Long-Term Outlook for IT Is Brilliant, but Also Will Result in Pain for Many

- **1997**: Y2K
- **2000**: Internet This, Now
  - Price Is No Object
  - Get Really Rich, Quickly
  - Pure Greed and Fear
- **2003**: Cut Costs
  - Keep the Lights On
  - Fix What You Have
  - Power Shifts to the User
  - Vendors Hemorrhage
- **2006**: Massive Consolidation
  - Power Shifts to Vendors
  - Fundamental Technology Changes
  - Installed Base Refresh
- **2009**: True Power of IT Finally Unleashed
  - Massive Wave of Innovation
  - Huge Productivity Gains
  - Enormous Societal Impact
  - Consumer Is King

Global IT Spending
Key Issues

1. What will be the most crucial challenges to IT through 2006? Through 2009?

2. Which market forces and end-user behaviors will dominate IT through 2006? Through 2009?

3. Which technology advances will dominate the IT landscape through 2006? Through 2009?

4. How will the confluence of market forces, end-user behaviors and technology advances affect IT and society through 2006? Through 2009?

5. Who will be selling the winning technologies through 2006? Through 2009?
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The Condition of the IT Industry Is Not Due to Lack of Demand — *It Is Self-Inflicted.*
IT Industry Has Six Fundamental Issues

1. IT costs too much.
2. Infrastructure is too fragile, complex and expensive.
3. Cost and time needed is prohibitive.
4. Cost and time needed to reliably connect to third parties is prohibitive.
5. Financial returns are elusive.
6. Too many vendors are selling the same thing.
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Overall IT Spending Will See Single-Digit Gains in 2004 and 2005, but ...

Many sectors will see exactly zero incremental spending.

Some sectors will thrive.

There will be huge variations within and between sectors.

Advantage will shift dramatically to the largest players.
Massive Vendor Consolidation Will Enable or Cause ‘Burn and Churn’ Through 2005

2,300+ Software Companies
Massive Vendor Consolidation Will Enable or Cause ‘Burn and Churn’ Through 2005

About 50% to 60% Too Many
End-User Best Practices
End-User *Standard* Practices

**Consider ...**

- ... outsourcing anything non-value-added
- ... standardizing everything you can at base level
- ... rigorously managing your portfolio
Key Issues

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Advances in Technology Can and Will Fix Most of the Fundamental Problems

Infrastructure: Make It Robust, Reliable and Invisible

Application Development: Make It Faster, Cheaper and Holistic

Application Maintenance: Make It Inexpensive

Application Deployment: Make It Secure, Reliable and Interenterprise
Advances in Technology: Computing Infrastructure Goes Virtual

- Dynamic Partitioning
- Network Load Balancing
- Horizontal Scaling
- Frame Consolidation

2006–2008: Networking and Storage Meld
- Blade Management
- Parallel Database
- Mixed Workload Efficiency
- Distributed Performance Mgmt.
- Server Provisioning
- Technical Computing Grids
- Dynamic Virtual Partitioning
- Virtual Blade Mgmt.

- Self-Healing
- Service-Level Management
- Policy-Based Management
- Distributed Workload Mgmt.
- Grid for Commercial Use

Gartner
Advances in Technology: Networks Go Wireless Broadband

- Wi-Fi
- 802.11g/b
- Intel
- Cisco
- IBM

Residential Broadband Cable
Advances in Technology: Power Management and Display Electronics

- Power delivery technology isn’t exciting
- Power consumption technology is awesome
- “Always on, always connected”

Source: E Ink
Advances in Technology: Massive Shift in Software Architecture

SODA

Development

Interface Separation

Wrapping (Reflection)

Description

Dynamism

Gartner
Advances in Technology: Massive Shift in Software Architecture
Advances in Technology: Massive Shift in Software Architecture

Interoperability Is Cheaper Than Integration

Composite Applications

“Real Time” Integration
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Next **Massive Wave of Innovation and Demand for IT Will Start** in 2006

- Secure Broadband Wireless
- Low-Power-Consumption Mobile Devices
- Real-Time Infrastructure
- Transition to SOA

2006
By 2007 ...

- It will be difficult to buy a nonwireless “device.”
- Secure, robust, national wireless broadband networks will reach critical mass.
- It will be nearly impossible to buy a cell phone without a camera.
- Electronic paper will be a viable alternative to paper for industrial and consumer applications.
- Applications will be built by assembling services.
- Core infrastructures of computing and storage will be much more autonomic and reliable.
- The last new application for Unix will have been written.
- RFID will be ubiquitous up to the retail shop.
- The wireless digital media center will be the de facto home form factor.
- Real-time analytics and massive data management will emerge as the most important business applications.
This Next Wave of Technology Will Cause Massive Disruption in the IT Workforce

- A robust, reliable and high-capacity infrastructure will demand entirely new skill sets.

- Also, SOBA and SODA will demand major changes in system design and programming skill sets.

### Extremely High-Value Technologies

- Broadband
- Linux
- Real-time analytics
- Security
- Certification
- Wireless
- Content management
- Data mining
- Middleware
This Next Wave of Technology Will Cause Massive Worldwide Upheaval in Societies

- Real productivity gains will be achieved via workforce reductions
- Replacement or reduction of entire industries
- Live video around the world
- No longer “seeing is believing”
Key Issues

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‘Battle of the Seven’

* Windows and .NET in Everything
* $50B+ in Cash and Growing
* Independent Platforms and Services
* But No Packaged Apps.
* Solaris, SPARC and Java
* OpenView and Broad HW Lineup
* Single Data/Apps. Architecture
* Between Giants

IBM

Microsoft

SAP

webMethods
A New Wave of Startups Is Being Funded Now

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Uninvested Venture Capital as a Percentage of Five-Year Committed Capital

'81 '83 '85 '87 '89 '91 '93 '95 '97 '99 '01
Short-Term Conclusions and Recommendations

• Massive Vendor Consolidation Is Inevitable.
• Power Will Shift Back to the Vendors in Many Sectors.
• Desperate Vendors Will Do Desperate Things in the Next Several Quarters.
• Overall Demand Will See Good Single-Digit Growth in 2004 and 2005, but There Will Be Huge Variations Between and Within Individual Sectors.
• Design Architectures and Strategies Are Based on the Fundamental and Inevitable Confluence of:
  — Real-Time Infrastructure
  — Wireless Broadband
  — Low-Cost, Low-Power-Consumption Mobile Devices
  — Service-Oriented Architecture
• Pick Products and Services Accordingly (Think Like a Vendor).
• Upgrade Your Skills to Support the New Platform and Win.
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• Design Architectures and Strategies Are Based on the Fundamental and Inevitable Confluence of:
  — Real-Time Infrastructure
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• Results in Massive Improvements in Productivity.
• Demands Changes in Core Skill Sets.
• Creates Next Huge Wave of Innovation.
• Creates Massive Societal Disruption.
• Creates Massive Potential to Solve Problems That We Can’t Envision Tackling Today.
• Trigger Year Is 2006 — Future Will Be Terrific for Those That Upgrade Their Skills Now.
The following material provides more detail about the content of this presentation.
Long-Term Outlook for IT Is Brilliant, but Also Will Result in Pain for Many

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- Cut Costs
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- 1997
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Gartner
Condition of the IT Industry Is *Not* Due to Lack of Demand — It Is Self-Inflicted

IT as an industry has six fundamental issues:

1. IT costs too much for the value delivered, in far too many cases.
2. The infrastructure just to “keep the lights on” is too fragile, complex and expensive.
3. The cost and time needed to develop new applications and maintain current ones is prohibitive.
4. The cost and time needed to connect to third parties reliably is prohibitive.
5. The financial returns are elusive in far too many instances.
6. There are way too many vendors selling essentially the same “stuff.”

Technology advances and market forces will solve many of these problems; end-user best practices will mitigate the rest.
Overall IT Spending Will See Single-Digit Gains in 2004 and 2005, but ... 

- Many sectors will see exactly zero incremental spending.
  - Condition of the installed base
  - Vendor desperation
  - Lower-cost technology platforms

- Some sectors will thrive even if the global economy doesn’t improve.
  - Again, condition of the installed base
  - Hard financial returns from solid — not stunning — technology improvements

- There are huge variations within and between sectors.

- Advantage shifts *dramatically* to the largest players.
Massive Vendor Consolidation Will Enable or Cause ‘Burn and Churn’ Through 2005

2,300+ publicly traded software companies; about 50% to 60% too many

The notion that “when business spending picks up, our business will, too” is incorrect for most vendors:

- Signals end of price war in select sectors
- Marginal players finally are forced out
- Vendor-induced “upgrades” take hold

No. of SW Vendors


Innovators of Internet boom burn themselves and venture capital cash

Oligopoly of fewer vendors
End Users’ Standard Practices for the Next Several Years

- Seriously *consider* outsourcing anything that doesn’t provide added value.
  - Not always the right answer, and an appropriate mix is usually best, but ...
  - Start with IT infrastructure.
  - Continue with IT maintenance.
  - Move to business processes.
  - *Never* give up control of IT strategic planning and architectures.

- Standardize everything you can at the raw horsepower, storage and networking levels.
  - A slightly better “box” (that is, new hardware) means nothing but pain and fiscal waste.

- Rigorous portfolio management is a must.
Advances in Technology Can and Will Fix Most of the Fundamental Problems

- **Infrastructure:** *Make it robust, reliable and invisible.*
  - Computing, storage and network virtualization
  - Utility computing

- **Application Development:** *Make it faster, inexpensive and holistic.*
  - Web services
  - Business process management
  - Application platform suites
  - Complex event processing

- **Application Maintenance:** *Make it really inexpensive.*
  - Components
  - Automatic testing

- **Application Deployment:** *Make it secure, reliable and interenterprise.*
  - Transaction delivery networks
Advances in Technology: Computing Infrastructure Goes Virtual

- Computing and Storage Virtualization
- Utility Computing
- Networking and Storage Merge

2003–2005
- Dynamic Partitioning
- Network Load Balancing
- Horizontal Scaling
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2006–2008
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Advances in Technology: Networks Go Wireless Broadband

- Wi-Fi is the clear winner; 3G starts rolling out.
- Intel, Cisco and IBM are the most important players.
- It will be virtually impossible to buy non-wireless-enabled devices within three years.
- Cisco “finesses” the security issue.

Best bets: 802.11g and 802.11b (now), and 802.16 (next 24 to 36 months)

Although wireless will be the ultimate enabler, don’t forget wired broadband to the home. Its relentless penetration rate is unstoppable (more than 50 percent of U.S. households by 2006).
Advances in Technology: Power Management and Display Electronics

- Power delivery technology isn’t exciting.

- Power consumption technology is awesome.
  - Silicon/germanium/copper advances for compute/store functions
  - OLED/microfluid (etc.) for display functions

Will finally enable “always-on, always-connected” devices (but we aren’t certain if this is really good or really bad).

Source: E Ink
Advances in Technology: Massive Shift in Software Architecture

Develop

Services-Oriented Development of Applications (SODA)

- Interface Separation
- Wrapping (Reflection)
- Description
- Dynamism

Deploy

Service-Oriented Architecture (SOA)

- Contracts
- Messages
- Repository
- Servers

Composite Apps.

“Real-Time” (JIT) Integration

Interoperability Is Cheaper Than Integration.
Next Massive Wave of Innovation and Demand for IT Will Start in 2006

- Triggered by the confluence of four critical items:
  - Secure broadband wireless
  - Low-power-consumption mobile devices
  - Real-time infrastructure
  - Transition to SOA

- Further fueled by the relentless price/performance improvements in hardware

- The resulting impact on society, business, government and technology will approach that of the Internet itself
By 2007 ...

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This Next Wave of Technology Will Cause Massive Disruption in the IT Workforce

- As the infrastructure becomes more reliable and robust, the armies of IT professionals that are now employed to perform administration and maintenance functions must upgrade their skill sets.
  - Network administrators
  - System administrators
  - PC administrators

- As application development shifts to a service model, armies of programmers also must upgrade their skill sets.

- Broadband, wireless, Linux, content management, real-time analytics, data mining, security, middleware and certification skills will be highly valued — and security patch installation skills will be highly sought after.
This Next Wave of Technology Will Cause Massive, Worldwide Upheaval in Societies

- Real productivity gains will be achieved by workforce reductions.
  - The ability to automatically and continuously identify, verify and track physical devices will enable stunning efficiencies in the transportation, logistics and distribution functions of every enterprise.

- Real productivity gains will be achieved by replacing or greatly diminishing the roles of entire industries.
  - The combination of secure broadband wireless, electronic paper and large, low-cost memory will have stunning consequences for the paper, media and advertising industries — just to name a few.

- The ability of hundreds of millions of people to instantly transmit live video around the globe will have consequences that are difficult to foresee.
  - Privacy, security, reliability, government use and control aren’t understood.

- Ability to synthesize realistic video invalidates “seeing is believing.”

- Nations assuming that a lower-wage IT workforce is their key to economic growth will be devastated unless they prepare now.

- Nations and organizations that prize, encourage and develop an extremely highly educated workforce will benefit more disproportionately than ever before.
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Gartner
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![Graph showing uninvested venture capital as a percentage of five-year committed capital from 1981 to 2001.](image-source)
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