Supporting successful business transformation and growth
We have helped clients in several industries with significant business transformations and “bet your business” initiatives.

A sample of our engagements…

- Finance…Capacity planning in support of corporate mergers and acquisitions
- Communication and Utilities…Performance management in support of the testing of rapid technology adoption systems influencing consumer buying behavior
- Healthcare…Performance management and capacity planning in support of transformation to a hybrid cloud computing model
- Insurance…Performance engineering in support of enterprise wide migration of applications to open architectures for improved customer service and cost reduction
- Investment Banking…Design and implementation of a capacity planning process backed by a central business metrics and IT metrics repository to support low latency infrastructure planning for peak business demands
We are helping address challenges driven by business dynamics and the complexities of today’s IT infrastructures.

Common challenges we are hearing…

- “We are in a race to compete in a rapidly changing market and need help governing our infrastructure planning to deploy on schedule.”
- “Due to new regulations, we are changing hundreds of applications and are not confident in our ability to plan and manage their capacity demands.”
- “We need help in simulating our application server environments to accurately model the impact of increased business demands.”
- “We need to reduce costs and want the ability to simulate various application infrastructure options, on demand.”
- “We are now supporting 24x7 global operations and need to know the impact on critical batch and legacy applications.”
- “Our peak season will stress our infrastructure and we cannot afford an outage and lost revenue.”
Our services include comprehensive end-to-end capabilities designed to help improve the success of your application deployments.

- Infrastructure Capacity Planning
  - Process assessment & design
  - Execution via simulation modeling, analytic modeling & statistical forecasting
  - Modeling tools assessment & recommendations

- Application Performance Management
  - Process and tools assessment & recommendations
  - Monitoring support and analysis for application testing teams
  - Performance engineering support for application design teams – enabled by application modeling

Our focus is consultative and technical leadership...performing these services for you, sourcing commodity skills as needed...or helping enable your staff through planning, process improvement and project management.
Our expertise in both Distributed AND Mainframe environments includes skills and experience with tools to analyze your full IT infrastructure

We help you with analysis of…

• Applications including Siebel, SAP, Java-based (J2EE) and others
• Operating systems including z/OS, Unix, Linux, Solaris and Windows
• Database environments including DB2, DB2 UDB, Sybase, SQL Server and Oracle
• Middleware solutions including WebSphere and Weblogic
• Routers and network infrastructures
• Other leading vendors’ hardware and software components

Our tools include…

• System capacity planning tools
• Network capacity planning tools
• Data analysis tools
In our clients’ I.T. environment, we provide an end-to-end focus on applications, systems, storage and networks.

Sample of client environments…

- SAP R/3 Module and Capacity Planning Analysis
- UNIX and/or Wintel SAP R/3 Application Servers
- UNIX Oracle or UDB DB2 Data Base Server
- Multi-tiered Web based applications
- Multi-vendor server and network components
Capacity Modeling for Server Virtualization Planning in support of Cloud infrastructures has been one of our focus areas.

Our capacity modeling process supports the two main virtualization approaches – hardware partitioning and hypervisors:

- **Hardware Partitioning**
  - Sun Domains, HP nPartitions
  - pSeries LPAR, HP vPartitions

- **Hypervisor: Type 1**
  - Hypervisor software/firmware runs directly on server.
    - zSeries PR/SM and zVM
    - POWER Hypervisor
    - VMware ESX Server
    - Open Source Hypervisor (Xen)
    - Virtual Iron, ScaleMP

- **Hypervisor: Type 2**
  - Hypervisor software runs on a host operating system.
    - VMware ESX
    - Microsoft Hyper-V
    - User Mode Linux

- **Our capacity modeling process supports the two main virtualization approaches – hardware partitioning and hypervisors:**
  - Our primary simulation modeling tool, SimZilla, supports both approaches
  - Our modeling process: takes into account the various overheads, including hypervisors
  - Our modeling scope: includes most hardware platforms from IBM, Oracle, HP, Intel
The Testing / Modeling Continuum is our guide to determining which forecasting technique should be used in a particular situation.
Leveraging modeling and simulation techniques, we provide estimates to help improve resource investment planning

Designed to…

- Help provide “hard” data to support investment planning
- Recommend systems resources and configurations to support enterprise wide demands
- Provide an affordable “test ride” to compare various technologies and vendor solutions
- Leverage over 50 years of capacity planning experience with industry leading modeling and simulation tools such as OPNET IT Guru, Hyperformix, Teamquest Model, and BMC Predict

“While trending provides a basic form of capacity planning and is useful in certain situations, it has its limitations. … Trending does not take into account discrete events, such as layoffs, mergers, network upgrades or replacing direct attached storage with a storage area network (SAN). Nor does it take into account the characteristics of a given piece of equipment under different traffic loads.”

- Capacity Planning: Art, Science or Magic? by Drew Robb, Datamation
Our capacity planning engagements with clients have produced measurable benefits in terms of both cost savings and...

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<tr>
<th>Benefits</th>
<th>Means of Achievement</th>
<th>Client Experiences</th>
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<tbody>
<tr>
<td>• Hardware acquisition deferrals</td>
<td>• Workload re-balancing</td>
<td>• 10-15% buyback of server capacity</td>
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<td>• Workload optimization</td>
<td>• 3-9 month deferral of processors without compromise in quality of service delivery</td>
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<td>• Better timing of application/initiative rollouts</td>
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<td>• Plans built with 6-12 months advance notice of initiative requirements and changes</td>
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<td>• Lower acquisition costs</td>
<td>• More accurate capacity schedule providing greater lead time for contract negotiation</td>
<td>• 5-10% lower acquisition cost due to better timing and volume purchases</td>
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<td>• Lower hardware costs through image consolidation</td>
<td>• Accurate model of business, application, and IT resource environment</td>
<td>• 80 images reduced to less than 50.</td>
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<td>• Workload reallocation</td>
<td>• Eliminated network redundancy: 120 super-routers to 80+</td>
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<td>• Run servers closer to the margin through IT-wide capacity planning</td>
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<td>• Improved efficiency and eliminated redundancy in business, system, and application data gathering.</td>
<td>• Improved efficiencies in systematizing the business, application, and system data gathering process</td>
<td>• 2 FTEs saved by eliminating duplicate business and application data gathering</td>
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<td>• Standardize application and business data gathering and delegate data collection</td>
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... improved service delivery.

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<td>• Business continuity&lt;br&gt;• Avoidance of capacity outage costs</td>
<td>• Accurate model of business, application, and IT resource environment&lt;br&gt;• Capacity monitoring&lt;br&gt;• Accurate, business-driven capacity plans</td>
<td>• Avoided estimated $300,000 per hour outages</td>
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<tr>
<td>• Improved quality of service delivery to business units</td>
<td>• Accurate capacity plans&lt;br&gt;• Periodic and consistent feedback to business units&lt;br&gt;• Capacity status reports&lt;br&gt;• Capacity impact studies</td>
<td>• Improved client satisfaction and communications&lt;br&gt;• Business and IT partnership in solving IT service issues&lt;br&gt;• Realistic business volume estimates leading to more accurate plans</td>
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<td>• Redirect crisis energies onto business issues</td>
<td>• Proactive capacity trending, tracking, and monitoring</td>
<td>• More than 70% of &quot;fire fighting&quot; time eliminated.</td>
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<td>• Timely rollout of initiatives with minimal disruption</td>
<td>• Collect and analyze capacity information for projects before they occur&lt;br&gt;• Forecasts based on current system design and volumes</td>
<td>• Multi-million dollar application rollouts on-time achieving planned service levels&lt;br&gt;• Planned initiative benefits received earlier</td>
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Capacity planning helps you plan for the future with a clear understanding of your true IT capacity requirements.

- Models possible infrastructure and application design solutions including emerging technologies
- Simulates “live” transaction business demands for new and legacy environments, including background activities such as batch processing
- Helps you identify optimal solutions and maximize your investment, to satisfy users and support current and future business needs
To achieve best practices in capacity planning requires a focus on meaningful metrics, defined processes, and skills.

- Correlate performance metrics to business metrics in order to provide meaningful measurements.
- Define capacity planning processes to accurately model infrastructure and application scenarios and simulate expected user and transaction demands.
- Understand legacy and emerging technologies as well as how to use tools for modeling and simulation in order to help you accurately analyze and identify optimal solutions.
Capacity modeling can be utilized to project the infrastructure requirements for any production or test based application

- Basic Capacity Planning (Scalability) Methodology...
- Identify key workloads / transactions and develop a performance metric collection strategy
- Collect performance and configuration data required to construct the models
- Create and calibrate the model to base system metrics
- Utilize the calibrated baseline model to project future business scenarios
- Analyze modeling results and identify application and infrastructure requirements
- Create and deliver final report and softcopy performance models
Our capacity planning methodology is based on 50+ years experience utilizing discrete simulation and analytic queue modeling tools

- Define and characterize the key transactions / business functions to be modeled
  - Define transaction flows
  - Identify interactions with server and network components

- Quantify relevant performance metrics associated with these transactions at a known workload level
  - CPU resource utilization
  - Disk operations
  - Network traffic
  - Server process thread utilization
  - Transaction response time / elapsed time

- Develop and calibrate a discrete event simulation model of the server / network infrastructure and key transactions
  - Simulate data flow and resource utilization across server / network components
  - Calibrate model to a set of known performance metrics

- Simulate the execution of the workload across defined modeling scenarios

- Project performance based on analysis of the model results
  - Characterize performance at increased transaction rates
  - Quantify workload levels which can be supported
  - Identify potential performance constraint(s)
  - Analyze alternative architecture and design scenarios (“what ifs”)
Empirical data are collected based on quantifiable performance metrics

- Collection of system metrics
  - Ideally, collect data in a prototype, test, or production environment
  - Alternatively, model can be based on architectural data (may be only source of data during the architecture phase of the application life cycle)

- Data collection considerations
  - What type of data collection tools are available?
  - Individual transaction level or “composite” workload?
  - Can we quantify resource utilization at the server process level?
  - Do we know how various server process execution rates will scale with increased transaction rates?

- Our models are typically able to simulate a transactions’ resource utilization in terms of:
  - CPU path lengths
  - Disk activity (e.g., I/O rates, block sizes, cache hit rates)
  - Network traffic (request / response data)
  - Server process thread utilization (available process threads, active threads)

- The level of modeling detail and specific data required are a function of the modeling objectives
Capacity planning forecast projects involve working with your staff to establish a baseline and then model alternative solutions, to simulate changing business demands.
Questions to help identify capacity planning and performance analysis opportunities.

- Are you meeting all your service level agreements? Are any being missed due to capacity or performance related issues?
- Do you have a system in place to help you identify either over or under provisioned infrastructure components?
- For new application development, can you ensure that the new application will be able to offer projected performance and scalability at an affordable cost?
- Are there times of the day that your business and supporting IT applications are vulnerable due to high demand?
- Is the technology or mix of technology employed to support your business applications the correct technology for your business demands?
Next Steps

- Schedule call with our capacity planning consultants to identify your requirements
- Confirm scope, approach, & high-level schedule
- Develop and deliver Statement of Work (SOW)
- Identify participants
- Schedule Kickoff Meeting