorizes software patterns into three categories viz. Architectural Patterns (high-level patterns useful at the early decomposition stage during software design), Design Patterns (mid-level patterns useful for designing subsystems) and Idioms (Code-level patterns, useful during implementation). The patterns are further grouped into sections based on their utility - e.g. architectural patterns are grouped into ‘From Mud to Structure’, ‘Distributed Systems’, ‘Interactive Systems’ and ‘Adaptable Systems’. This grouping helps in selecting a pattern for its application while designing an architecture for a given problem. Various architectural patterns such as Layers, Pipes-and-Filters, Blackboard, Model-View-Controller, Presentation-View-Controller, Broker, Microkernel and Reflection are described in detail in the book.

The section on design patterns provides in depth description of many patterns other than those already described in Design Patterns by gang-of-four. Some of these are Whole-Part, Master-Slave, Command-Processor, View-Handler and so on. The book provides description of how to go about applying patterns while creating design and emphasizes on how patterns help create software systems with desired properties. It provides information about the pattern community and explains in detail about how patterns are mined.

The book is a mandatory reading for those involved in developing and designing mid-sized and large-sized projects.
CSI and Springer jointly announce the launch of CSI Transactions on ICT

The formal launch culminated in the signing of an MOU between Computer Society of India and Springer India Pvt. Ltd.

Speaking on the occasion, Mr. Agarwal traced the steps taken by CSI to promote research. Mr. Mahalingam described the great advances that have taken place in India in the ICT application and how IT industry itself has contributed to the growth of India. Prof. Raghavan said that the Transactions on ICT, with its focus on what is happening in India, is an attempt at institutionalizing the Knowledge being created in India. He further said that we are beginning with one Transaction on ICT published every quarter, dealing with six areas. The intent is to quickly move to six publications (Table 2).

Mr. Sanjiv Goswami, M.D. of Springer India, spoke of the great development of scientific research and output from India and how Springer wanted to bring to India high quality publications. Mr. Paul Manning, President, Apress and EVP Computer Science, Springer spoke of the need to make new friends in the Indian Computer Industry and work closely with them.

In a thought provoking speech, Dr. R. Chidambaram spoke on “Vision for Science and Technology in India”. He talked of how aligned Indian Industry is at this time to benefit from the research outputs and that this new initiative has come at the most appropriate time.

<table>
<thead>
<tr>
<th>Table 1: Advisory Council</th>
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</thead>
<tbody>
<tr>
<td>1. Dr. R. Chidambaram, Principal Scientific Advisor to Government of India</td>
</tr>
<tr>
<td>2. Mr. S Ramadorai, Vice Chairman, Tata Consultancy Services</td>
</tr>
<tr>
<td>3. Mr. Kiran Karnick, Former President, Nasscom</td>
</tr>
<tr>
<td>4. Mr. S. Mahalingam, Executive Director &amp; Chief Financial Officer, Tata Consultancy Services</td>
</tr>
<tr>
<td>5. Prof. S. V. Raghavan, Scientific Secretary, Office of the Principal Scientific Advisor to Government of India</td>
</tr>
</tbody>
</table>

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<tr>
<th>Table 2: CSI Transactions on ICT</th>
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<tbody>
<tr>
<td>1. System and Architecture</td>
</tr>
<tr>
<td>2. Software Design and Performance</td>
</tr>
<tr>
<td>3. Cyber and Information Security</td>
</tr>
<tr>
<td>4. Education, Health and Agriculture</td>
</tr>
<tr>
<td>5. Economics, Practice and Management</td>
</tr>
<tr>
<td>6. Computing and Computational Science</td>
</tr>
</tbody>
</table>
CSI proposes to set up several Centers of Excellence across the country that would offer training on contemporary topics of high industry relevance. CSI will periodically conduct examinations to evaluate the skills of qualified professionals/students and award CSI professional certifications. This endeavor will be a three-way partnership between CSI, a chosen academic institution and a well-established technical expert.

Volunteering institutions are sought from among CSI Academic Institutional Members for jointly setting up centers of excellence. Each center will focus on one or more industry relevant CSI certification program. The topic for certification will be decided in consultation with industry. CSI will bring in technical experts with expertise on the topic. The expert will define curriculum, develop course material inclusive of lab exercises and question bank. He/she along with a delivery team will also deliver first few set of training programs and train faculty member(s) of the collaborative institution to be trainers for subsequent programs. Collaborating institutions will provide the following:

a) "Complete training and examination infrastructure (Class room with LCD, Audio, White board, Computer laboratory with required connectivity, software for hands on training, program coordinator and Examination hall with invigilators).

b) Depute faculty for "Train the trainer" model.

c) Sign-up an agreement to conduct the program exclusively through CSI.

*Training and certification examinations can be arranged on convenient weekend / Holidays without interruption to regular academic programs of the Institution

CSI will an attractive revenue model that will benefit collaborating institutions rendering above services. Brand equity of the collaborating institutions will improve by its association with CSI for a prestigious certification. The Institution faculty who would be trained to be trainers will also benefit by knowledge enhancement, which they can pass on to the students in-turn. Volunteering institutions are requested to express their willingness with attached details:

i. Name and Full address of Institution

ii. CSI Inst membership No.

iii. Affiliation Details to AICTE/UGC

iv. Date of establishment, Courses run with capacity for each and total student strength

v. Number of PhDs on faculty

vi. Details of areas on which Institution is pursuing active research

vii. Infrastructure (complete details) that can be shared for the program

viii. Contact person name & designation (Has to be a professor/HOD at the minimum)

ix. Phone & Mobile Number

x. Contact Email-id

xi. Period during which the college facility can be used for the program

xii. Details of collaboration with Industry / International universities/ MoU

xiii. Campus placement details (Total number of students placed at Campus for the last 3 years)

xiv. Undertaking by the head of the institution to abide by all provisions of a mutually agreed collaborative agreement with CSI should accompany the acceptance performa.

xv. Name and designation of the institutional head

All responses are to be sent only through email with subject heading as “CSI Center of Excellence” to yogendra.gahlaut@csi-india.org

This call is an expression of interest. CSI will enter into agreement with selected institutions subject to finalization of technical experts on topics of relevance

Further clarification, if any can be obtained from Yogendra Kumar at above email-id / or Mobile No. +91-9444267101

Last date for response to reach the mail box is 31st July 2011.
CSI proposes to set up several Centers of Excellence across the country on topics of high industrial relevance. CSI will periodically conduct examinations to evaluate the skills of qualified professionals / students and award CSI professional certifications. This endeavor will be a three-way partnership between CSI, a chosen academic institution and a well established technical specialist.

CSI invites IT practitioners with rich industrial experience / academia / Researchers to be technical specialists for the proposed CSI Centers of Excellence. The CSI Center of Excellence will function out of a collaborative academic institution whose facilities and infrastructure will be available for the program. The technical specialist is expected to propose a topic of industrial relevance for CSI certification targeted towards students and IT professionals.

The technical specialist is expected to perform the following:

- Propose the topic for certification for discussion and mutual acceptance by the three partners. It will be a significant plus if the specialist can have the topic and contents vetted by Industry for relevance and employment preference.
- Develop complete course material (PPTs, Student hand-out, lecture notes, Hands-on exercises and question bank for certification examination). The course ware will be reviewed and approved by an expert panel appointed by CSI. The technical specialist will assist in constitution of the panel consisting of potential employer industry representatives. The specialist will incorporate suggestions and modifications proposed by the expert panel.
- Deliver the program for target candidates as well as designated faculty from the host institution.
- Progressive transfer of training delivery capability to designated faculty / others, through “train the trainer” model.
- Assist in evaluation by bringing-in practitioners for examining the candidates.
- Actively enable placement of successful candidates.
- Incorporate suggestions for continuous improvements and program updates as advised by CSI / Industry.

CSI will engage the specialist through an appropriate revenue model that would address development of material, delivery of training and incorporation of updates. Interested volunteers are requested to respond through an email with subject heading as “Tech expert for CSICE” to Yogendra Kumar, email- yogendra.gahlaut@csi-india.org by furnishing the following details:

- Full Name
- Educational qualifications
- Date of Birth & Age
- CSI membership details (If a member)
- Experience profile with details such as employer, Designation, Responsibilities and period
- Current occupation with name, designation & address of employer
- Complete address for communication
- Contact Phone No
- Contact mobile No
- Contact email
- Proposed topic:
  a. Break-down into sections, modules and sub-modules with duration for each sub-module (that will be covered) – with total training duration
  b. Complete details of training pedagogy that will be followed (lectures/demo/hands-on/project etc)
  c. Team that will deliver the training (with name, academic qualification, current title, organization, chronological experience - for each team member) – This should include Industry practitioners.
  d. Training infrastructure requirement (Venue details with specification of training aids, lab requirement if any with description of hardware, software, tools and connectivity)
  e. Maximum course capacity
  f. Target audience with entry qualifications
  g. Date by which training material will be ready
  h. Track record (past history) of delivering training

Further clarification, if any can be obtained from Yogendra Kumar at above email-id / or Mobile No. +91-9444267101.

Last date for response to reach the mail box is 31st July 2011.
1. Regional and Chapter level Mentors and Advisors: With a view to realize the target of 100 chapters, 1000 student branches, 10000 institutional members and 100000 members within next 2-3 years, there is proposal to form chapter advisory councils comprising of past chapter chairs, past ExecCom members and CSI Fellows residing in and around the host city/town of the chapters. There is also specific proposal to nominate Regional and Chapter level mentors and advisors to guide the chapters in each region for CSI membership development and outreach programmes targeting Business, Industry, Government, Academia, Research and Consultancy (BIG ARC) sectors. The senior members from different regions and chapters are requested to come forward and volunteer their expert services for the above. The key result areas (KRAs) are being drafted which would be published on CSI Website and CSI Communications subsequently. The suggestions and inputs for the above may please be sent to the secretary@csi-india.org and hq@csi-india.org on or before 15th August 2011.

2. The HQ Enhancing Support for the Regions and Chapters: In the meeting of National Office Bearers held on 3rd June 2011 at Mumbai, it was decided to nominate specific staff to enhance support to various Regions, Chapters and members concerned. The staff allocation is as follows: Ms. Rashmi Chordiya, rashmi@csi-india.org (Region-1 & 8: Delhi Chapter to be the coordinating chapter), Ms. Sonali Naik, sonali@csi-india.org (Region- 2 & 4: Kolkata Chapter to be the coordinating chapter), Mr. S M Fahimuddin Pasha, fahima@csi-india.org (Region-3 & 6: Mumbai Chapter to be the coordinating chapter), Ms. Shruti Rane shruti_rv@csi-india.org (Region- 5 & 7: Chennai Chapter to be the coordinating chapter). The Key Result Areas (KRAs) for the staff and stakeholders will be circulated subsequently. The RVPs, Chapter Chairs and members concerned are requested to address their requirements and needs to the aforesaid staff pertaining to their regions. They may escalate the issues to Mr. Suchit Gogwakar, Executive Secretary, hq@csi-india.org with cc to Prof. H.R. Vishwakarma, Hon. Secretary, secretary@csi-india.org if there are undue delays on part of the staff.

3. Proposal for eMemberships of CSI: There have been several suggestions towards offering eMembership of CSI, keeping in view the similar practices and services in other leading societies including IEEE and ACM. There are specific proposals for eMembership for life and annual subscription under consideration. The chapters, student branches and members at large may send their inputs and opinions to the secretary@csi-india.org and hq@csi-india.org on or before 25th July 2011.

4. Norms and General Guidelines for Chapter Elections: The Chapters Revamping Committee Convener Dr. SC Bhatia has drafted an excellent set of norms and general guidelines for chapter elections- the same is under review by the Chairman Nominations Committee, Hon. Secretary & Chairman, Membership Committee. The norms and guidelines will be published on CSI Website and in CSI Communications for the perusal and comments of the members at large. The norms and guidelines will be applicable wef for this year after due approval by the ExecCom. The suggestions and inputs for the above may please be sent to the hq@csi-india.org with cc to secretary@csi-india.org and on or before 15th August 2011.

5. Best Practices Success Stories of the Chapters: The six leading chapters at Mumbai, Kolkata, Delhi, Chennai, Hyderabad and Bangalore have been advised to share their best practices and success stories among other CSI chapters across India. The active and vibrant chapters across India could handhold the newly formed chapters as well as explore forming chapters in cities/towns where there are no chapters at present.

6. Inauguration of New Chapters at Varanasi and Jhansi: The newly formed chapter at Varanasi was inaugurated on 19th May 2011 by Prof. P. Thirumurthy, Chairman, Academic Committee & the Immediate Past President in the presence of Prof. H.R. Vishwakarma, Hon. Secretary & Chairman, Membership Committee, Dr. R.K. Vyas, Regional Vice President (Region-I), Prof. A.K. Nayak, Chairman, Nominations Committee and CSI members (institutional and individual categories). Another new chapter at Jhansi was inaugurated on 10th June 2011 by Prof. H.R. Vishwakarma in the presence of Dr. R.K. Vyas, Regional Vice President (Region-I) and CSI members (institutional and individual categories) in and around Jhansi. A new CSI student branch was also inaugurated at the SR Group of Institutions Jhansi in the presence of Mr. S.K. Rai, Chairman of the group. A new student branch at IIBM, Patna was also inaugurated by Prof. P. Thirumurthy in the presence of Prof. H.R. Vishwakarma, Hon. Secretary, Prof. UK Singh, Prof. AK Nayak and faculty and students of the institute.

7. Proposal of Formation of New Chapters: The ongoing efforts of several months towards new chapters in the Region-V have yielded good results with the proposals coming forth from Mangalore and Hubli (both in Karnataka) and Tirupati-Chittoor (Andhra Pradesh). The proposal will be submitted for ExecCom approval in its next meeting scheduled during 23-24 July 2011 at Bangalore. There are early indications from the Region-III and Region-VII about a few new chapters coming up there.

8. CSI Association with Technical Universities: During several visits and interactions across India, there have been proposals for strengthening CSI association with the State Technical universities, giving their potential and strength of faculty members and students at affiliated engineering colleges. The notable among these, who have shown keen interest, include the states of Uttarakhand, Uttar Pradesh, Madhya Pradesh, Rajasthan and Bihar. The aim/objectives and generic guidelines for such collaboration are being drafted for the consideration and approval by the ExecCom. The chapters and student branches may send their suggestions and proposals to nsc@csi-india.org with cc to director.edu@csi-india.org and secretary@csi-india.org.

9. Catching them Young: As per the amended constitution and bye-laws, now the students in the 11std above are eligible to join as CSI student member. The Director (Edu) and National/Regional/State Student Coordinators are in the process of preparing specific action plans for the Schools such as teachers training and student academic and personality development programmes. The chapters, student branches and members at large may please send their inputs and suggestions to nsc@csi-india.org with cc director.edu@csi-india.org on or before 15th August 2011.
CSI Collaborations

CSI National/International Collaboration and Inter-Societies Interaction

It is a matter of pride for us that the CSI reaches a new zenith in this arena with formal agreements with over 15 national/international organizations – including consortia, professional societies, industry, academia and research. A brief summary is appended herewith:

1. **CSI Represents India in the IFIP:** International Federation for Information Processing (IFIP) is an umbrella body consisting of the leading National Computing/IT Societies in the world including IEEE Computer Society, ACM and SEARC. Formally IFIP is a non-governmental, non-profit umbrella organization for national societies working in the field of information processing. It was established in 1960 under the auspices of UNESCO as a result of the first World Computer Congress held in Paris in 1959. Since its inception, the CSI has been representing India in the IFIP and has been striving to bring IFIP events and technical activities to India. The IFIP President, Mr. Leon Strous, visited India on 28th May 2010 and interacted with the CSI National Office Bearers in Mumbai to strengthen the joint IFIP-CSI programmes in India. The CSI President nominates a list of CSI Representatives to serve on 14 IFIP Technical Committees following a blended approach of continuity and change. The role and responsibilities of these representatives include working at various levels in IFIP TCs, bringing high-quality IFIP events to India and to enhance global visibility for CSI programmes and activities.

2. **CSI an earliest member of SEARC:** The South East Asia Regional Computer Confederation (SEARC) is a 10-member nations’ organization, established on 28th February 1978. Apart from hosting SEARC international conferences, the Computer Society of India has also been reaching out to the School students in the South-East Asian region through the SEARC International School Software Competitions. The SEARC-2011 will be hosted in September 2011 at Mumbai under the leadership of Mr. MD Agrawal as the CSI President and SEARC Vice President.

3. **CSI a founding member of the Engineering Council of India (ECI):** The ECI is an apex organization with over 27-member professional societies as its members. The ECI is a key founding member of the ECI, since its inception on 4th April 2002. At present, the ECI and its member professional societies are working on the Engineers bill proposed for introduction for discussion in the Indian parliament. The other major initiatives of the ECI include (a) proposal for the National Proficiency Evaluation Test (NPET) for the engineers in India and (b) a set of recommendations for major overhaul of engineering curricula in India.

4. **CSI’s recent initiatives:** The Computer Society of India has recently revived and revitalized its association with the IEEE (including its IEEE Computer Society) during the IEEE 125 years’ celebrations in Bangalore on 29th August 2009, wherein Dr. John Vig, the IEEE President and Prof. HR Vishwakarma on behalf of CSI exchanged the copies of MoU. Mr. S. Mahalingam, the then CSI President and Mr. Michiel Van der Voort, Executive Director-International of BCS exchanged the copies of the MoU in January 2010. Mr. MD Agrawal, the then CSI Vice President and Mr. Satish Babu played crucial roles towards CSI’s newest collaboration with the C-DAC and Project Management Institute formalized on 28th June 2010 at Trivandrum. Prof. P. Thrimurthy, the then CSI President revived the CSI previous collaborations with the DOEACC and the IE (India) in July 2010.

The complete details are available at [http://csi-india.org/web/csi/collaborations](http://csi-india.org/web/csi/collaborations).

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**Announcement**

CSI Discover Thinking Quiz – Call to CSI chapters

CSI Discover Thinking quiz which was started for young learners (classes 6 to 9) last year was successfully held across various chapters culminating in a National Finals at Coimbatore (visit [www.csidiscoverthinking.com](http://www.csidiscoverthinking.com)). It is proposed to hold the quiz at the Chapter, Regional and National levels during October-November this year.

Chapters will be provided guidelines for conduct of the chapter level quiz prelims. Any one chapter from the Region will host the Regional round where finalists from all chapters will participate. The Regional winners will contest in the National Finals.

CSI will provide partial support through grants at the various levels which can be augmented through local sponsorships. Chapters desirous of hosting the Chapter Level and Regional Level rounds may send in their intent to [nsc@csi-india.org](mailto:nsc@csi-india.org) before 25th July.
From CSI Chapters »

Please check detailed news at:

**SPEAKER(S) TOPIC AND GIST**

<table>
<thead>
<tr>
<th>ALLAHABAD (REGION I)</th>
<th>28 May 2011 : Technical Lecture on - “Data Mining and Knowledge Engineering: Challenges and Opportunities”</th>
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<tr>
<td></td>
<td>Prof. Vyas introduced Knowledge Engineering and evolution of Data Mining as perspective and proactive information delivery systems. He informed how Data Mining is used as the process of extracting patterns from large data sets by combining methods from statistics and artificial intelligence with database management. He discussed about four classes of Data mining i.e. association rules learning, clustering, classification using supervised learning &amp; regression and concluded the talk with discussion about challenges faced in management of hybrid data management systems due to diversity of data formats and various reasons in developing a general unifying theory for Data Mining solutions.</td>
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<tr>
<th>DEHRADUN (REGION I)</th>
<th>30 April 2011 : One-day Regional Workshop on “Image &amp; Signal Processing using MATLAB”</th>
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<td>The expert explained MATLAB (matrix laboratory), which is a numerical computing environment and fourth-generation programming language. MATLAB users come from various backgrounds of engineering, science, and economics. The participants were also given the opportunity to use MATLAB during lab sessions. Image and signal processing have a variety of applications, for example, health care, disaster management, information security, exploration, etc.</td>
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<tr>
<th>GHAZIABAD (REGION I)</th>
<th>30 April 2011 : National Seminar on “Convergence of Database &amp; Communication Technologies (CDCT-2011)”</th>
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<td>The seminar had two technical sessions: 1. Technological Advancements &amp; Research Directions and 2. Design &amp; Deployment issues in Databases. Prof. Kak touched upon various issues required for research. Mr. Subhash Verma spoke about the latest developments taking place in the IT Industry. Mr. Manoj Tandon said that the converging technologies are leading to a different kind of environment. Mr. Bohitesh Mishra, Chief Technology Officer, TIGERS Connect Trans Systems, Noida delivered a talk on the development of Indian Railway Reservation System.</td>
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<th>JHANSI (REGION I)</th>
<th>11 June 2011 : Expert Talk on “Data Mining and Data Warehousing”</th>
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<td></td>
<td>Jhansi chapter and SRGI Student Branch (first in Bundelkhand) were inaugurated. On this occasion, Prof Vishwakarma delivered a talk on Data Mining and Data Warehousing for the benefit of faculty members and students.</td>
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<inuguration program in progress.>
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<tr>
<th>SPEAKER(S)</th>
<th>TOPIC AND GIST</th>
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<tr>
<td>GWALIOR (REGION III)</td>
<td><strong>Mr. Deepak Shindey</strong></td>
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<td>“Knowledge Engineering is a technique applied to build intelligent systems such as - Expert Systems, Knowledge Based Systems, Knowledge based Decision Support Systems, Expert Database Systems etc.” - Dr. Dickson Lukose</td>
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<td></td>
<td><strong>29 March to 2 April 2011</strong> : Computer Training Programme “Data Mining and Knowledge Engineering: Challenges and Opportunities” <strong>Staff of Saraswati Sangh Middle School, Gwalior.</strong></td>
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<td><strong>Dr. Kamal Raj Pardasani, Professor, MANIT Bhopal</strong></td>
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<td>The basics of the Computer and its operational training was imparted to Staff of Saraswati Sangh Middle School, Gwalior.</td>
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<td></td>
<td>He stressed upon Data Mining and Data Warehousing too.</td>
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<tr>
<td>UDAIPUR (REGION III)</td>
<td><strong>Dr. Sorel Reisman, G. Prabhakar, RP Gupta, Satish Babu, Dr VR Singh, RK Sanan, Dr Dharam Singh, Anil Srivastava, SS Chahal, RC Purohit, Sanjaya Singhal</strong></td>
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<td></td>
<td>Mr. RP Gupta said that Computer and Communications networks are key infrastructures of the information society with high socio-economic value as they contribute to the correct operations of many critical services. Mr. Sanjaya Singhal, MD Secure Meters Ltd., presented his views saying, “Engineers have a bigger role in society than just being inventors.”</td>
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<td>BANGALORE (REGION V)</td>
<td><strong>Suresh Thiagarajan, Service Architect, Start Run Training Academy</strong></td>
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<td><strong>23 April 2011</strong> : Workshop on “First Steps in Project Management (PM101)”</td>
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<td>The workshop demonstrated typical issues faced by project managers through a case study. Various techniques for defining scope, estimation and arriving at SDLC (SW Development Life Cycle) were demonstrated with hands on exercises. An excel-based simulation tool that can be used for estimating maintenance requests was provided to the participants. A greater emphasis on planning part was highlighted consisting of detailed processes, granular level scheduling, risk analysis &amp; mitigation, training and configuration management plans. The workshop concluded with an important note to capture the best practices and lessons learnt at the end of the project.</td>
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<td>COCHIN (REGION VII)</td>
<td><strong>Prof. Santhosh Kumar G.</strong></td>
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<td><strong>11 May 2011</strong> : Talk on “The World of Sensor Networks”</td>
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<td>The talk was organized as a part of the National Technology Day Celebration. It gave a good overview of sensor technologies, starting from simple introduction to the field of wireless sensor networks, sensor network designs and applications.</td>
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## COCHIN (REGION VII)

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<tr>
<th>Event</th>
<th>Organizer/Partners</th>
<th>Details</th>
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<tbody>
<tr>
<td>14 May 2011: Training Programme for School Children</td>
<td>Ms. Mini Ulanat and Ms. Manjusha Devi Programme in partnership with M/s. Nitta Gelatin India Limited</td>
<td>The objective was to raise the level of computer education and awareness among children from the state run schools and help disadvantaged children realize their full potential.</td>
</tr>
<tr>
<td>17 May 2011: Talk on “Better Life in Rural Communities with ICT”</td>
<td>Prof. Poulose Jacob</td>
<td>The talk was organized on the occasion of World Telecommunication Day. It gave an overview of the various e-governance programmes initiated worldwide emphasising the activities led by Govt. of India under NeGP.</td>
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## TIRUCHIRAPALLI (REGION VII)

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<th>Event</th>
<th>Organizer/Partners</th>
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<tr>
<td>5 May 2011: Seminar on “Cloud Computing”</td>
<td>Prof. Inder Singh Mahajan</td>
<td>The speaker explained basic concepts of cloud computing and the difference between cloud computing and grid computing. He also explained about the different types of clouds.</td>
</tr>
<tr>
<td>14 June 2011: Guest Lecture on “Pervasive Computing”</td>
<td>Prof. P Valarmathi</td>
<td>“Pervasive computing (also called ubiquitous computing) is the growing trend towards embedding microprocessors in everyday objects so they can communicate information.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Courtesy: <a href="http://searchnetworking.techtarget.com/definition/pervasive-computing">http://searchnetworking.techtarget.com/definition/pervasive-computing</a></td>
</tr>
</tbody>
</table>

## TRIVANDRUM (REGION VII)

<table>
<thead>
<tr>
<th>Event</th>
<th>Organizer/Partners</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 April 2011: Technical Talk on “Malayalam Wikipedia Awareness”</td>
<td>Dr. Fuad Jaleel, Wiki Volunteer Editor</td>
<td></td>
</tr>
<tr>
<td>27 April 2011: Technical Talk on “Applications of Poly Average Technique for Entrance Examination Ranking”</td>
<td>Dr. R. Purushothaman Nair, Scientist /Engineer SE</td>
<td></td>
</tr>
<tr>
<td>11 May 2011: Technical Talk on “Dynamics of Public – Police Communications”</td>
<td>Mr. B Krishnakumar, Assistant Commissioner of Police, Kerala Police</td>
<td></td>
</tr>
<tr>
<td>20 May 2011: Lecture on “Cloud Computing”</td>
<td>Mr. S R Nair, Managing Director, Team Frontline</td>
<td></td>
</tr>
<tr>
<td>SPEAKER(S)</td>
<td>TOPIC AND GIST</td>
<td></td>
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</tr>
<tr>
<td>Mr. Sinoj Mullangath, Head, User Experience Team, Symantec-India</td>
<td>28 May 2011: Workshop on “Engineering Mobile &amp; Web Applications for Better Usability”</td>
<td></td>
</tr>
<tr>
<td>Dr. Vikram Kumar B.T., Director (Training), UST Global, Technopark, Trivandrum</td>
<td>8 June 2011: Technical Talk on “Human Aspects of Project Management”</td>
<td></td>
</tr>
<tr>
<td>Mr. N T Nair, Chief Editor, Executive Knowledge Lines Monthly</td>
<td>15 June 2011: Technical Talk on “Information and Communication Technologies for Common Man – Engineering Challenges”</td>
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</tr>
</tbody>
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### From Student Branches


<table>
<thead>
<tr>
<th>SPEAKER(S)</th>
<th>TOPIC AND GIST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. N S Chodhary, Mitesh Gupta, Aquib Khan, Mayank Agrawal, Vishal Patidar</td>
<td>Oath Ceremony of CSI Student Branch</td>
</tr>
<tr>
<td>Dr. P K Chande, Prof. H R Vishwakarma, Dr R K Dutta, Prof. Karmeshu, Prof. N S Chaudhary, Prof. Poonam Sinha</td>
<td>9 to 11 June 2011: National Conference on “Information Technology, Networking &amp; Automation”</td>
</tr>
<tr>
<td>Dr. Chande gave key-note speech on Knowledge Management. Dr. R K Dutta delivered a lecture on “From Distributed to Cloud Computing”. A lecture on “Performance Evaluation of Communication Networks” was delivered by Prof. Karmeshu from JNU, New Delhi. Another lecture was delivered by Prof. N S Chaudhary, who talked about 2-SAT and 3-SAT problems. Prof. Poonam Sinha talked about Mobile Communication Hazards.</td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>ACROPOLIS INSTITUTE OF TECHNOLOGY AND RESEARCH (AITR), INDORE (REGION-III)</th>
<th>14-15 April 2011: National Level Technical Festival “Armageddon”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armageddon was a battlefield for building engineers, scientists and researchers. It gave a platform to put forth their vivid skills and at the same time explore the new world waiting for them to conquer. From quiz to workshops, from LAN war to poster making, it had each and every bit incorporated into it. The technical grouping of events being:</td>
<td></td>
</tr>
<tr>
<td>Robotics EC &amp; Mechanical Dept.</td>
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<tr>
<td>Eco Mansion, Shelter Designing and proto construct, Civil Department</td>
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</tr>
<tr>
<td>IT quiz, PC assembling and testing programming capabilities, IT &amp; CSE department and various other miscellaneous events such as paper presentation, technical poster making, mock test and documentary making.</td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>SAGAR INSTITUTE OF RESEARCH TECHNOLOGY AND SCIENCE (SIRT), BHOPAL (REGION-III)</th>
<th>7-8 April 2011: A Technical Test “Treasure Hunt – Khazane ki khozzz...”</th>
</tr>
</thead>
<tbody>
<tr>
<td>The event was organized to test and improve students’ technical as well as logical and reasoning skills. It provided a unique opportunity to the students for developing their skills in team working abilities and finding on the spot solutions to the critical problems.</td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>TECHNO INDIA NJR INSTITUTE OF TECHNOLOGY (TINJIRT), UDAIPUR (REGION III)</th>
<th>7-8 April 2011: A Technical Test “Treasure Hunt – Khazane ki khozzz...” in progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>The event was organized to test and improve students’ technical as well as logical and reasoning skills. It provided a unique opportunity to the students for developing their skills in team working abilities and finding on the spot solutions to the critical problems.</td>
<td></td>
</tr>
</tbody>
</table>

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**OP JINDAL INSTITUTE OF TECHNOLOGY (OPJIT), RAIGARH, CHATTISGARH (REGION IV)**

9-10 March 2011: Workshop on “Ethical Hacking and Information Security-HACKTRACK”

The speaker, Mr. Modi, taught the nuances of Hacking and many tricks to sniff into other’s system. He also made everyone aware of their own system’s security.

**ANDHRA MAHILA SABHA SCHOOL OF INFORMATICS (AMSSOI), HYDERABAD (REGION V)**

Dr. Dipti Misra Sharma, Research Associate Professor, IIIT- Hyderabad

18 April 2011: 4th Prof R Narasimhan Commemoration Lecture on “Information Dynamics in Machine Language and Machine Translation”

Knowledge Engineering is a technique applied for building intelligent systems.

- Dr. C V Ramamohan, Director, AMSSOI, giving his remarks in 4th commemoration lecture

**ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY AND SCIENCES (ANITS), SANGIVALASA, VISAKHAPATNAM (REGION V)**

Dr. Amit Kumar, CEO and Chief Scientific officer of BioAxis DNA Research Center (BDRC)

9 April 2011: A Guest Lecture on “DNA changes with the climate change: truth, myths and the challenges”

5 May 2011: One-day Seminar on “Cloud Computing”

Prof. Inder Singh Mahajan started the session, clearly explaining the basic concepts of cloud computing and the difference between cloud computing and grid computing. He explained about the different types of clouds. He briefed about the security mechanism.

- Seminar on “Cloud Computing” in progress.
<table>
<thead>
<tr>
<th>Date</th>
<th>Event Details &amp; Organisers</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2011</td>
<td><strong>A Seminar on “Cloud Computing” for Industry professionals</strong> CSI Aurangabad chapter</td>
<td>dp@<a href="mailto:gadekar@endurance.co.in">gadekar@endurance.co.in</a></td>
</tr>
<tr>
<td>21 July</td>
<td><strong>Project Management</strong> CSI Mumbai Chapter</td>
<td><a href="mailto:info@csi-mumbai.org">info@csi-mumbai.org</a></td>
</tr>
<tr>
<td>21-24 July</td>
<td><strong>Functional Test Automation Using Selenium</strong> CSI Mumbai Chapter</td>
<td><a href="mailto:info@csi-mumbai.org">info@csi-mumbai.org</a></td>
</tr>
<tr>
<td>22-24 July</td>
<td><strong>ACC-2011: Intl. Conf. on Advances in Computing and Communications</strong> RASET, Kochi, CSI Div.IV &amp; Cochin Chapter, IETE, IE, PMI, Trivandrum, Kerala Chapter</td>
<td>Dr. Sabu M. Thampi <a href="mailto:acc2011.rset@gmail.com">acc2011.rset@gmail.com</a></td>
</tr>
<tr>
<td>23 July</td>
<td><strong>Six Sigma White Belt Certification</strong> CSI Mumbai Chapter</td>
<td><a href="mailto:info@csi-mumbai.org">info@csi-mumbai.org</a></td>
</tr>
<tr>
<td>23-24 July</td>
<td><strong>Advanced Microsoft Excel 2010</strong> CSI Mumbai Chapter</td>
<td><a href="mailto:info@csi-mumbai.org">info@csi-mumbai.org</a></td>
</tr>
<tr>
<td>30 July</td>
<td><strong>Seminar on Systems Engineering – Education and Research</strong> VIT's Software Engineering Division and CSI Vellore Chapter in association with the International Council of Systems Engineering</td>
<td><a href="mailto:Lddhineshbabu@vit.ac.in">Lddhineshbabu@vit.ac.in</a> <a href="mailto:hrvishwakarma@vit.ac.in">hrvishwakarma@vit.ac.in</a></td>
</tr>
<tr>
<td>30 July</td>
<td><strong>Workshop on Software Effort Estimation</strong> CSI Mumbai Chapter</td>
<td><a href="mailto:info@csi-mumbai.org">info@csi-mumbai.org</a></td>
</tr>
<tr>
<td>30-31 Jul</td>
<td><strong>Two-day Workshop on Role of Computing in Better Governance</strong> CSI Kolkata Chapter</td>
<td>Dr. Debasis Jana/Prof. R T Goswami/Dr. Pinakpani Pal, <a href="mailto:csical@gmail.com">csical@gmail.com</a></td>
</tr>
<tr>
<td>August 2011</td>
<td><strong>One-day Seminar on Mobile Application Development Awareness</strong> CSI Kolkata Chapter</td>
<td>Avik Bose, Prof. Phalguni Mukherjee, <a href="mailto:csical@gmail.com">csical@gmail.com</a></td>
</tr>
<tr>
<td>6 August</td>
<td><strong>Annual state student convention</strong> CSI Goa Chapter</td>
<td>Abhay Bhamaiyar <a href="mailto:abhay_bhamaiyar@rediffmail.com">abhay_bhamaiyar@rediffmail.com</a></td>
</tr>
<tr>
<td>15 August</td>
<td><strong>A seminar on “Careers in IT” for students community</strong> CSI Aurangabad Chapter</td>
<td><a href="mailto:bhagwat.kshirsagar@mit.asia">bhagwat.kshirsagar@mit.asia</a></td>
</tr>
<tr>
<td>8-10 Sept</td>
<td><strong>International Conference on e-Governance (ICEG-2011)</strong> CSI SIGe-Gov &amp; Nirma Group with Govt of Gujarat support at Institute of Management, Nirma University, Ahmedabad</td>
<td>Prof. Niytesh Bhatt <a href="http://www.iceg.net/2011">www.iceg.net/2011</a></td>
</tr>
<tr>
<td>17-18 Sept</td>
<td><strong>Exhibition of Computer &amp; Allied Products ECAP 2011</strong> CSI Goa Chapter</td>
<td>Santosh Kamat <a href="mailto:santoshkamat.goa@gmail.com">santoshkamat.goa@gmail.com</a></td>
</tr>
<tr>
<td>22-25 Sept</td>
<td><strong>2nd International conference of bioinformatics</strong> IFIP-TC 5 and Computer Society of India</td>
<td>Dr. Datta or Dr. Kamal Raj Pardasani <a href="mailto:kamalraj@rediffmail.com">kamalraj@rediffmail.com</a></td>
</tr>
<tr>
<td>23 Sept</td>
<td><strong>A seminar on “How to do IT projects” for students community</strong> CSI Aurangabad chapter</td>
<td><a href="mailto:bhagwat.kshirsagar@mit.asia">bhagwat.kshirsagar@mit.asia</a></td>
</tr>
<tr>
<td>October 2011</td>
<td><strong>Emerging trends in Information and Communication Technologies</strong> Guru Nanak Institutions, Ibrahimpatnam, CSI Div. IV and Hyderabad Chapter</td>
<td>Dr. D.D. Sarma, H.R. Mohan <a href="mailto:ddssarma18@yahoo.com">ddssarma18@yahoo.com</a> <a href="mailto:hrmohan.csi@gmail.com">hrmohan.csi@gmail.com</a></td>
</tr>
</tbody>
</table>
### December 2011 Events

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Organizer/Co-organizers</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3 December</td>
<td><strong>CSI 2011: 46th Annual National Convention</strong></td>
<td>CSI Ahmedabad Chapter</td>
<td>Mr. Pradeep N Jain, Dr. R Nanda Kumar, Dr. Nileshkumar K Modi &lt;<a href="mailto:cs@csi-2011.org">cs@csi-2011.org</a>/www.csi-2011.org&gt;</td>
</tr>
<tr>
<td>4-6 December</td>
<td><strong>COMNET 2011: Conference on Computer Networks</strong></td>
<td>CSI SIG-WNS, Div IV and TINIR Udaipur</td>
<td>Dr. Dharm Singh <a href="mailto:singhdharm@hotmail.com">singhdharm@hotmail.com</a></td>
</tr>
<tr>
<td>8-11 December</td>
<td><strong>ObCom2011: the 4th International Conference on Recent Trends in Computing, Communication and Information Technologies</strong></td>
<td>VIT University and CSI Vellore Chapter</td>
<td>Dr. P Venkat Krishna, Prof. H R Vishwakarma &lt;<a href="mailto:obcom2011@gmail.com">obcom2011@gmail.com</a>, <a href="mailto:obcom2011@vit.ac.in">obcom2011@vit.ac.in</a>&gt; <a href="http://www.obcomonline.org/">http://www.obcomonline.org/</a></td>
</tr>
<tr>
<td>12-13 December</td>
<td><strong>SEARCC-2011 (South East Asia Conference)</strong></td>
<td>CSI Mumbai Chapter</td>
<td>Abraham Koshi and S M F Pasha <a href="mailto:csimumbai@vsnl.com">csimumbai@vsnl.com</a></td>
</tr>
<tr>
<td>19-21 December</td>
<td><strong>COMAD 2011: The 17th International Conference on Management of Data</strong></td>
<td>CS Div II and Bangalore Chapter</td>
<td>Balasubba Raman Guruswamy <a href="mailto:Bala0302@gmail.com">Bala0302@gmail.com</a></td>
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**Announcement**

**CSI/ISACA Virtual Seminar and Tradeshow**

CSI Mumbai Chapter jointly with ISACA, USA brings to you a virtual seminar and trade show on Friday, 5th August 2011. Members of CSI can participate in the trade show online. The virtual seminar and trade show is a full day event that features keynote and educational sessions by thought leaders and professionals, a virtual exhibit hall and networking lounge, which will enable you to connect with professionals throughout India. For CSI Members, registration is free, but compulsory. Details will be provided in email invite.

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Various vacancies are available at CSI. The vacancies are for various posts and at different locations. The details about these are available at the following link on CSI website -


Candidates are requested to send their applications in the prescribed format to Executive Secretary at email id csijobs@csi-india.org latest by 25th July, 2011.

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“The manager administers, the leader innovates. The manager maintains, the leader develops. The manager relies on systems, the leader relies on people. The manager counts on controls, the leader counts on trust. The manager does things right, the leader does the right thing.”

— *Fortune Magazine*

"Plan for the future because that’s where you are going to spend the rest of your life.”

— *Mark Twain*
Call for Papers

Pre-convention International Conferences to be held at Ahmedabad on 1st December, 2011 in conjunction with CSI Annual Convention

International Conference on Grid and Cloud Computing
Website: www.csi-2011.org/IGnC2011 | Email: ignc2011@csi-2011.org

Pre-convention International Conference on Grid and Cloud Computing seeks to bring together international researchers to present papers and generate discussions on current research and development in latest trends in IT. The conference will feature a range of presentations on latest research as well as stimulating talks and keynote addresses. The conference will feature peer reviewed technical paper presentation with short-papers and posters, tutorial, student paper presentation and stimulating Keynote talks.

Pre-convention International Conference on Grid and Cloud Computing will include the following types of sessions Keynote / Invited Lectures, Tutorial Sessions, Regular Oral Paper Sessions, Short Paper Sessions, Poster Sessions, Industrial Presentations and Exhibits Session.

Conference Committee
Dr. Thamarai Selvi. S - Conference Chair, IGnC 2011
Anna University, Chennai

Topics of Interest
- Distributed System Architecture
- Distributed Programming Models
- Parallel Programming Models
- Grid Computing
- Cloud Computing
- Service Oriented and Web Oriented Architectures
- ‘aaS Paradigm
- Virtualization Technologies
- Security and Trust in Cloud Computing
- Data Mining and Data Warehousing
- Applications of Grid and Cloud Computing
- Middleware Technologies

International Conference on IT Security
Website: www.csi-2011.org/ITSec2011 | Email: itsec2011@csi-2011.org

The mission of CSI 2011 IT Security Conference is to share research solutions to problems of ICT Security issues and to identify directions for future research and development work. One of the major challenges in Today’s connected world is to safeguard ICT resources and critical information exchanged through them. This conference provides an excellent platform to discuss Information & Network security concerns weaving science, technology and policy in developing and implementing sophisticated, yet practical, solutions that will help secure information, computer and network assets.

Conference Committee
Dr. Zia Saquib – Conference Chair, ITSec 2011
C-DAC Mumbai
Dr. Shimon Modi – USA
Dr. Ted Dunstone – Australia
Dr. Rajat Moona – IIT Kanpur
Dr. Dhiren Patel – NIT Surat

Dr. Anish Mathuria, DAIICT Gandhinagar
Dr. Madhukumar – NIT Calicut
Dr. M. Rajarajan, City University London
Dr. Anish Mathuria, DAIICT Gandhinagar
Dr. T J Mathews, SNDT Mumbai

Topics of Interest
- Applied Cryptography
- Security Engineering and its Application
- Security Models & protocols
- Biometric security
- Security of Critical Infrastructures
- Cross-layer design for security
- Defensive information warfare
- Denial of service protection, Intrusion Detection
- Grid security
- Insider threat protection, Integrity
- Trusted computing
- Ubiquitous Computing Security

Paper Submission Guideline: Important Dates
Submitted papers must be original and unpublished. Papers must be written in English should be at most 10 pages long in total and must conform to IEEE format. IEEE format can be downloaded from the conference website. The authors will be notified on the status of the paper acceptance by 01st October 2011.

Paper Submission: 31 August 2011
Notification of Acceptance: 10 October 2011
Camera Ready Copy: 2 November 2011