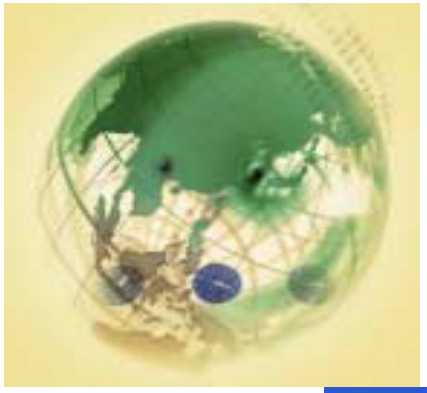

High Availability Solutions
Protecting Business-Critical Information

. . . When the life of your business depends on it!

Andrea Chiaffitelli
Chief Technical, Consulting and COE Leader
SAN, Storage, & Rich Media Services
AT&T Ultravailable[SM] Solutions
AT&T Managed Services and Hosting
HP World August, 2001

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Example Publicized Outages

eBay Blacks Out Again

June 13, 1999

Despite a frantic, around-the-clock effort to keep the auction site running after two embarrassing and costly outages this week, eBay was again inaccessible to customers this morning. Visitors to eBay early today received no response from the

Outage a Deliberate Attack, Yahoo says

Feb 7, 2000

A three-hour outage today on Yahoo was the result of a malicious attack intentionally aimed at disabling the service, according to company executives. Yahoo president Jeff…

Site outages hit E*Trade

January 24, 2000

E*Trade customers had sporadic access to their accounts this morning, preventing some customers from making online trades for about 30 minutes, the company confirmed. E*Trade's Web site began to stall about 9 a.m. PST because of a telecommunications problem, according

DLJ Site Down for Second Day in a Row

March 14, 2000

For the second day in a row, customers of online brokerage DLJ Direct were prevented from making trades via the Web site. This morning, a message posted on DLJ Direct's site informed customers that

Sears.com Incident a Cautionary Tale

July 24, 2000

Sears, Roebuck and Co.s' Sears.com site experienced a hiccup of sorts last week when it blocked customers' access while adding a section on home electronics products…

Cut cable Delays Northwest Flights

Mar. 21, 2000

Call it the cable cut that grounded Northwest. Hundreds of Northwest travelers at Detroit Metropolitan Airport -- and thousands more at airports across the nation -- were stranded after a construction crew in

Mega-Trend 1: Unprecedented Bandwidth Demand

Drivers:

- **Rapid Compound Annual Growth**
- **New Enabling Optical Technologies**
  - Dense Wavelength Division Multiplexing (DWDM)
  - Optical switching

Implications:

- **End-to-End Bandwidth Abundance**
- **Enables New Bandwidth-Intensive Applications**
  - Geographically distributed real-time data mirroring, SANs, cluster computing
  - Protocol independence (ESCON, Fiber Channel, FICON, GbE, ….)
- **New Business Models, Opportunities & Threats**

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Mega-Trend 2: Storage Demand Exploding

Drivers:

- Text ⇨ Multimedia
- Supply Chain Management / networked communities
- Data Protection and Data Availability
- Distributed Content / Information Base
- Data Mining & Knowledge Management

Implications:

- Rising cost and complexity of storage management
- Need more efficient & effective enterprise storage capabilities, SANs, storage management & monitoring
- Must ensure all mission-critical data is always available, accessible
- Must ensure no critical transactions are lost in any event

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Mega-Trend 3: 100% Availability

Drivers:

- **Round-the-Clock Customer Access**
- **Rising Threat Portfolio**
  - Physical - Earthquakes, Hurricanes, Tornadoes, Floods
  - Logical - Hackers, Crackers, Denial of Service
  - Political - Terrorists, Outages
  - Capacity Strain - Sudden Spikes in Demand, Accelerated Business Growth
- **Customer Attention Span is the Key Resource**
  - A click away from oblivion
  - A real-time transaction away from failures of supply chains, just in time inventory

Implications:

- ***You MUST be available 24 x 7 x 365***

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Mega-Trend 4: Managing End-to-End Solutions

Drivers:

- Cost Reduction, Quality Improvements, Cycle Time Reduction
- Limited Capital Investment
- Dramatically Increasing Infrastructure Complexity
- Scarcity of Talent
- Management Attention / Focus
- New Technology Risk Reduction

Implications:

- You must focus on your core competency

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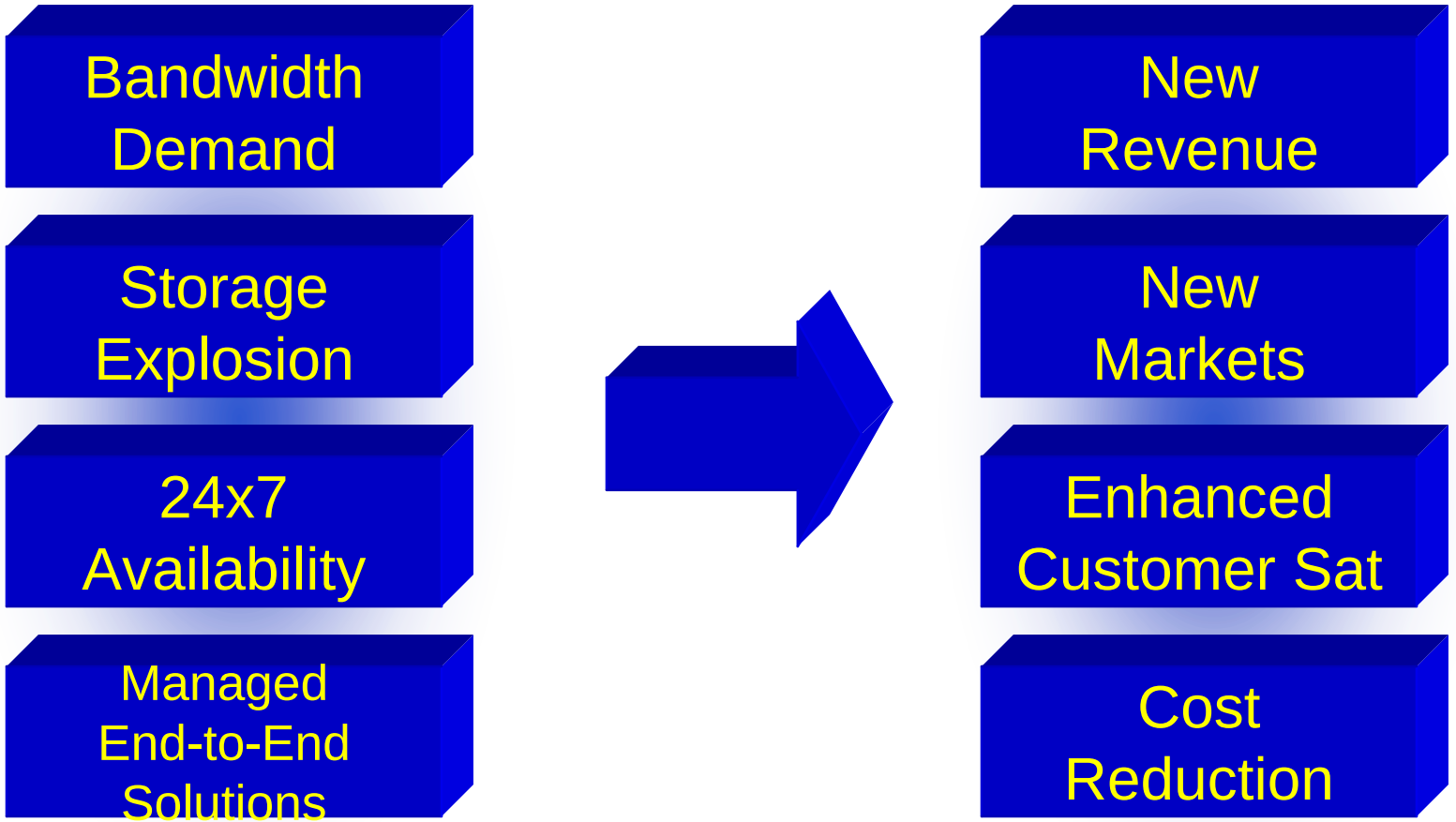
Mega-Trends Drive New Business Opportunities



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Bandwidth Demand
100% Availability
High Availability Solutions
Protecting Your Business Critical Data
Storage Explosion
Managed Solutions
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Protecting Business-Critical Information

Drivers:

- Pooling servers simplifies management
- Increases in server processing power
- Centralized servers enable mirroring of files
- The Need for Fault Tolerance
- Recognizing the Single Point of Failure
- The Importance of Non-Stop Performance
- Reliability and Resiliency
- The Added Advantage of a Mirrored Architecture
- Upgrading Existing Networks

Implications:

- You must focus on your core competency

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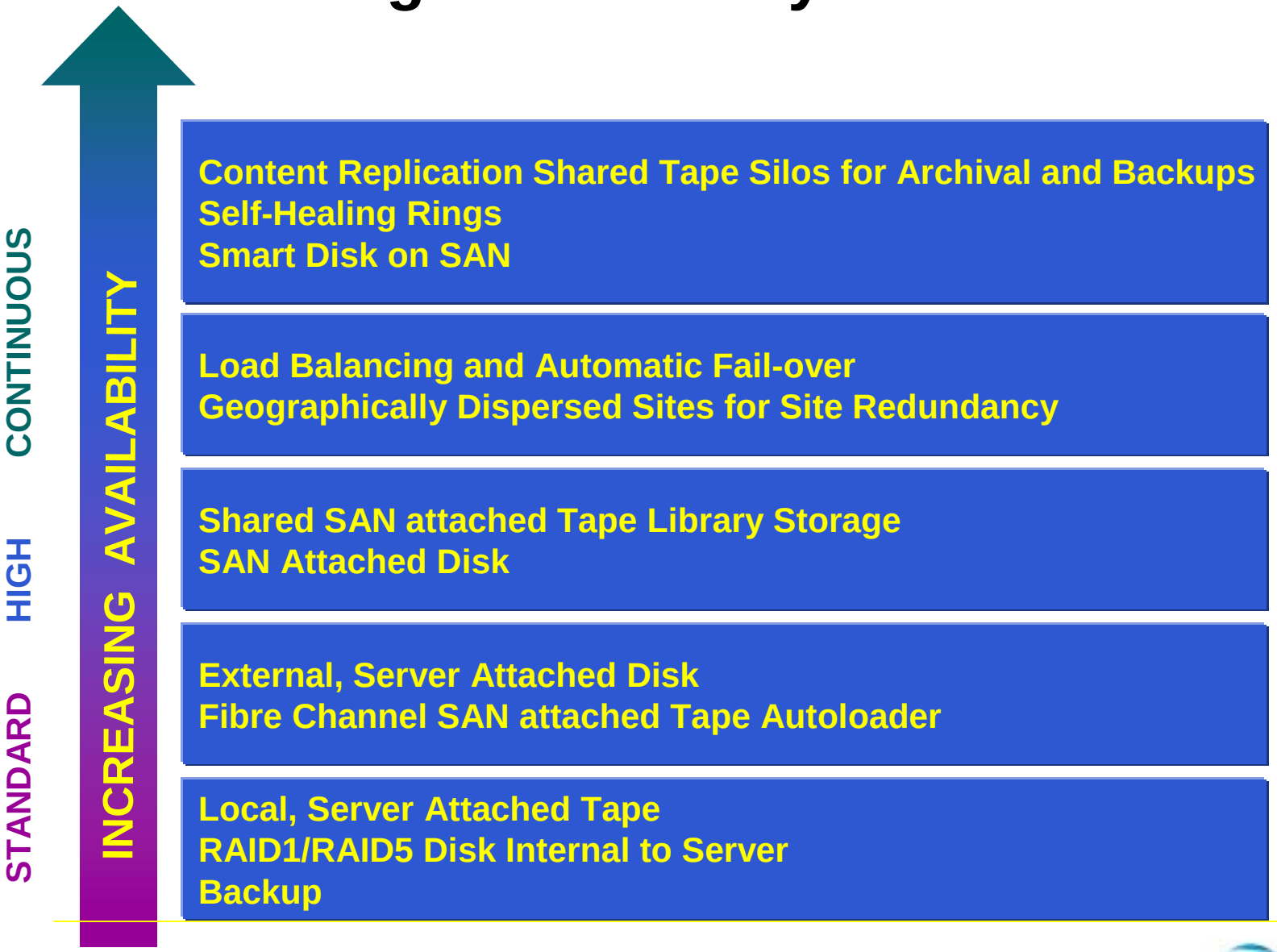
Spectrum of High Availability Solutions



Storage Area Network (SAN)
Redundant Array of Independent Disk (RAID)

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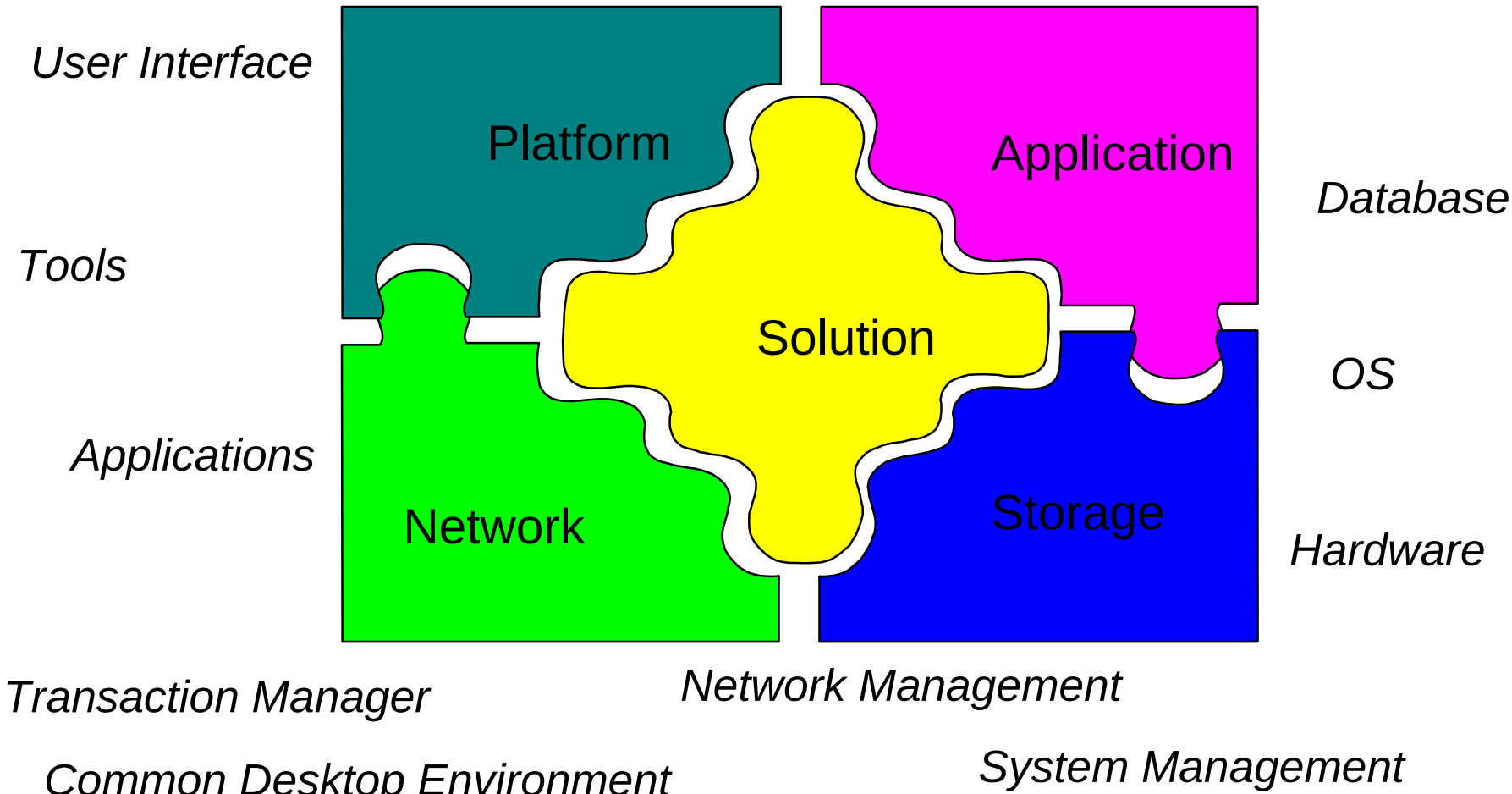
Challenge … The Puzzle



Protecting Business-Critical Information
Platform, Network, and Storage Infrastructure

Business Process A
Critical

Business Process B
Major

Business Process C
Minor

Business Process D

Business Process E

Business Process F

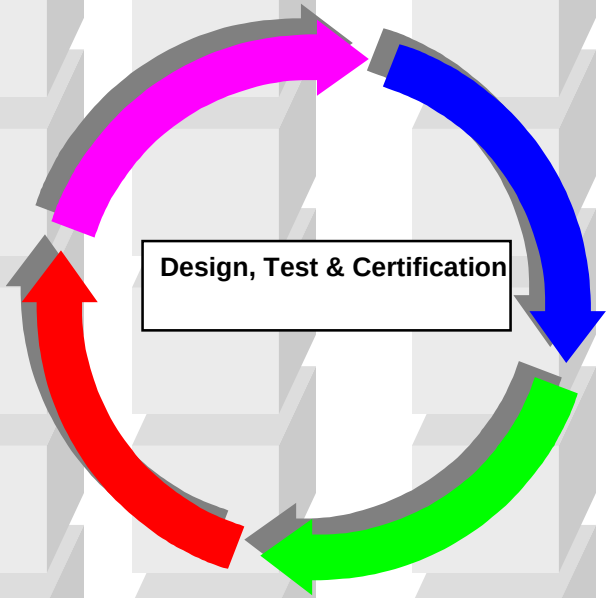
Users

Applications

Platforms

Network

Storage



Availability to Support The Business!

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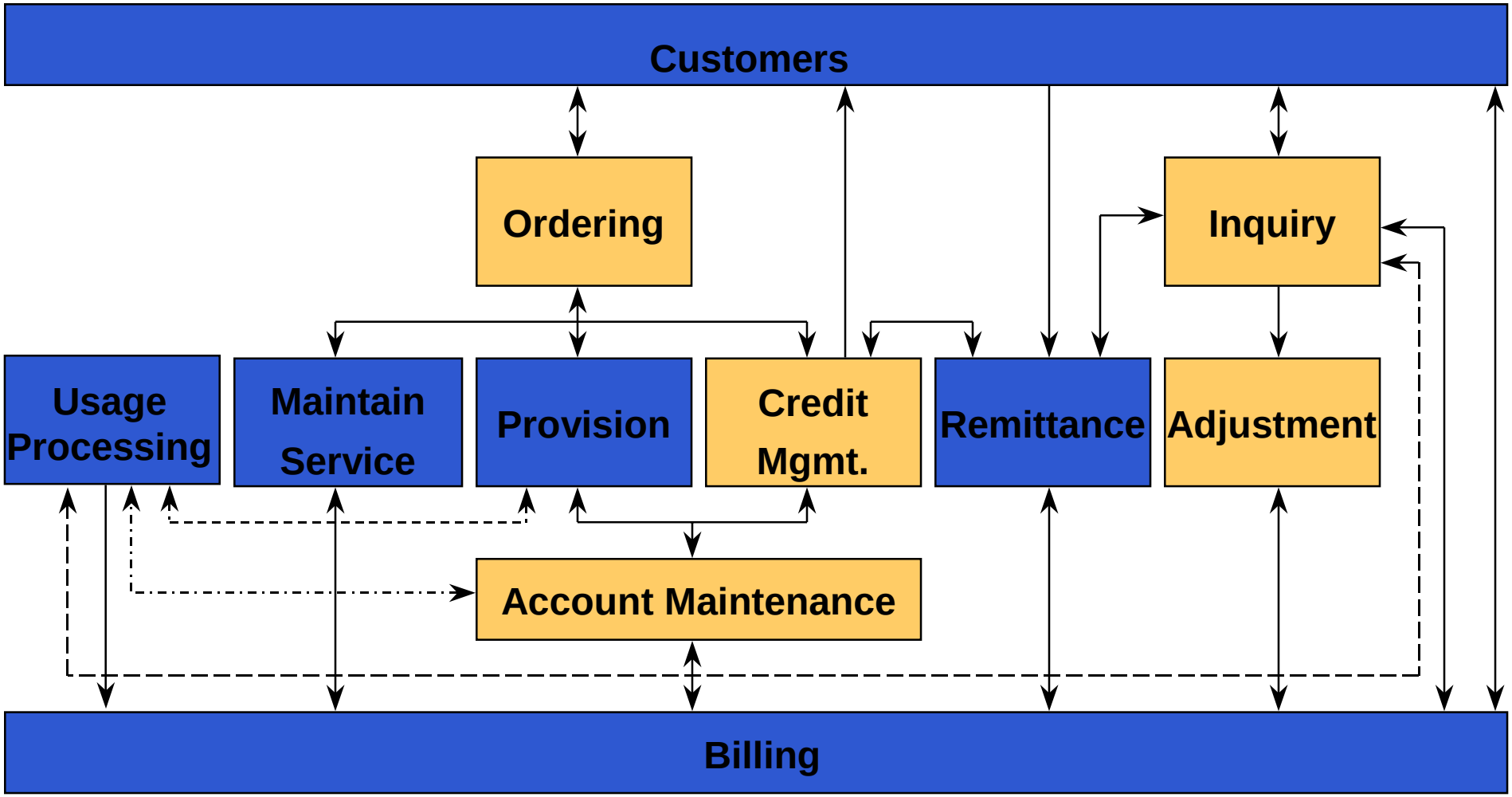
Protecting Business-Critical Information

… Business Process



Business Process to Supporting Applications

Business Process	Supporting Applications
Ordering	Application A
Account Maintenance	Application B
Inquiry and Adjustment	Application C
Credit Management	Application D

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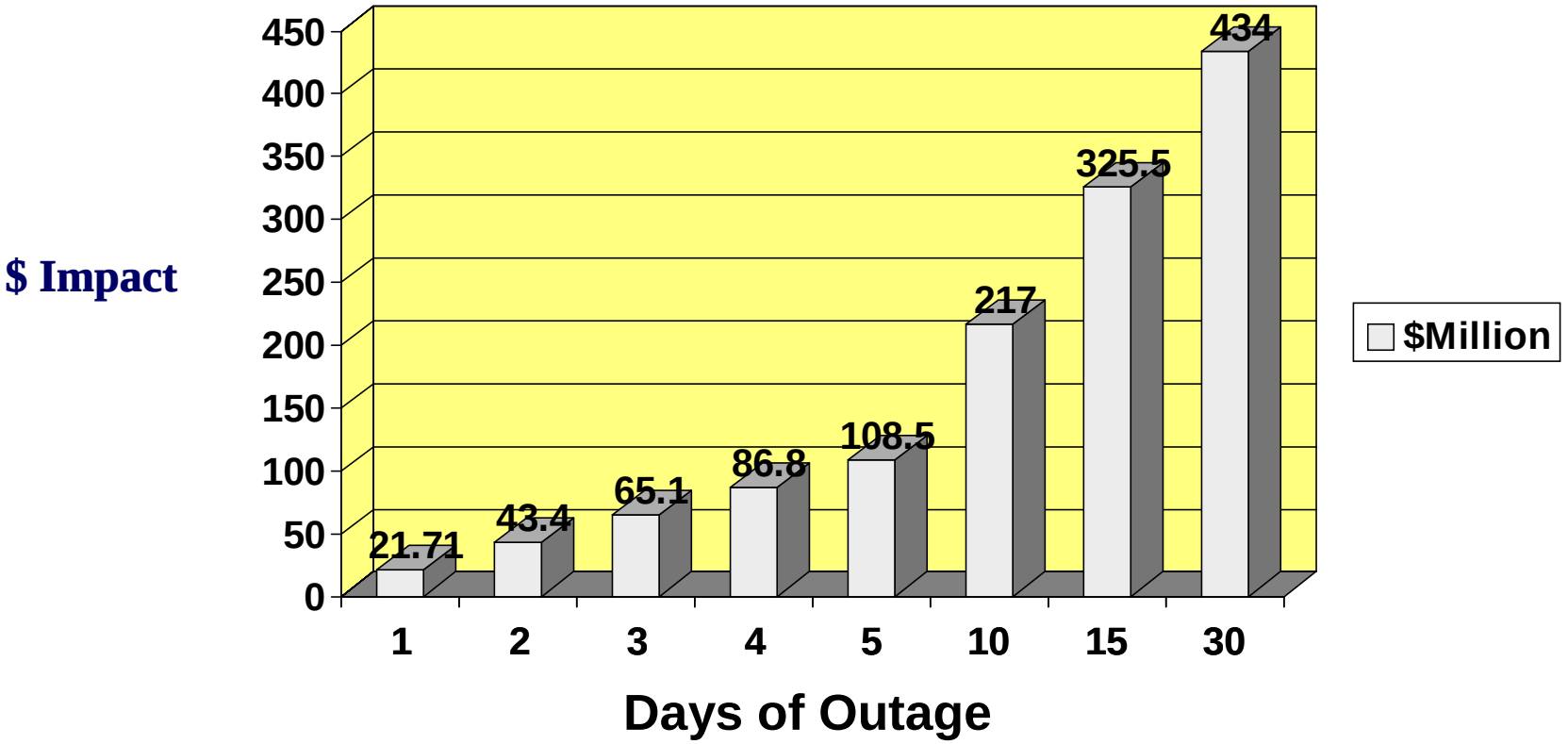
Business Process to Supporting Applications Financial Impact



$ Impact = Lost Revenue + Deferred Revenue + Increased Costs + Customer Satisfaction + Competitive Advantage + Regulatory + Litigation

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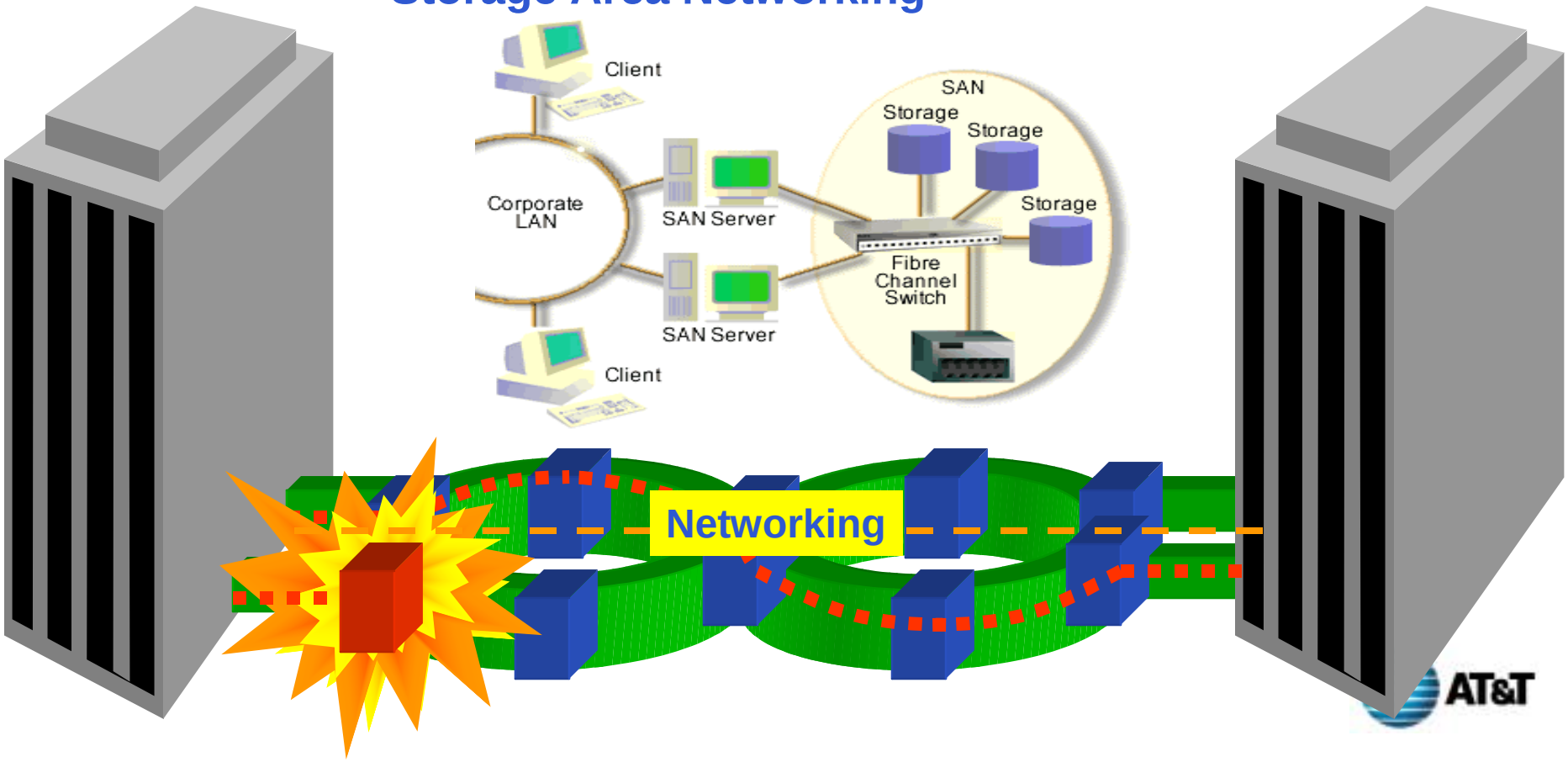
Protecting Business-Critical Information … Network

- Survivable Networks Automatically Route Around Single Points of Failure
- Storage Area Networking



Protecting Business-Critical Information … Network

Network Downtime Measured in Terms of:

- **Revenue loss per hour**
- **Profit loss per hour**
- **Direct labor loss per hour**
- **Overhead expense per hour**

Implications:

- **You must focus on your core competency**

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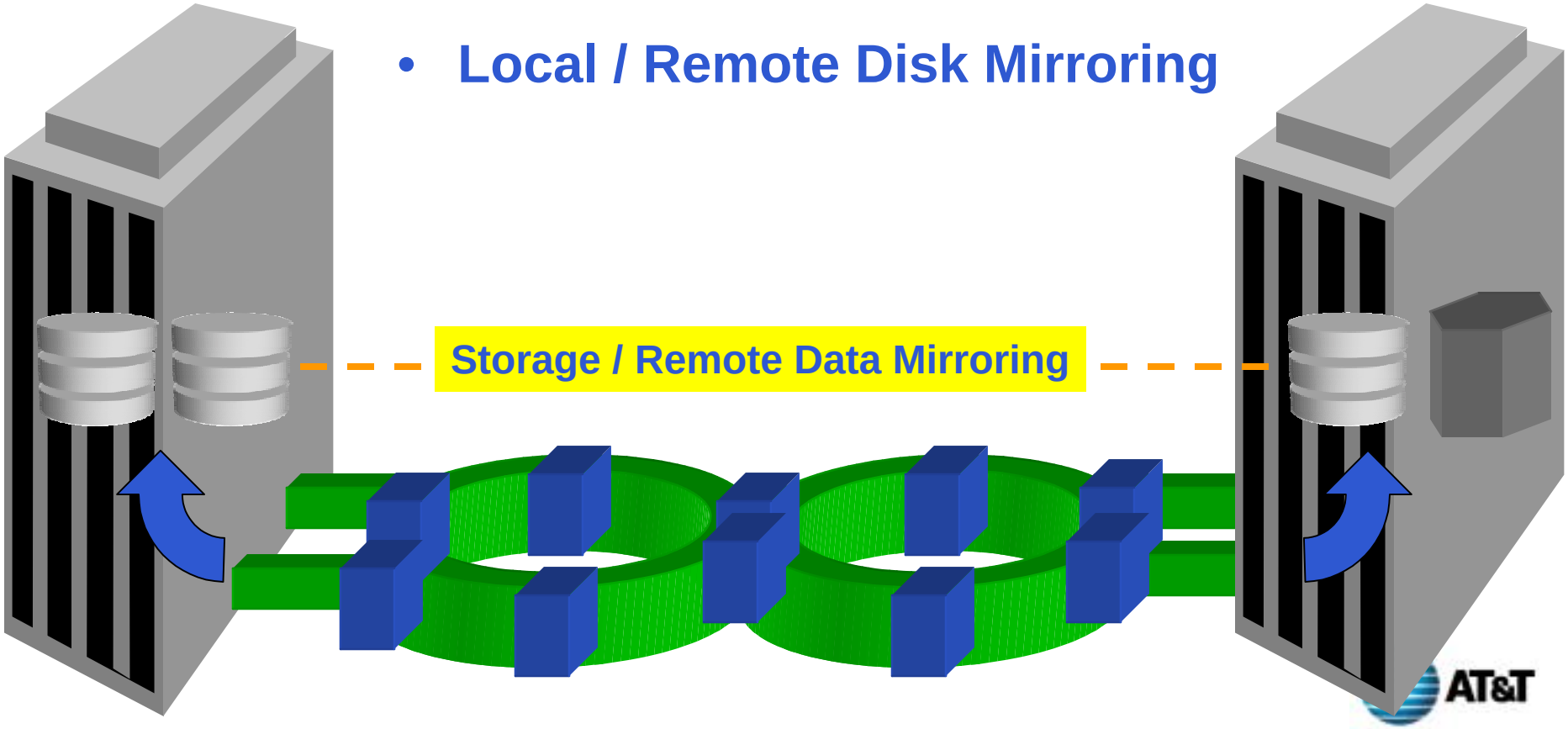
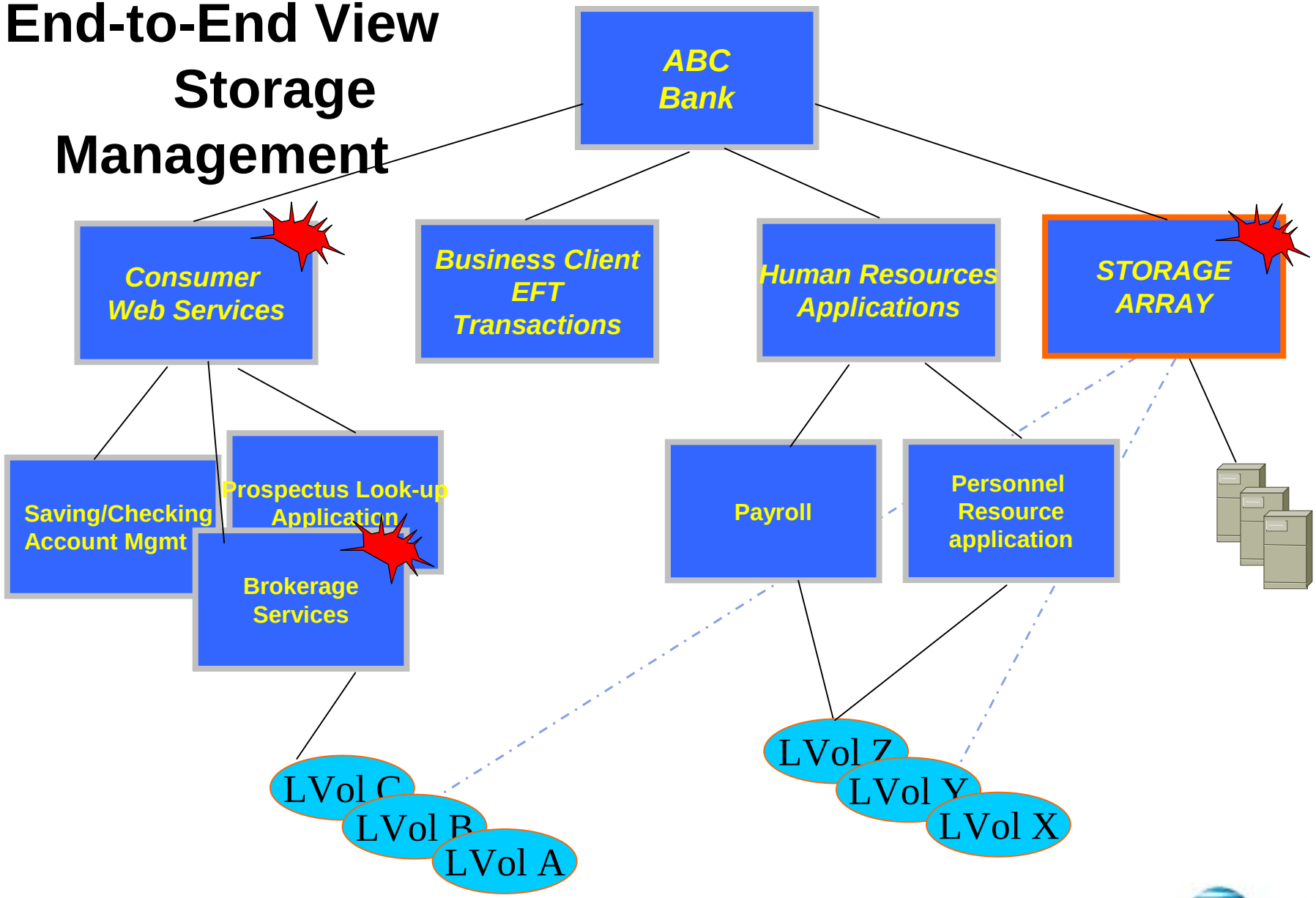
Protecting Business-Critical Information … Storage

- Storage Growth
- Remote Tape Back-up
- Local / Remote Disk Mirroring



End-to-End View Storage Management



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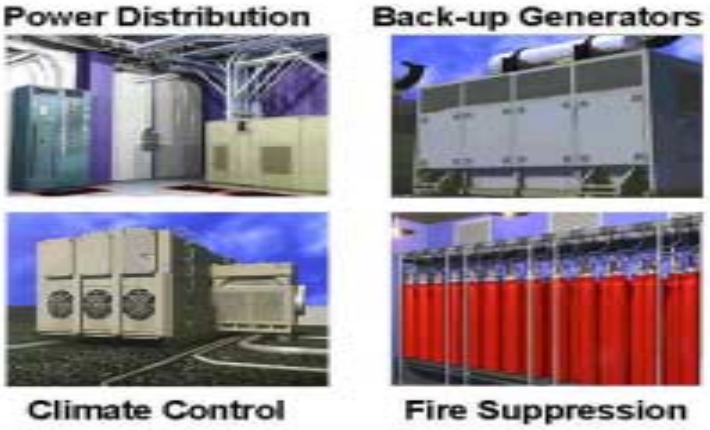
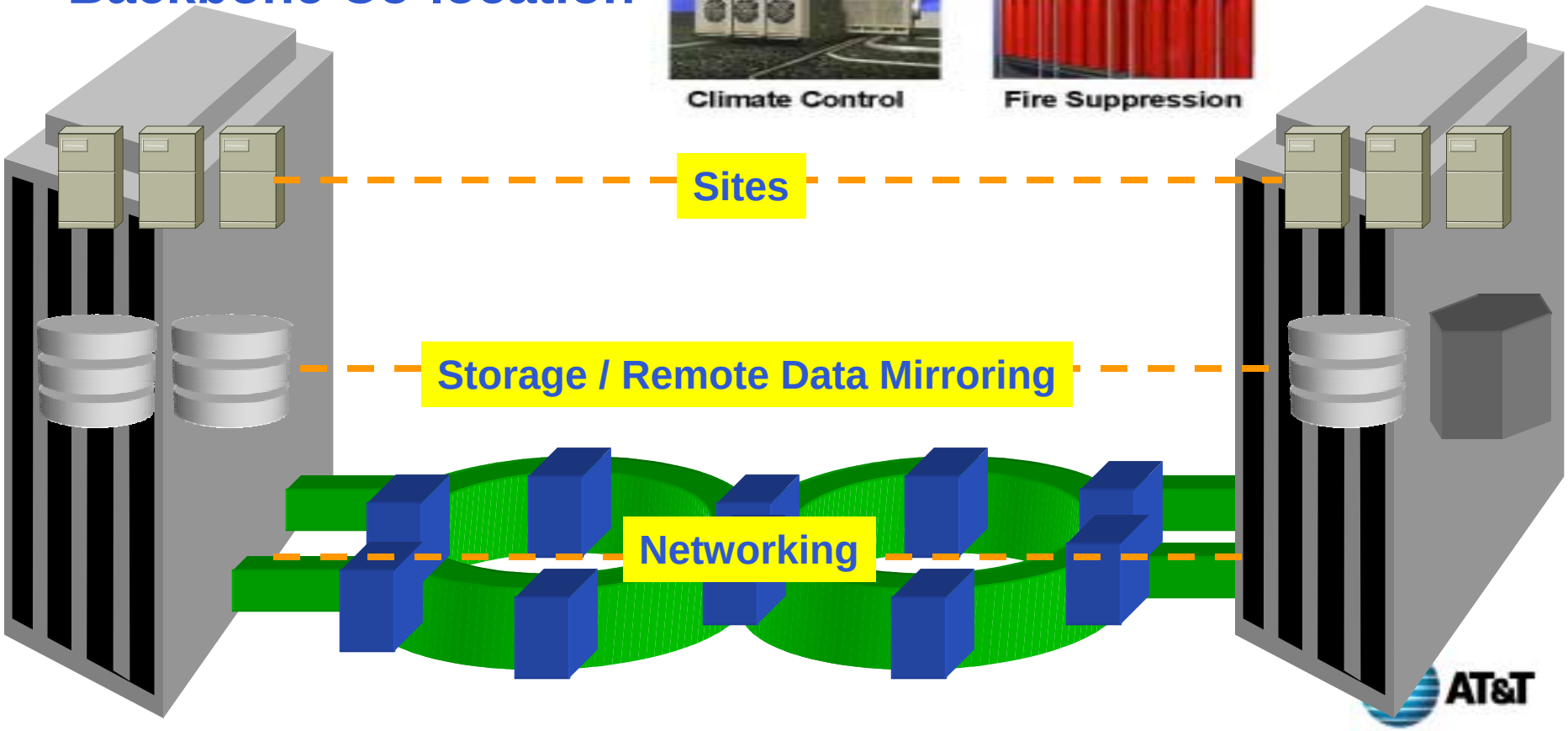
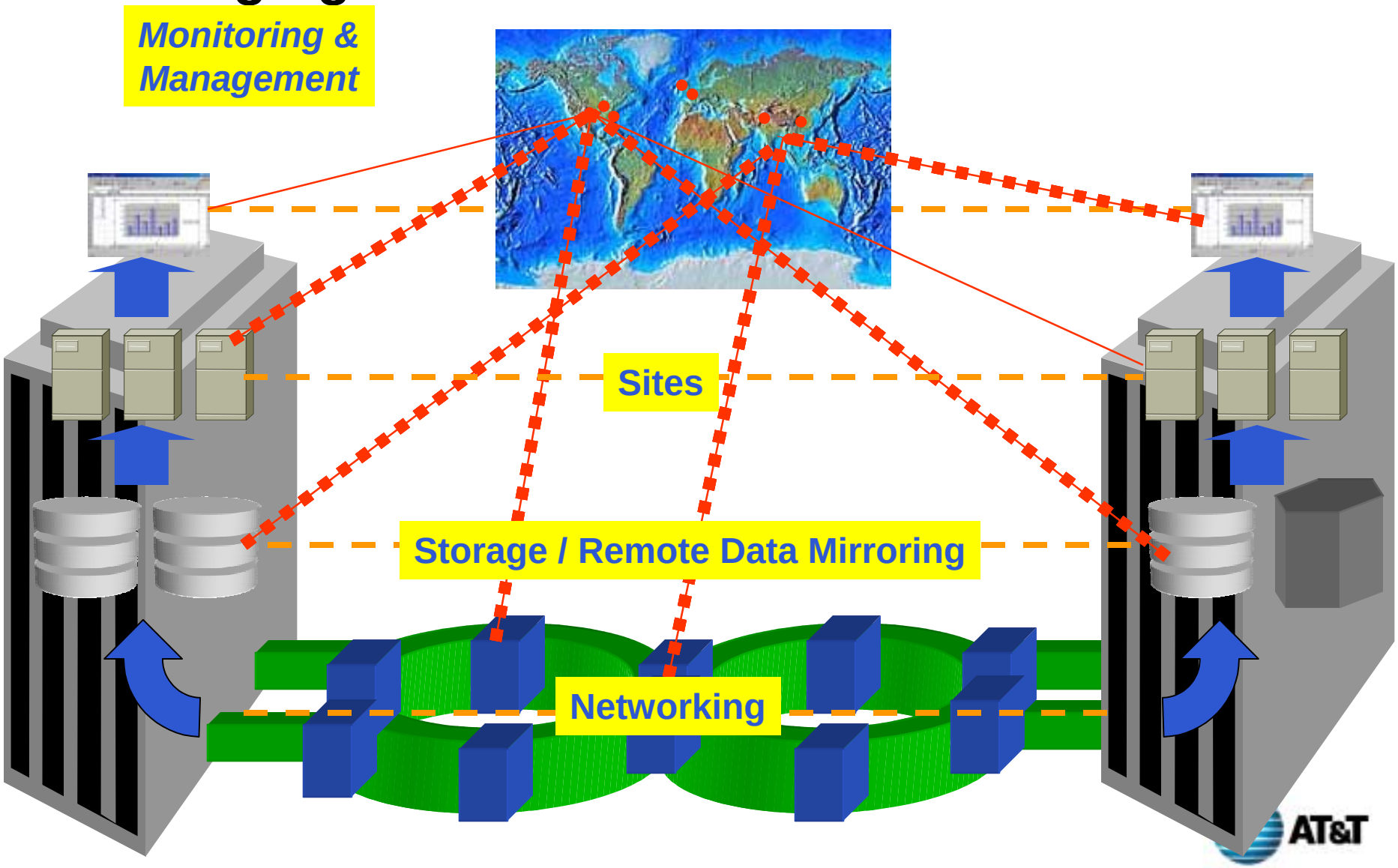
Protecting Business-Critical Information … Near 100% Availability

- Conditioned Space
- Physically Secure
- Backbone Co-location

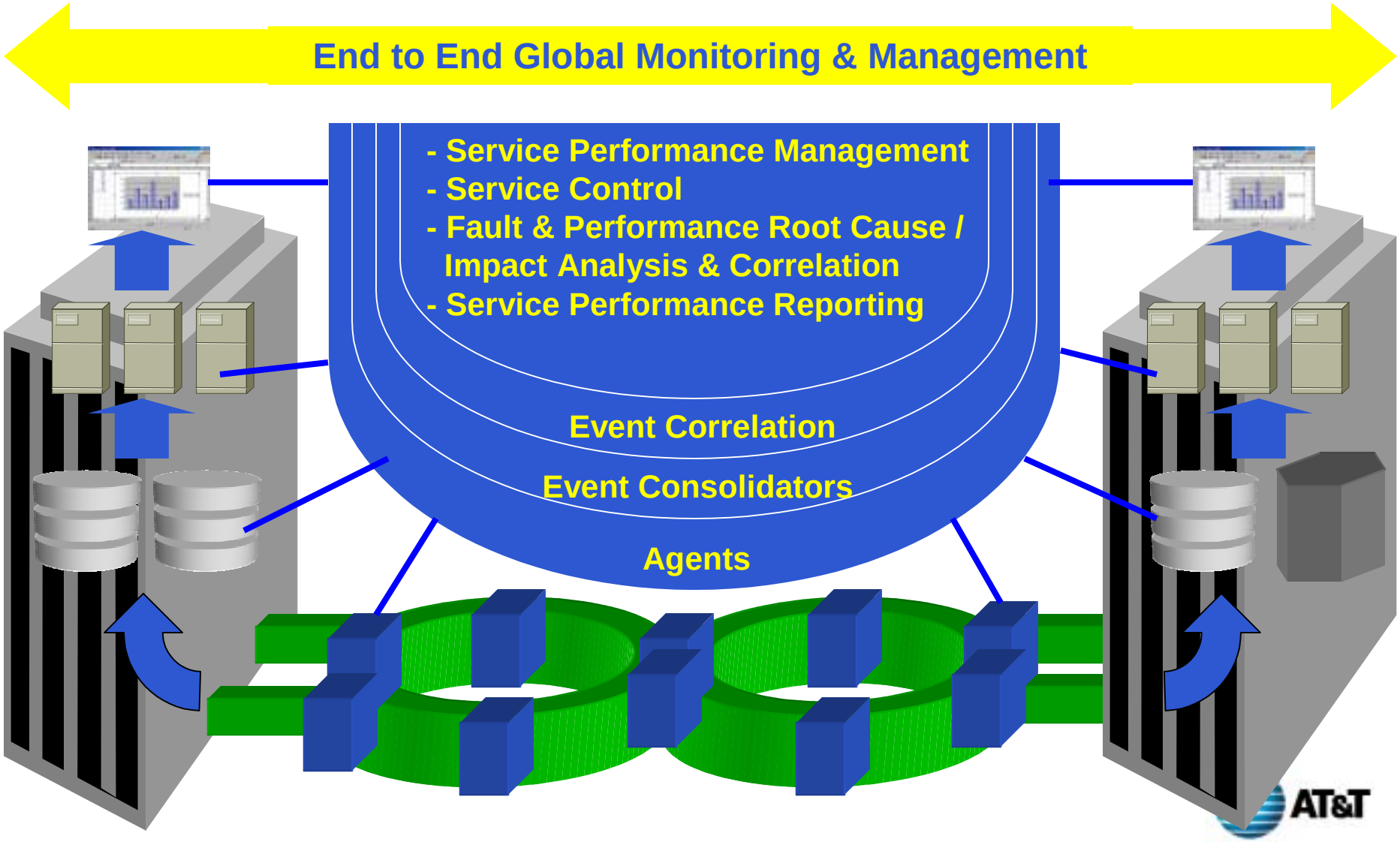




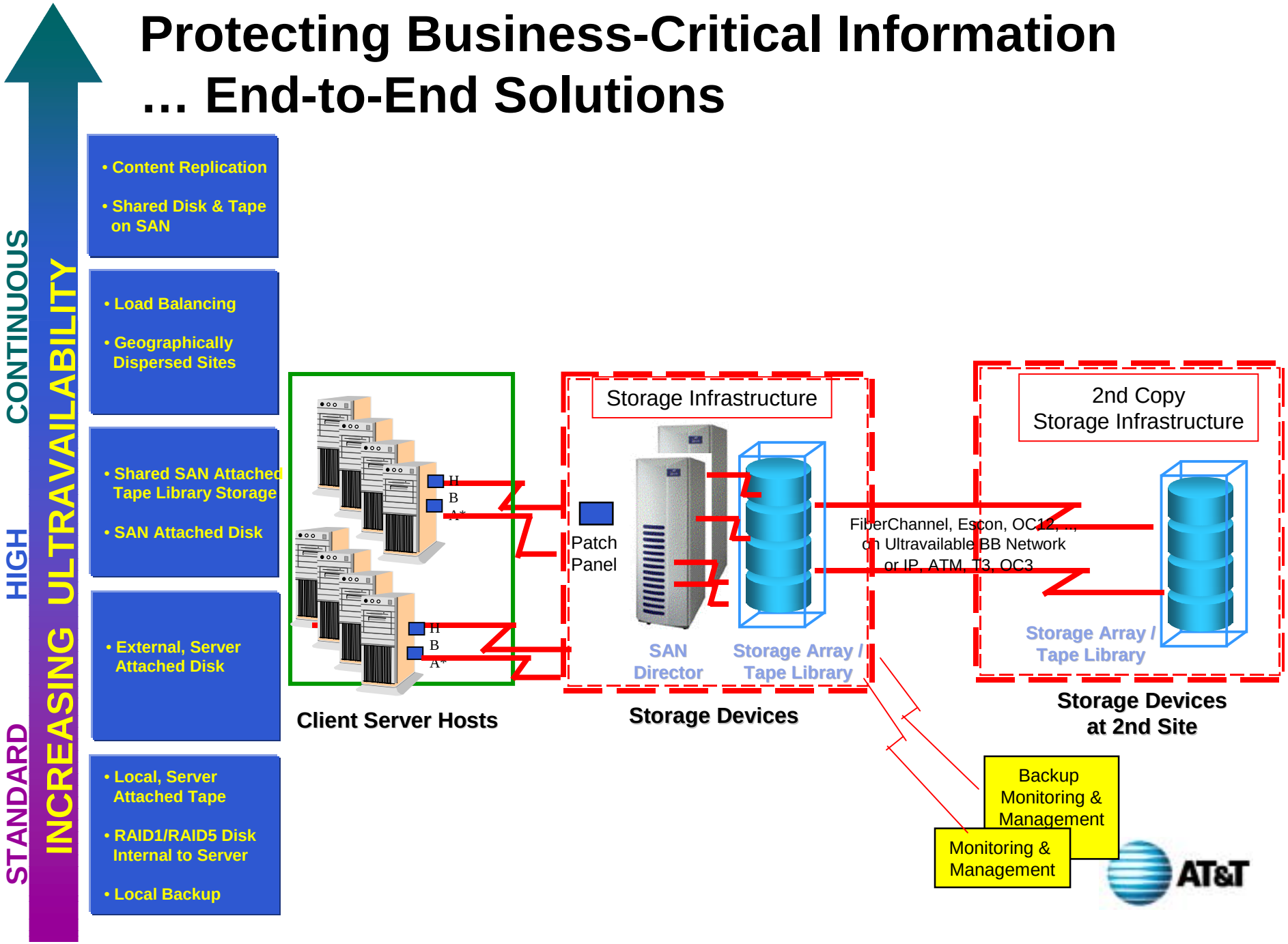
Protecting Business-Critical Information … Managing End-to-End Solutions



Protecting Business-Critical Information … Managing End-to-End Solutions



Protecting Business-Critical Information … End-to-End Solutions



Protecting Business-Critical Information … End-to-End Solutions

IT Based Service Level Objectives

- **Transaction**
  - Transaction Availability
  - Transaction Resp. Time
- **Platform / Application**
  - Availability
  - CPU Utilization
  - I/O
- **Network**
  - Availability
  - Latency
  - Packet Loss
- **Storage**
  - Availability
- **Resolution Management**
  - Time to Respond
  - Time to Cure

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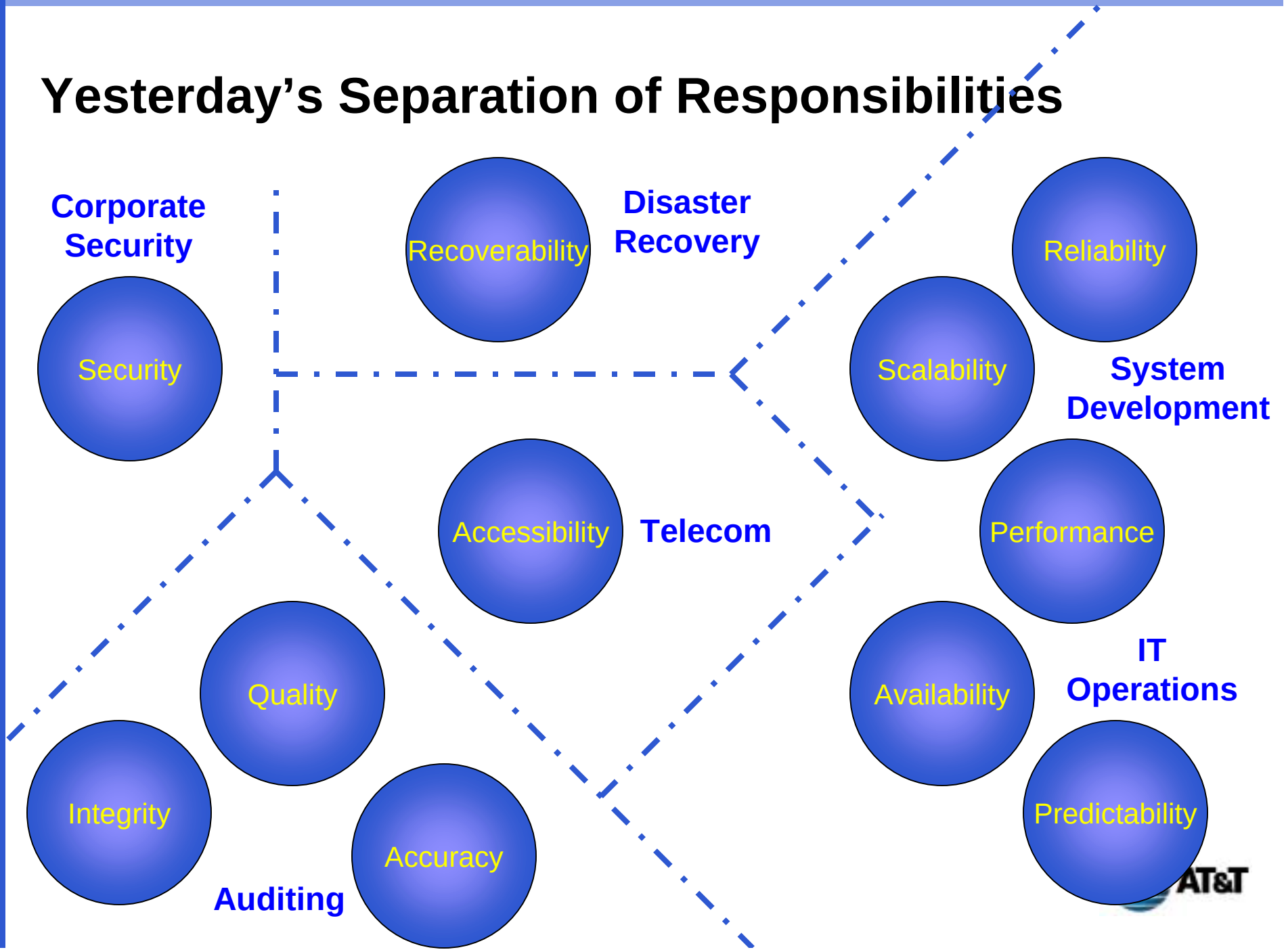
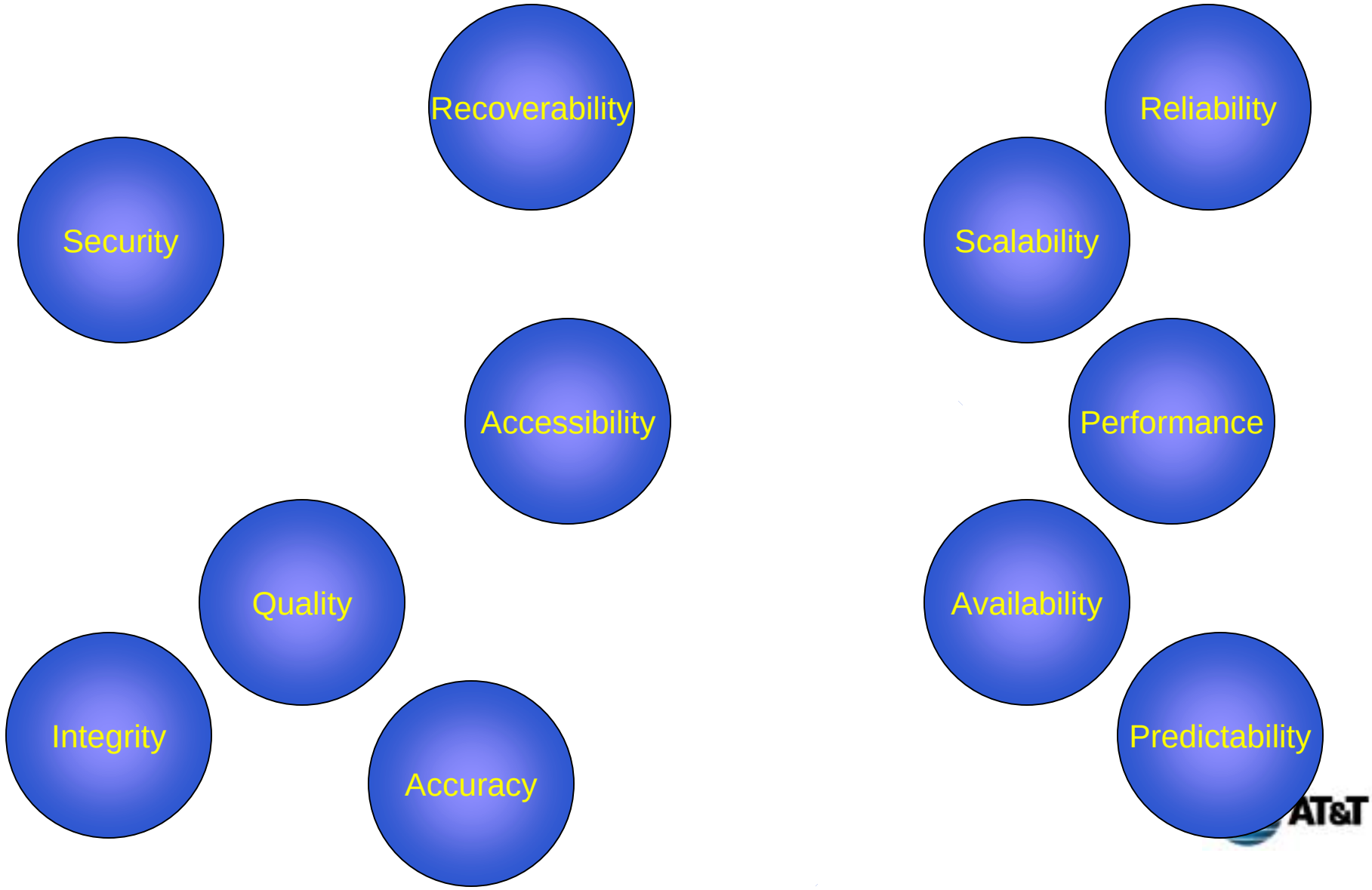
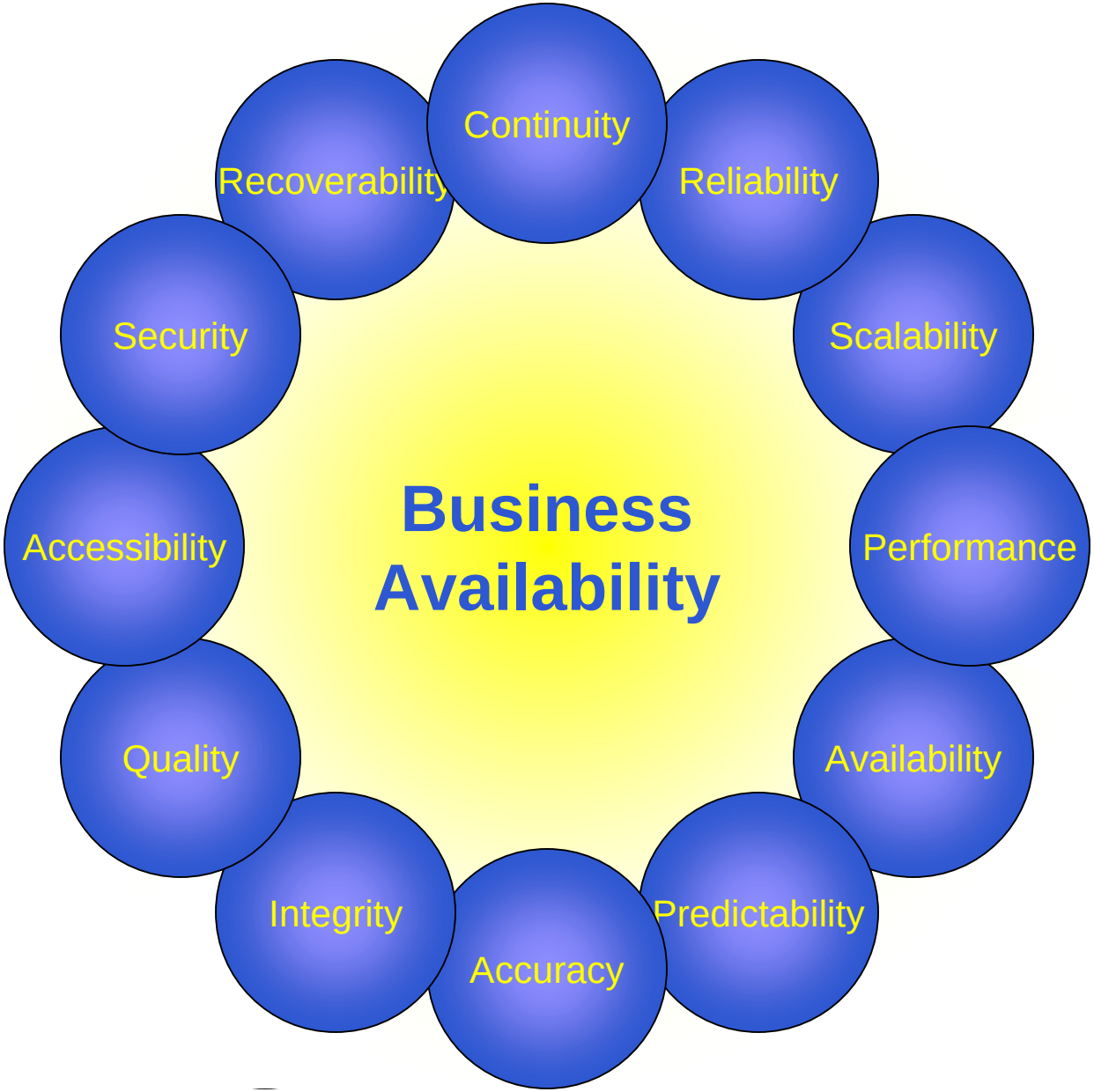
Yesterday's Separation of Responsibilities



Eliminating Barriers



Unifying the Customer Experience



Today's challenge: Design, build, implement and manage highly specialized complex high availability, secure, disaster resilient solutions that the business absolutely depends *while also*:

Maintaining focus on the core business

Hiring, training, and retaining a skilled staff

Selecting and managing multiple vendor partners

Handling aggressive implementation schedules

Keeping up-to-date with changing technology

Ensuring that the solution will not suffer an outage

Minimizing capital expenditures

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BOTTOM LINE:

Protecting Business-Critical Information