



## Deep Computing Capacity on Demand: Actuarial Analysis, Risk Management and Compliance in the Insurance Industry



### Highlights

- Extend your HPC infrastructure outside the enterprise to scale beyond in-house limits
- Tap into IBM® high performance computing capacity to help satisfy peak or long-term demand
- Mitigate data center space, power and cooling constraints
- Offload compute-intensive workloads requiring 10s, 100s, or 1000s of processors or storage
- Offers flexibility to scale-up/scale-down capacity without the need for capital investment and infrastructure costs
- Extensive technology choices from IBM POWER™, PowerPC® based Blue Gene® — the fastest supercomputing technology in the world<sup>1</sup>, AMD Opteron™, and Intel® Xeon®
- Value Added Services to help improve systems management and complete your experience

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<sup>1</sup> As defined by the November 2006 TOP500 List, which measures LINPACK performance.

### Overview

Insurance companies today face significant cost and regulatory pressures. To meet evolving market needs and maintain a competitive edge they must comply with mounting financial reporting demands ... bring innovative products to market faster ... reach new, improved levels of capital management ... reduce portfolio risk and ideally reduce reserves. Increasingly sophisticated business models and algorithms are being used to tackle these challenges.

Achieving the benefits of enhanced modeling techniques, including multi-dimensional stochastic modeling, requires different thinking. The static compute environment used by most actuarial departments must be transformed into a dynamic infrastructure; one that can provide the data and processing power necessary to run simulations over extended periods, with thousands of scenarios and tens of thousands of model points.

As insurers strive to “model reality”, it is imperative to anticipate and respond to business demands while helping derive maximum value from IT investments.

With the right formulas and access to enough computing power Insurance companies may be able to:

- ***Reduce time to results for sophisticated modeling***
- ***Increase flexibility and precision***
- ***Run more complex models faster and enable***
  - ***better insight into risks and reserves***
  - ***shorter product development cycles***
  - ***predictability for meeting regulatory compliance***
- ***Improve resource utilization***
- ***Minimize implementation risks***

In a traditional owned-capacity model, companies purchase and deploy enough computing capacity to manage day-to-day processing. In this model, when project timelines overlap, business may be stuck waiting for the in-house processors to work through the assigned tasks. Thanks to IBM it's not too late to reduce the probability of that undesirable future.

IBM Deep Computing Capacity on Demand® (DCCoD) is an IBM Systems & Technology Group offering that provides companies with flexible access to vast computing power capable of handling large workloads. DCCoD members have access to security-rich supercomputing environments that can be used like on-site hardware, but without the capital commitment, management, and maintenance costs. When computing demands exceed in-house capacity clients can shift the excess workload to an IBM DCCoD center and purchase the additional processing capacity necessary to help meet demand. The hardware is hosted, maintained, and supported by IBM to deliver cost-effective capacity that helps free companies to focus on business operations.

The desire to run multiple risk scenarios simultaneously is contributing to an order of magnitude increase in demand for processing power and speed, stretching scarce IT resources. It can be challenging for firms to make the capital expenditures required to address these computing requirements and build sufficient computing capacity to satisfy peak workloads - especially given the market pressure to keep costs low. Risk and compliance managers

are seeking real-time, accurate results without sacrificing cost, liquidity, or competitiveness.

With the access to on-tap supercomputing capability an Insurance company might be able to maintain business critical processor intensive tasks in-house while, for example, delegating an urgent legal compliance verification program to reserved DCCoD capacity. Instead of a large capital investment to buffer capacity from spikes in demand, DCCoD members can treat additional capacity as a value-driven operational expense. If customers only have to pay for capacity when they need it, the undedicated capital may be re-committed to strategic business objectives. Ultimately, Deep Computing Capacity on Demand can help companies achieve the speed and agility to lead the market, gain greater flexibility, and reduce costs.

IBM's Deep Computing Capacity on Demand can be used to help accomplish these complex calculations and extend the Insurance institution's in-house computing infrastructure. It provides a scalable, highly resilient, security-rich, on demand operating environment and can allow firms to use their existing custom-built and best-of-breed commercial analytics applications and tools. IBM's Deep Computing Capacity on

Demand capability is designed to help Insurance institutions more efficiently integrate their risk management processes while improving analytical performance and regulatory compliance.

### **Examining computing requirements for the Insurance Industry**

Providing computing resources on demand requires an infrastructure of high-speed processors and storage that can provide capacity in a flexible, scalable and highly secure manner. Users want seamless access to these resources, regardless of where the physical systems may reside. A computing infrastructure for Insurance Companies should help meet the following objectives:

**Scalability:** Applications and databases often exceed the capacity of even the largest single systems, so systems need to be enabled to grow with demand.

**Security:** Insurance analysts and decision makers need a data, information, and knowledge sharing environment that is highly secure.

**Flexibility:** While they focus on controlling costs, Insurance Services companies need increased flexibility in a rapidly changing environment.

**Significant processing capacity:** As processing requirements continue to grow, more and more companies are finding that they can benefit from using clustered servers and Grid computing. Clusters link separate nodes to create a single, powerful, scalable system, while Grid computing increases overall compute resource sharing and utilization.

### **Flexible financial and delivery models**

Insurance companies may be able to benefit from balancing their fixed and variable IT infrastructure and operations costs and from choosing between onsite owned/operated versus offsite hosted IT solutions.

Clustering and Grid computing, combined with a wide range of server and storage technologies, are designed to provide:

- *High availability with failover protection*
- *Scalability with minimal downtime*
- *Large-capacity data volumes*
- *Capability to handle peaks in workload, permitting flexible responses to changing scientific and business requirements*

### **Computing capacity on demand**

Fundamentally, providing capacity on demand is a

simple concept. Instead of purchasing computers to meet peak demands, companies can procure sufficient hardware for average demand and then contract remote processing power to help meet peak loads, or offload a majority of processing to a remote facility. In practice this process can be more complex. However, IBM can help shield customers from much of this complexity—one of the primary advantages of a hosted on demand environment.

High performance computing can have many different requirements, and purchasing sufficient hardware can become expensive. Some problems are computationally parallel, and a large number of servers working in parallel can solve the problem quickly and efficiently. Other problems require ultra-fast interprocess communication or a single large memory model. A hosted environment can supply access to these resources, and instead of paying for equipment that may be underutilized, customers simply pay for the cycles and compute or storage resources that they reserve for a specified period of time.

IBM provides a scalable, highly secure and extensible environment designed to handle dedicated, variable or dynamic workloads. This solution combines the best

of IBM technologies and open standards with on demand computing, providing an infrastructure that enables customers to help meet their goals of increased scalability, flexibility, and processing capacity.

### **Building a world class infrastructure to support the Insurance Industry**

With four Deep Computing Capacity on Demand Centers currently in operation, members have access to over 20,000 CPUs, 6,000 servers and 24TB of storage. IBM DCCoD centers feature a variety of technologies including IBM POWER, AMD Opteron, Intel Xeon, as well as the PowerPC technology found in IBM Blue Gene systems—which alone can provide access to a whopping 17.77 TeraFLOPs of total computing power.

### **How it works**

Customers purchase annual base membership to the Deep Computing Capacity on Demand center. Base membership includes a “home” management node in the IBM DCCoD center and a software VPN connection (hardware upgrade available). With support for Windows®, AIX 5L™ and Linux®, members can store their operating system, software stack, and licenses on the management node. With a customized environment already in place, capacity

can be reserved and added quickly and easily.

Customers maintain root control of the compute and storage resources within their assigned environment. A robust, security-rich networking infrastructure, including remote access through VPN, is designed to keep customer data and applications highly available.

### **Mitigate Data Center constraints**

For those with constrained Data Center space, power, and cooling, DCCoD provides offsite alternatives to traditional server purchases. Offering programs allow you to purchase just the amount of compute capacity you need. Capacity is available through highly flexible and cost effective contract terms.

- Dynamic: hourly commitments
- Variable: weekly commitments
- Dedicated: Yearly commitments.

In all cases customers can, subject to availability, supplement in-house computing capacity with IBM hosted compute clusters and storage, which can help clients to respond to peak or long-term compute capacity requirements and capture business opportunities that might otherwise be out of reach.

### **Advanced systems management and Grid-enabling software**

IBM Cluster Systems Management (CSM) for Linux software provides robust capabilities for resource monitoring, automated operations, remote hardware control, distributed command execution, configuration file management and parallel network installation. Access to the system is accomplished through a remote shell interface. Customers may use CSM directly to perform remote management tasks, install and use their own management tools, or request comprehensive management and monitoring services from IBM.

The IBM General Parallel File System (GPFS) for Linux and AIX®, offered as an option, is a high performance scalable file system - ideal for Financial Services companies that manage extremely large data files. GPFS can provide an enhanced layer of scalability, availability and performance.

Customers supply software required to run their workloads; this software may include in-house, open source, or IBM and third party applications and tools. Customers can use Grid software and services, acquired separately from IBM or a third party, to develop new applications or run existing applications

in a Grid environment. In addition to running production workloads,

customers may run benchmarks of their software or perform other

types of analysis at the DCCoD centers.

### Services for Deep Computing Capacity on Demand

IBM offers a variety of services to support IBM-supplied hardware, software, networking components and infrastructure. Base services deliver excellent support and value to all DCCoD members. Value added services can provide greater utility and may increase efficiencies within existing resources while helping to reduce project risk.

Standard Services
<ul style="list-style-type: none"> <li>• Data center and environmentals</li> <li>• Cluster hardware provisioning</li> <li>• Virtual Private Network</li> <li>• Physical security</li> <li>• Networking and logical security</li> <li>• 24x365 monitoring of critical components</li> <li>• Hardware maintenance</li> <li>• Help desk</li> <li>• Access to an IBM Solution Architect to help plan the DCCoD engagement</li> </ul>

### Value Added Services

In addition to the basic membership, members have the option to add capability from a growing menu of services that support operations within the environment. Options can include:

Services	Description	Availability
High Availability	<ul style="list-style-type: none"> <li>• UPS</li> <li>• Diesel generators</li> <li>• N+1</li> </ul>	Location dependant
Security	<ul style="list-style-type: none"> <li>• Biometrics</li> <li>• Dedicated network switches</li> <li>• Physical separation (cages, rooms)</li> <li>• SAS 70 certification</li> </ul>	Today
Monitoring	Performance monitoring and reports regarding: <ul style="list-style-type: none"> <li>• CPU utilization</li> <li>• Memory allocation</li> <li>• Network utilization</li> <li>• Storage usage</li> </ul>	Today
Metering	<ul style="list-style-type: none"> <li>• Ability for usage-based billing and charge-back</li> </ul>	Today
Skilled support services	<ul style="list-style-type: none"> <li>• Middleware</li> <li>• Grid scheduling</li> <li>• GPFS*</li> </ul>	Today
Interconnect	<ul style="list-style-type: none"> <li>• GigE</li> <li>• InfiniBand</li> <li>• Myrinet</li> </ul>	Today
Software	<ul style="list-style-type: none"> <li>• Microsoft Windows</li> </ul>	Today
Storage	<ul style="list-style-type: none"> <li>• FastT</li> <li>• SAN</li> <li>• NAS</li> </ul>	Today

**Monitoring and Metering value added services feature Tivoli products. Highlights include:**

**IBM Tivoli Monitoring**

- Service to proactively monitor critical components of your DCCoD Environment
- Data to aid in problem resolution and scaling issues
- Historical reporting for system and application performance
- Standard and customizable reporting and alert options

**IBM Tivoli Usage and Accounting Manager**

- Service offering to meter your DCCoD system usage (or that of your clients)
- Identifies resources and processes that are utilizing compute resources
- Standard and customizable reporting and alert options

In addition, IBM Global Technology Services, Global Engineering Services, Software Group, and our extensive network of business partners offer deep technical and business expertise that includes planning, architecture, customization, best practices, integration, skills transfer, service offerings, custom on-site training workshops and premium support.

**Delivering on demand resources**

The on demand computing model is economical, enabling customers to enjoy flexible compute capacity, pricing, and terms, which can help lower both operating costs and fixed infrastructure costs. This computing model also can help reduce

infrastructure complexity, IT training and staffing and ongoing maintenance and upgrades. Customers can focus on their core development and business while increasing insulation from rapid information technology shifts and asset turnover.

IBM is extending its leadership in deep computing to the on demand environment. By combining leading IBM technologies, advanced cluster and systems management capabilities, growth and innovation in Grid Computing, Virtualization, and industry expertise, IBM is delivering solutions designed to enable Insurance customers to conduct their business more efficiently and effectively in a highly competitive market.

**For more information**

To learn more about Deep Computing Capacity on Demand for the Insurance industry, contact your IBM representative.

**Additional resources for IBM Deep Computing Capacity on Demand**

IBM Deep Computing Capacity on Demand:  
[www.ibm.com/servers/deepcomputing/cod/](http://www.ibm.com/servers/deepcomputing/cod/)  
Tivoli Management Software:  
<http://www.ibm.com/software/tivoli/>  
IBM Deep Computing:  
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<http://www.ibm.com/solutions>

**Worldwide Sales**

Alan McCarter  
e-mail: [armccar@us.ibm.com](mailto:armccar@us.ibm.com)

**Americas Sales**

John Wilsterman  
e-mail: [jwilste@us.ibm.com](mailto:jwilste@us.ibm.com)

**Europe/Middle East/Africa**

Nick Gair  
e-mail: [gairn@uk.ibm.com](mailto:gairn@uk.ibm.com)

**Asia Pacific**

Jeffrey Lee Dunn  
e-mail: [dunnjl@sg.ibm.com](mailto:dunnjl@sg.ibm.com)

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