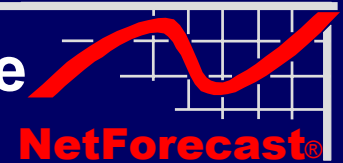


Performance Framework and Supporting Technology

NetWorld+Interop Performance Conference
Las Vegas – May 12, 2004



Peter Sevcik

NetForecast, Inc.
955 Emerson Drive
Charlottesville, VA 22901

434 249 1310
www.netforecast.com

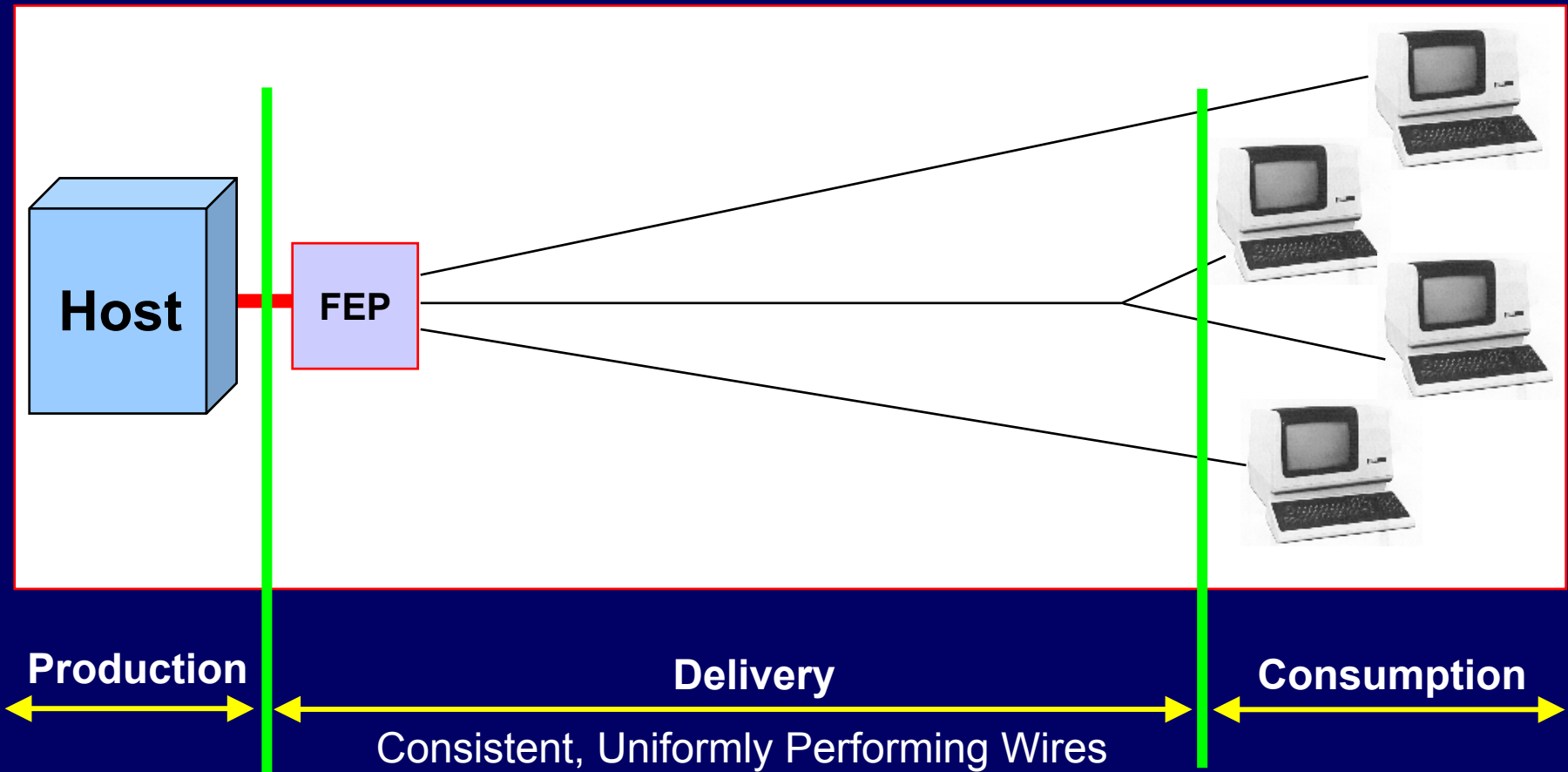
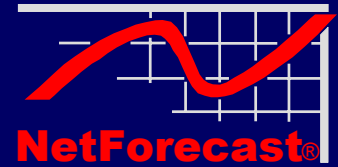
NetForecast Report 5071

Outline

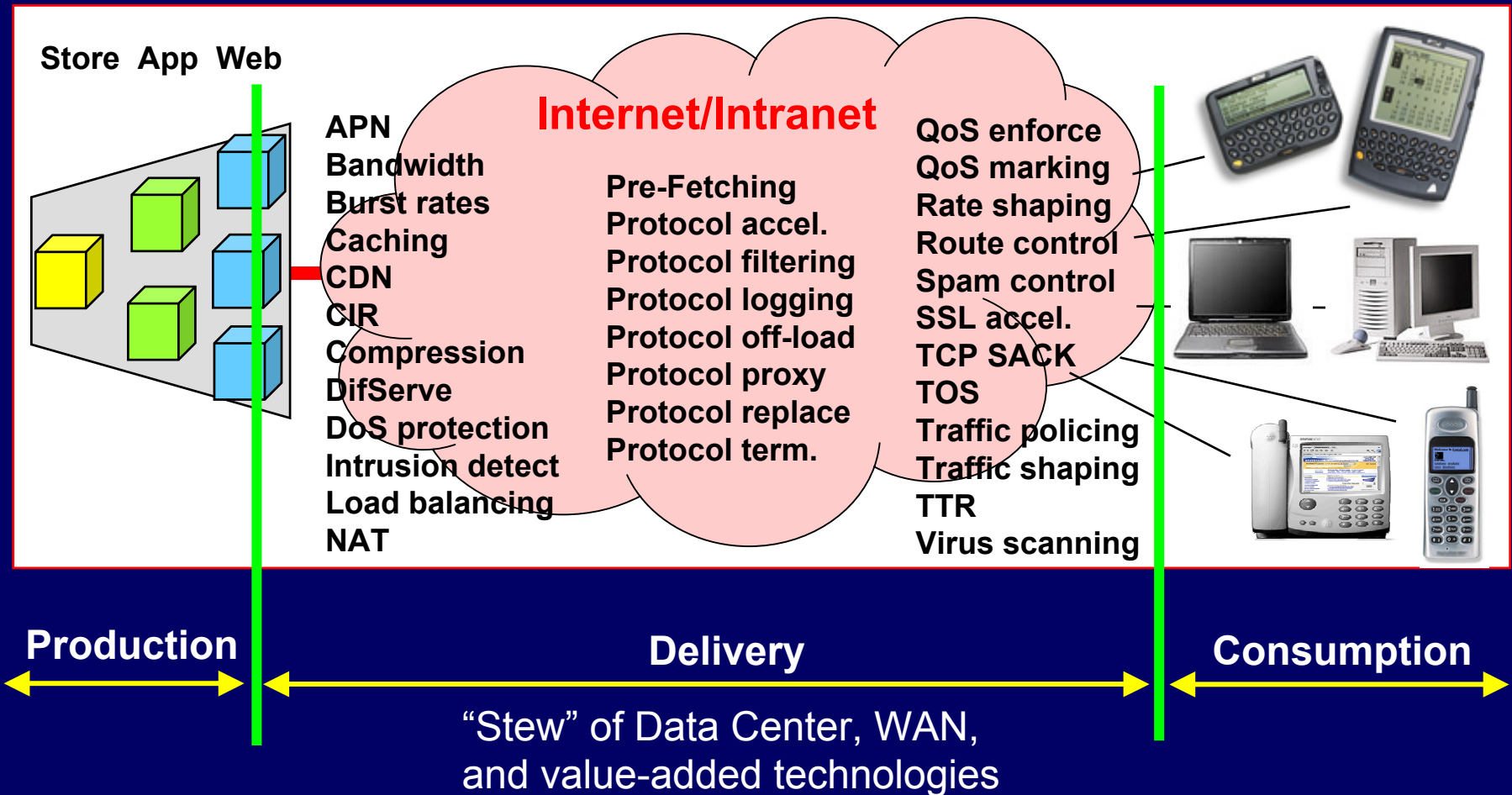


- **The Application Delivery System**
- **Performance Framework**
- **Solutions in the Framework**
- **The N+I Performance Venue**

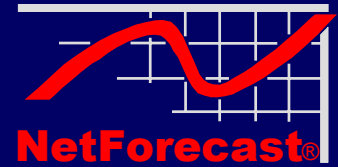
In the Beginning Life Was Simple



Today Complexity Abounds

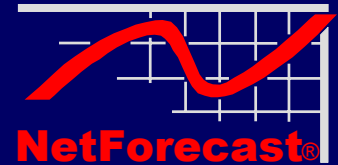


The Application Performance Delivery System



- **Applications deployed to solve a business problem**
 - Performance is assumed in the process
 - Acceptance is based upon easy delivery conditions
 - When real world conditions hit – something does not work well
- **Too late to change application or user expectations**
 - Conventional wisdom is that you can't measure or improve performance over the Internet
 - But you often can know more and do more for a Web-based application over the Internet than you can for traditional private network applications
- **Do not give up!**
 - Help is available in the delivery system
 - Vendors striving to exert control over a shared system
 - Enhancing performance is a new arena for innovation

Performance Framework Offers



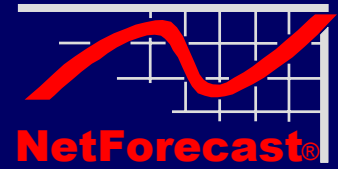
- **The application performance delivery system stew**
 - **A confusing, growing market:**
 - More than 150 vendors claim to measure or improve performance
 - **Each vendor provides its own view and approach**
 - Results can be confusing, inconsistent, conflicting, and incomplete
- **Methodology to understand many components**
- **Puts solutions into easily understood categories**
- **Easy mapping between requirements and solutions**
- **Defines an evaluation process**
- **Translates performance benefits into business value**

Outline



- The Application Delivery System
- Performance Framework
- Solutions in the Framework
- The N+I Performance Venue

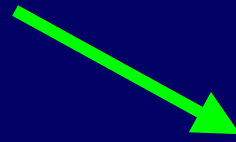
Performance Framework



Approach

Constraint

| | | | | |
|-----------|--|--|--|--|
| Objective | | | | |
| | | | | |
| | | | | |

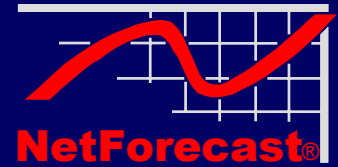


Effectiveness

Function

| | | | | |
|-------------|--|--|--------|--|
| Application | | | | |
| | | | Metric | |
| | | | | |

Using the Framework in a Process



Decision Process

Why change the system?

Where can you change it?

What is the performance effect?

Who is effected?

How well does a solution work?

Framework

Objective

Constraint

Function

Application

Benefit

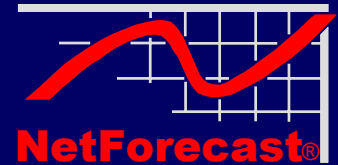
Approach

Effectiveness

Framework

Objective
Constraint
Function
Application
Benefit

Objective



- **Measure (watch what is going on)**
 - Monitor performance
 - Gather real-time data on the application delivery system
 - Report meaningful information that directly aids decisions
 - Analyze data to find and fix performance problems
- **Control (ensure bad things don't happen)**
 - Maintain “good” performance during system stress
 - Too much traffic, resource loss, congestion, conflicting traffic
 - Optimize the application delivery system
 - Effect is evident only during times of stress
- **Extend (improve behavior in all situations)**
 - Improve performance regardless of system stress
 - Change how the delivery system operates
 - Overcome technical limitations by streamlining the process
 - Effect is evident all the time

Framework

Objective

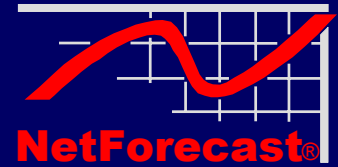
Constraint

Function

Application

Benefit

Objective Examples



Extend

Akamai
Netli
NetScaler

Control

Packeteer
Route Science
Sitara

Measure

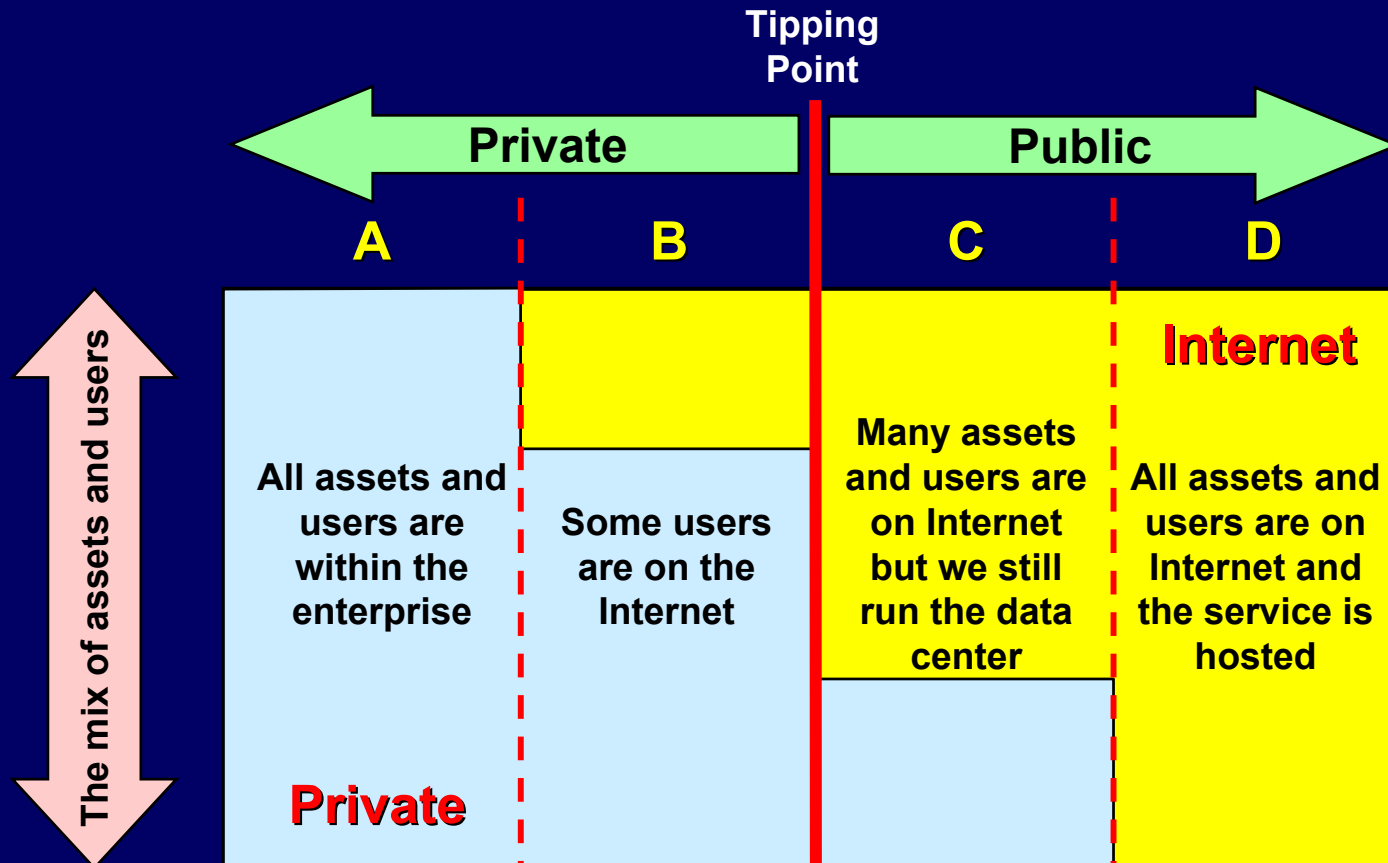
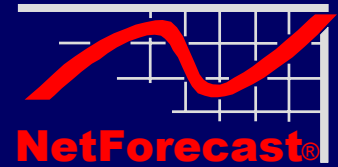
Coradiant
Keynote
Network Physics

| | | |
|---|-----------------|---------------------|
| Reporting | Reporting | Reporting |
| Correlation Analysis | Active Control | Flow Reconstruction |
| | Policy Analysis | Flow Intercept |
| | | Pattern Recognition |
| Instrumentation, Data Gathering, Integration | | |

Framework

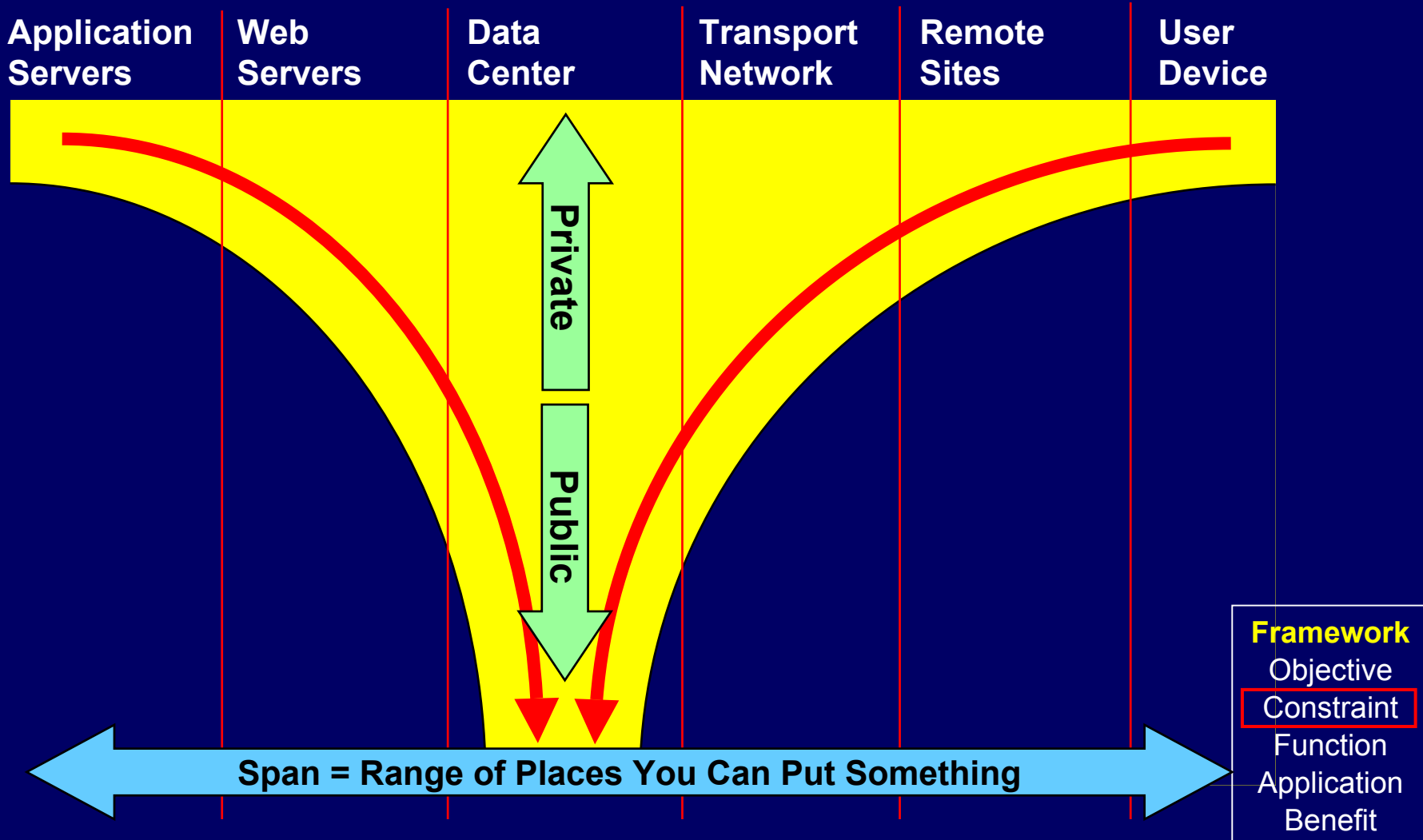
Objective
Constraint
Function
Application
Benefit

IT Assets and Users Scenario

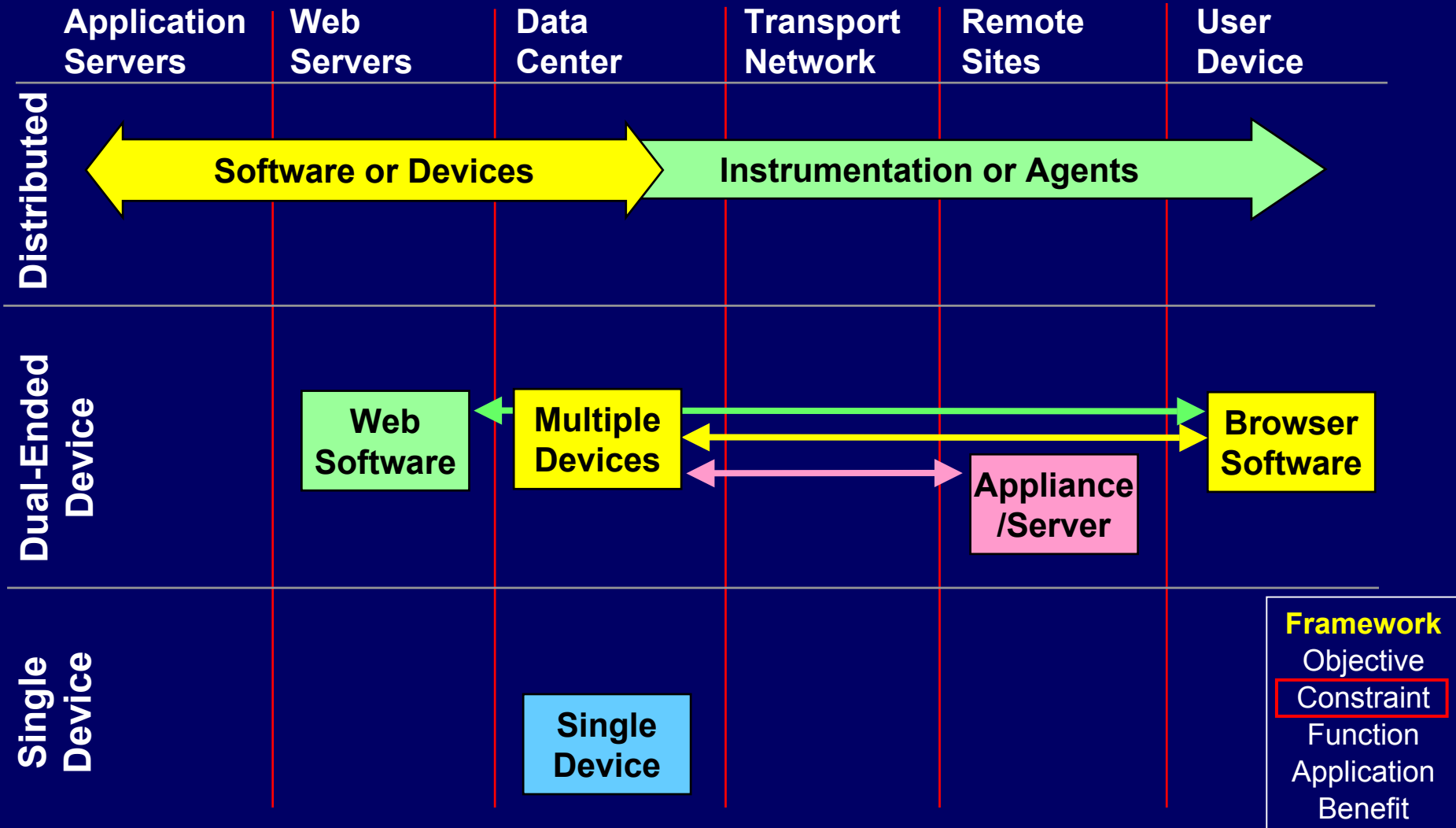
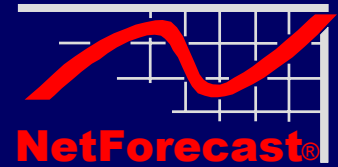


- Framework
- Objective
- Constraint
- Function
- Application
- Benefit

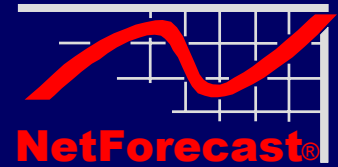
Span of Control



Constraint is Defined by Span of Control



Performance Framework – Approach



| | | Approach | | | | | |
|-----------|---------|-------------|-----------|---------------|----------|---------------------|-----------------------|
| | | Distributed | | Single Device | | Dual-Ended Device | |
| | | Data Mining | Real-Time | Server Edge | Net Edge | Datacenter +Browser | Datacenter +Appliance |
| Objective | Measure | | | | | | |
| | Control | | | | | | |
| | Extend | | | | | | |

Framework

Objective

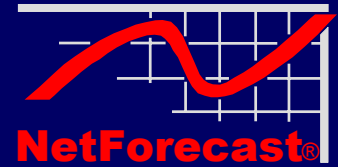
Constraint

Function

Application

Benefit

Two Management Goals



- **Asset Management (managing the delivery assets)**
 - Link the system goals to the internal needs of the business
 - Insure that the budgets are met
 - Get the best efficiently out of the assets
 - Control or decrease costs
- **Experience Management (managing user experience)**
 - Link the system goals to the external needs of the business
 - Insure that users are happy
 - Provide the highest value to the users
 - Maintain or increase revenue

Framework

Objective

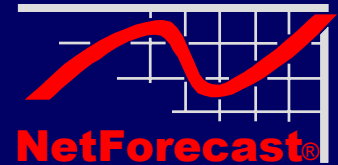
Constraint

Function

Application

Benefit

Resolving the Confusion



Legacy View

- **Asset Management**
 - Availability – All of the assets are working
 - Performance – Efficient utilization of the assets
 - Security – Making sure the system is safe from attack
- **Experience Management**
 - Availability – Users have access to the resources they need
 - Performance – The users have a quality experience
 - Security – Making sure that the users are safe

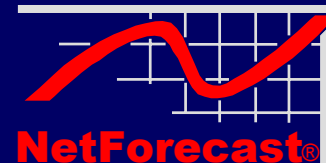
Better Terms

- **Asset Management**
 - Provisioning
 - Efficiency
 - Protection
- **Experience Management**
 - Accessibility
 - Quality
 - Safety

Framework
Objective
Constraint
Function
Application
Benefit

Performance Functions

Performance = an integration of these functions



| | Availability | Effectiveness | Security |
|---------------------------|--|--|--|
| Asset (Internal View) | Provisioning Ability of the system to establish new service or recover failed service | Efficiency Ability of the system to make the best utilization of the assets | Protection Ability of the system to protect itself from malicious use that would degrade the asset |
| Experience (User View) | Accessibility Ability of the system to provide the broadest access to its authorized users | Quality Number of users that are satisfied with the interaction process (response time, MOS) | Safety User comfort interacting with the system (privacy, Identity protection, anti-virus, etc) |

Framework

Objective

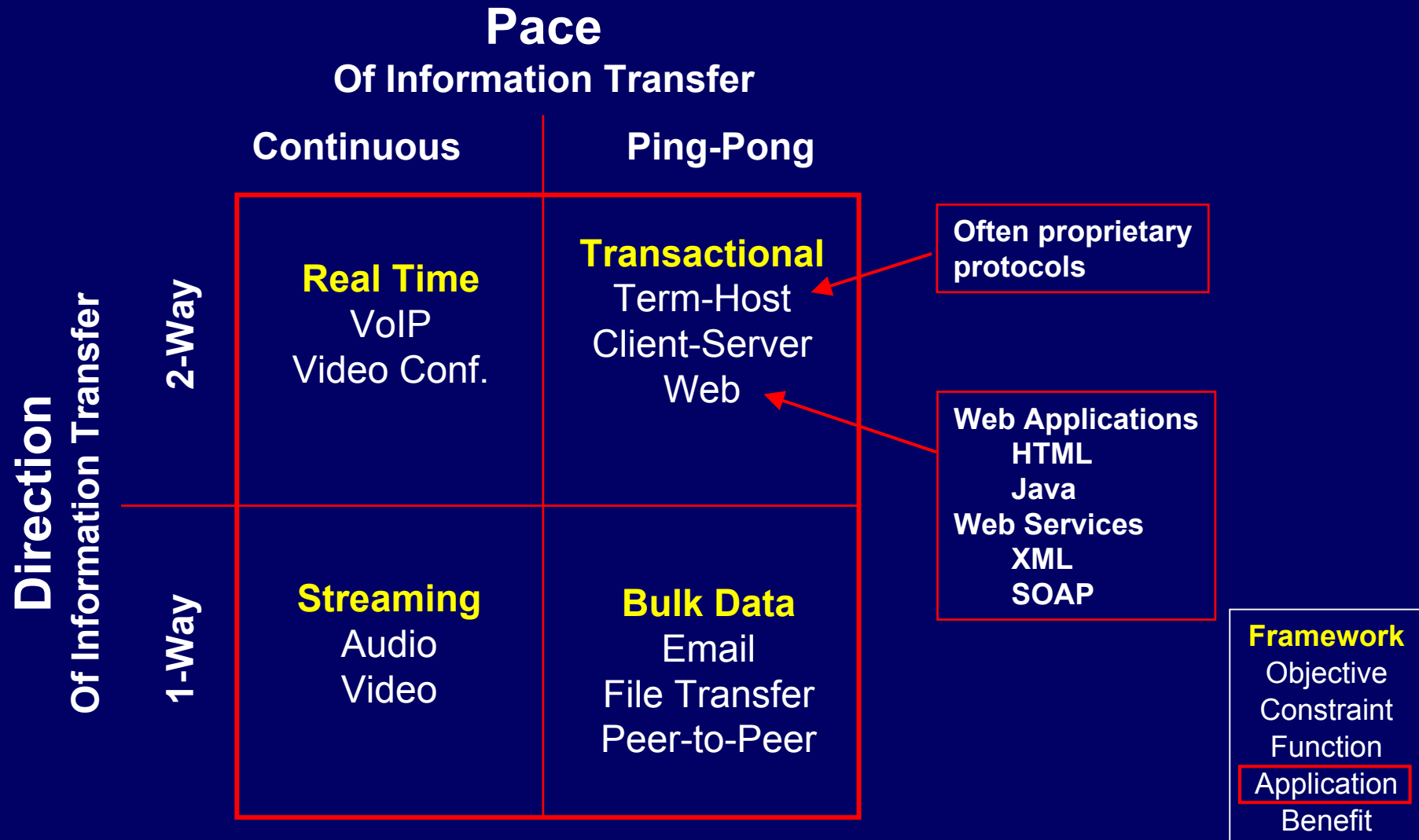
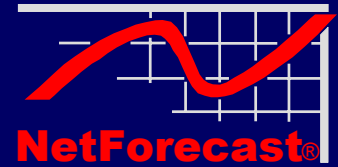
Constraint

Function

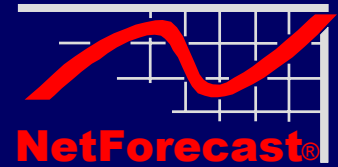
Application

Benefit

Management Points are Application and Protocol Driven



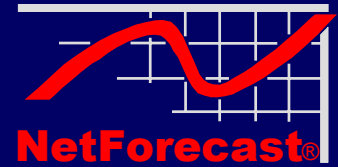
Performance Framework – Effectiveness



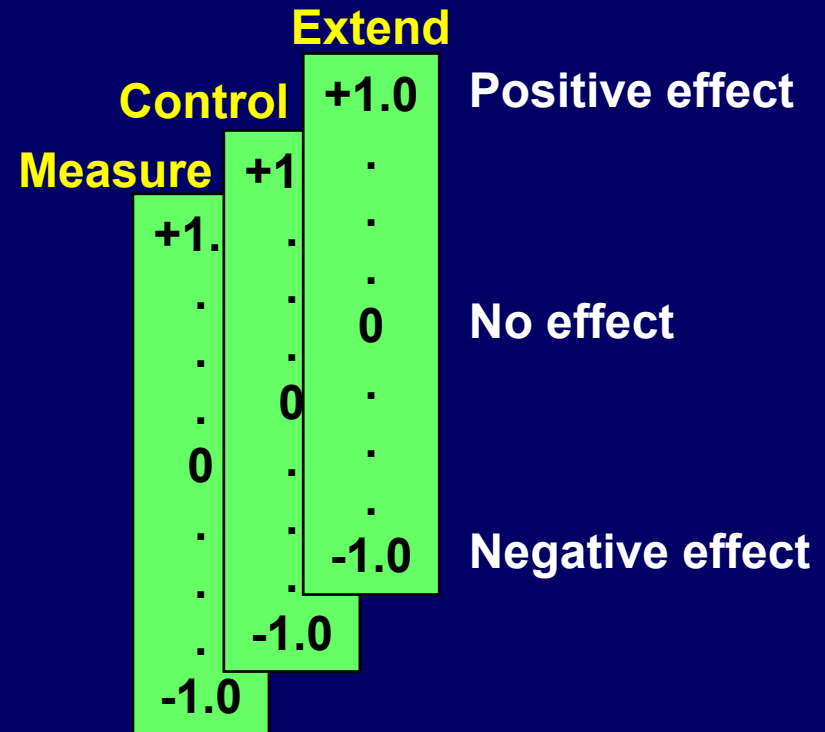
| | | Effectiveness | | | | | |
|---------------|------------------|------------------|------------|------------|-----------------------|---------|--------|
| | | Asset Management | | | Experience Management | | |
| | | Provisioning | Efficiency | Protection | Accessibility | Quality | Safety |
| Real Time | Voice over IP | | | | | | |
| | Video Conference | | | | | | |
| Transactional | Terminal-Host | | | | | | |
| | Client-Server | | | | | | |
| | Web Applications | | | | | | |
| | Web Services | | | | | | |
| Stream | Streaming Audio | | | | | | |
| | Streaming Video | | | | | | |
| Bulk Data | Email | | | | | | |
| | Peer-Peer | | | | | | |
| | File Transfer | | | | | | |

Framework
 Objective
 Constraint
 Function
 Application
 Benefit

Benefit Metrics for Functions



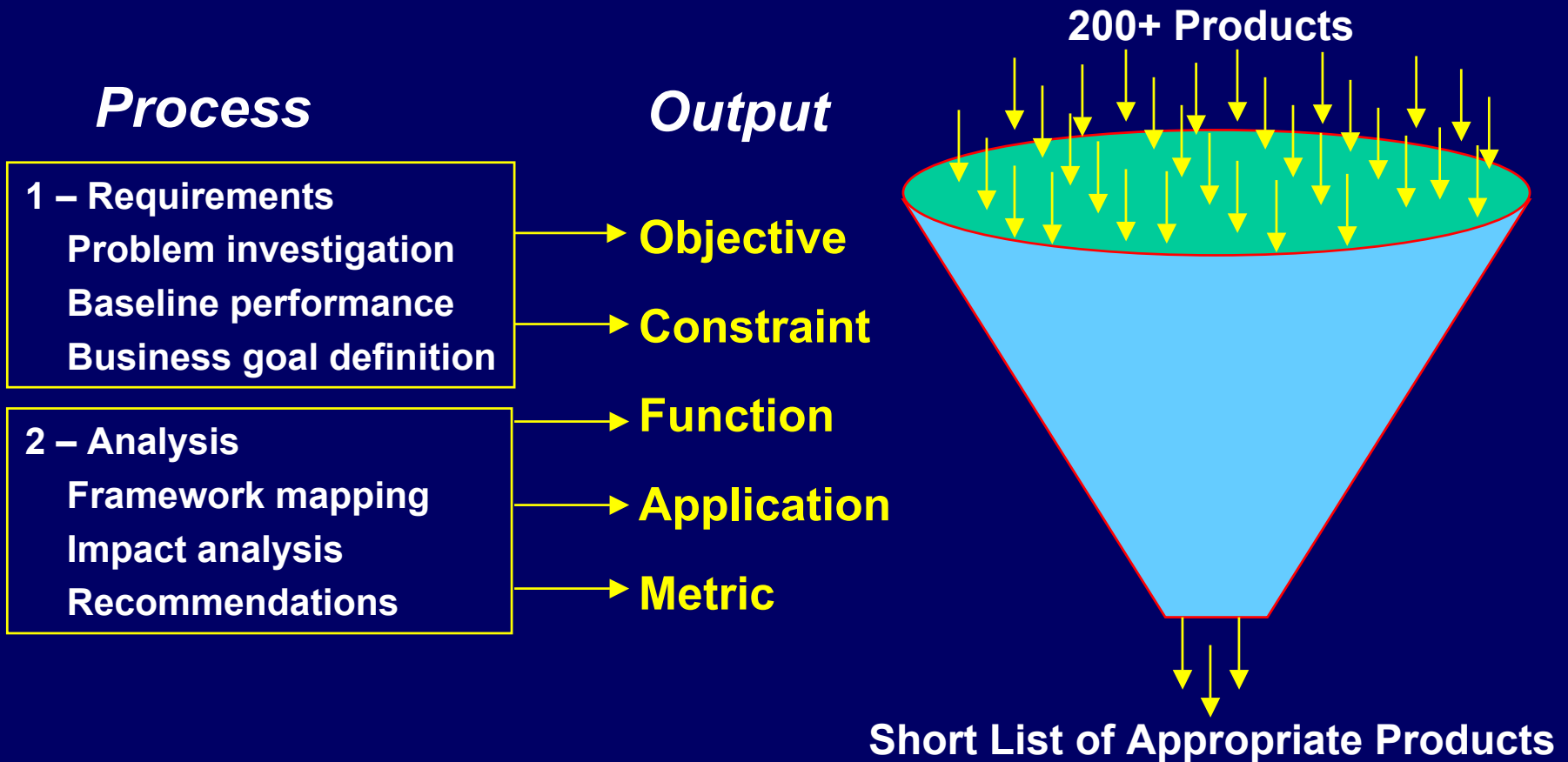
- Metrics are uniform across functions and approaches
- Each metric is normalized into a scale of 0 to 1
- Metrics clearly state which part of the framework is being evaluated
- Each rating is for the additional capability provided for the function and application pair (within a cell)



Framework

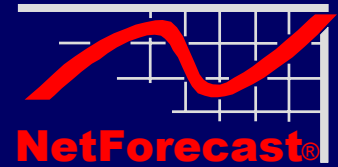
Objective
Constraint
Function
Application
Benefit

Framework Helps Focus Choices



Multinational Corp. SCM Case

Benefit Ratings



Final
Weighted
Score

| Asset Management | | | Experience Management | | |
|------------------|------------|------------|-----------------------|---------|--------|
| Provisioning | Efficiency | Protection | Accessibility | Quality | Safety |

Control: Route Control

| | | | | | | | |
|---------------|---|------|---|------|---|---|------|
| Web-based SCM | 0 | +0.1 | 0 | +0.1 | 0 | 0 | +0.1 |
|---------------|---|------|---|------|---|---|------|

Extend: CDN

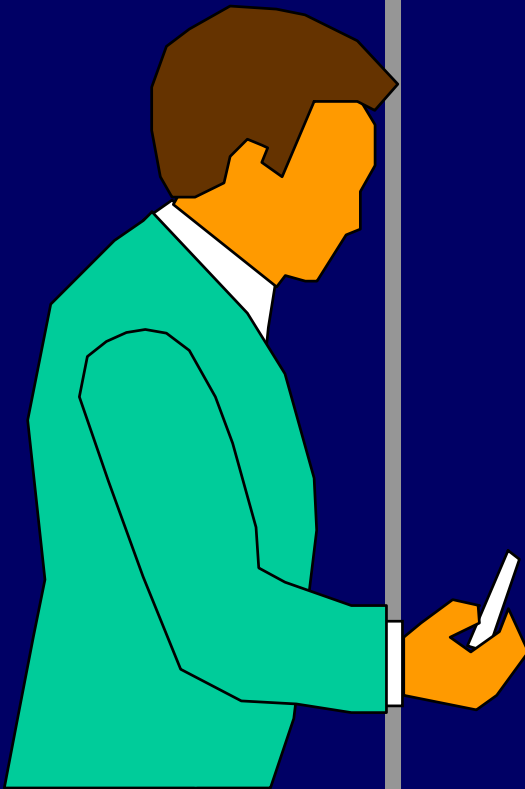
| | | | | | | | |
|---------------|---|------|---|------|---|---|------|
| Web-based SCM | 0 | +0.3 | 0 | -0.3 | 0 | 0 | -0.2 |
|---------------|---|------|---|------|---|---|------|

Extend: Compression Server-Browser

| | | | | | | | |
|---------------|---|------|---|------|------|---|------|
| Web-based SCM | 0 | +0.1 | 0 | -0.1 | +0.5 | 0 | +0.4 |
|---------------|---|------|---|------|------|---|------|

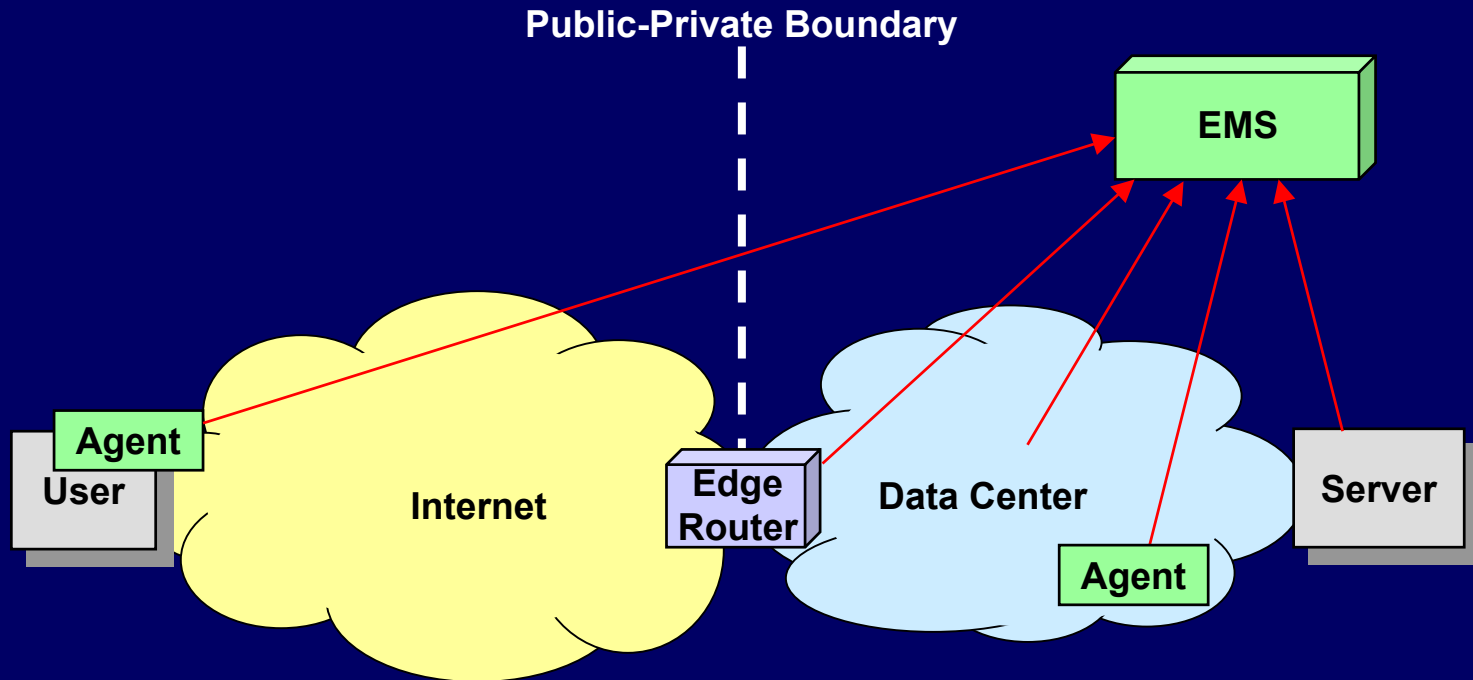
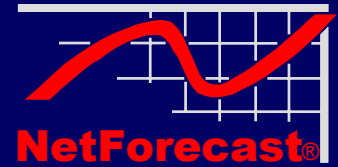
Extend: Compression Datacenter-Browser

| | | | | | | | |
|---------------|------|------|---|------|------|---|------|
| Web-based SCM | -0.1 | +0.3 | 0 | -0.1 | +0.5 | 0 | +0.3 |
|---------------|------|------|---|------|------|---|------|



- The Application Delivery System
- Performance Framework
- Solutions in the Framework
- The N+I Performance Venue

Traditional EMS Measurement



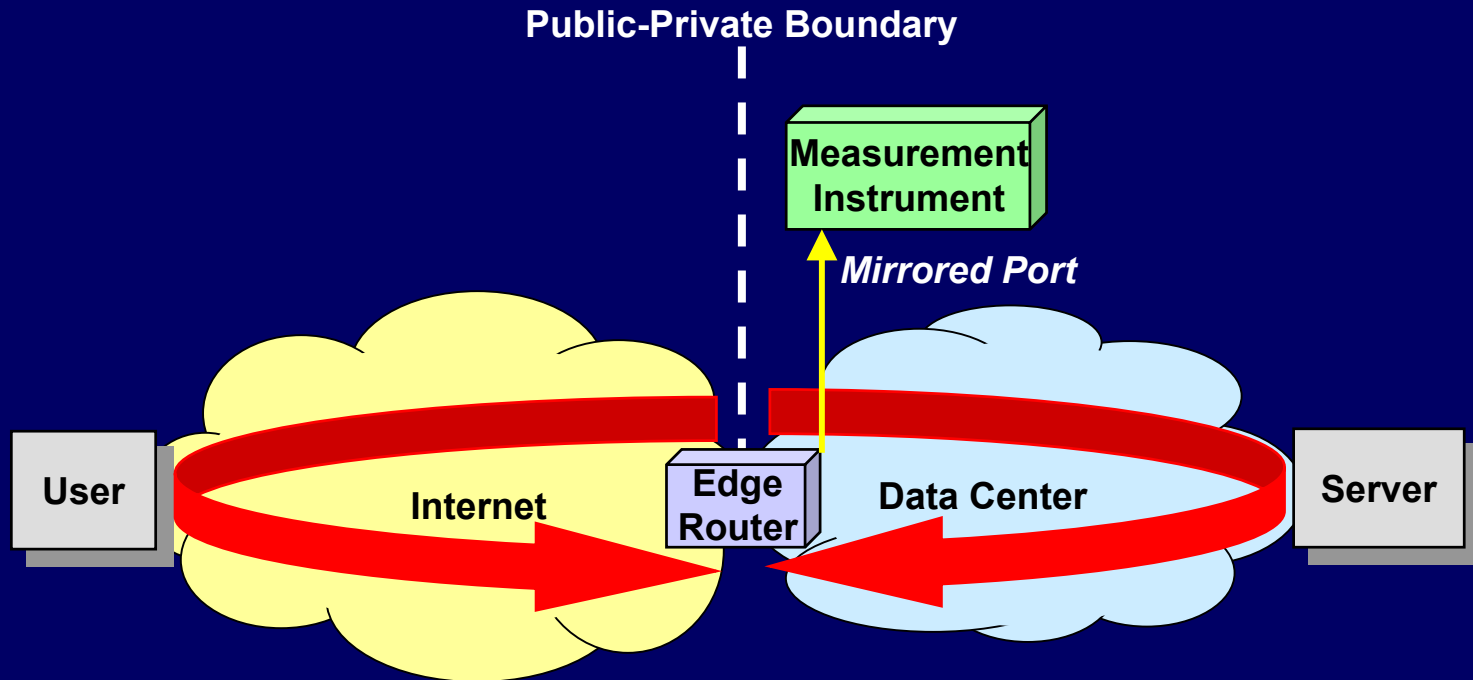
Agent Enhanced EMS

Deploy agents across the infrastructure and into remote locations. Integrate data from other sources (e.g., Keynote). Operate sophisticated correlation engine that integrates device data with agent data to find root cause of problems.

Enterprise Management System

Gather data from many devices in the infrastructure (typically via SNMP). Integrate readings into a database. Perform data trending analysis. Send alarms based upon critical performance thresholds

New Flow-Based Measurement



Outbound Measurement

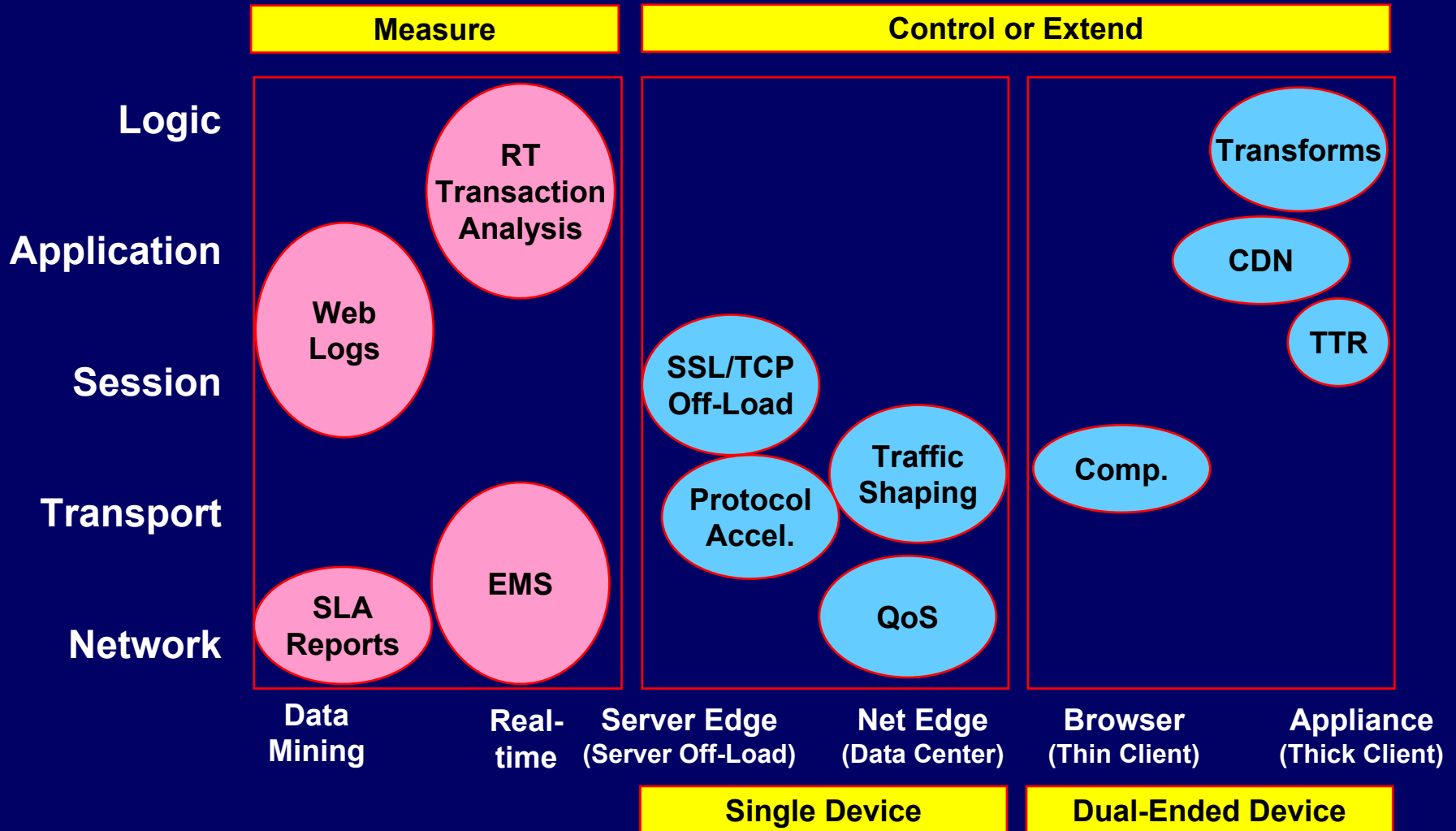
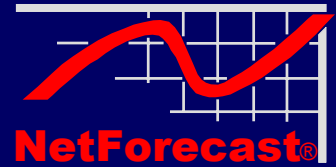
Watching packets arrive from the user to identify each user session. Then watching packets arriving from the server and tracking how well the system of routers, Internet access lines, ISPs, peering points, user access networks, and user desktop respond.

Data Center Measurement

Watching packets arrive from the user and then tracking how well the system of switches, load balancers, SSL boxes, proxies, Web servers, application servers, database servers, and storage devices respond.

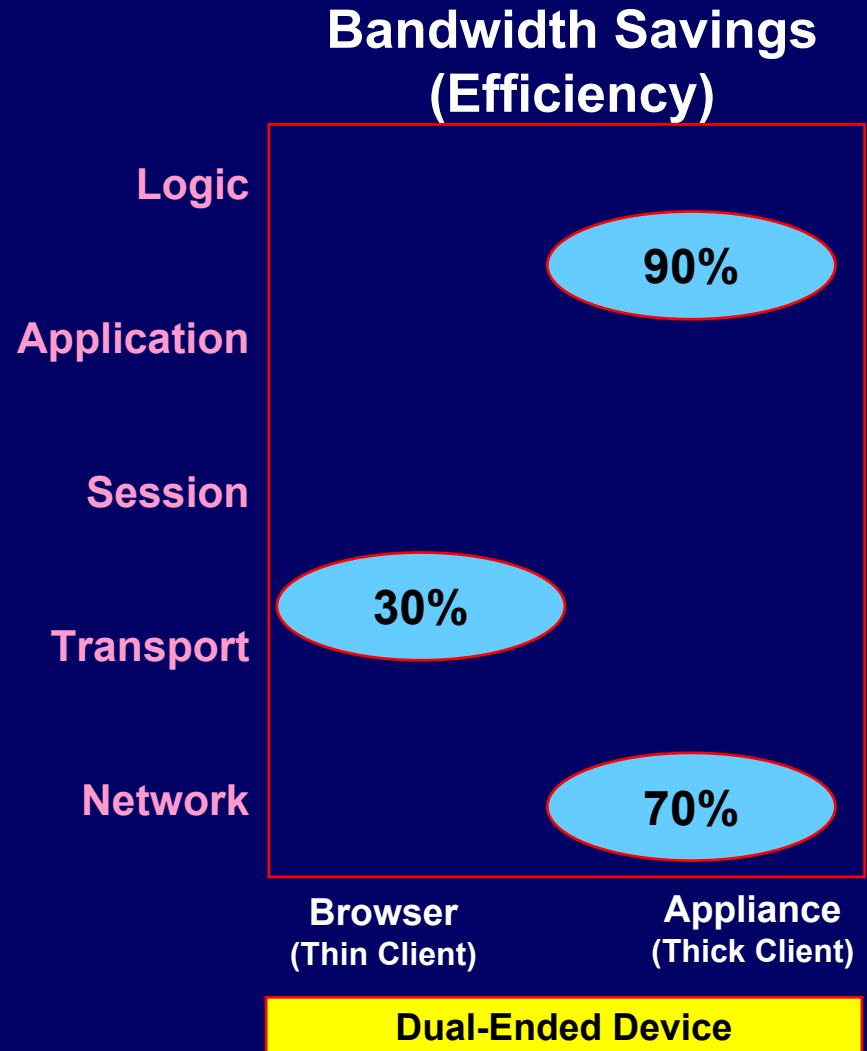
General Market Segmentation

(Not a complete list)

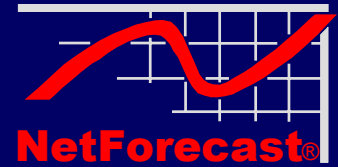


The Approach Matters

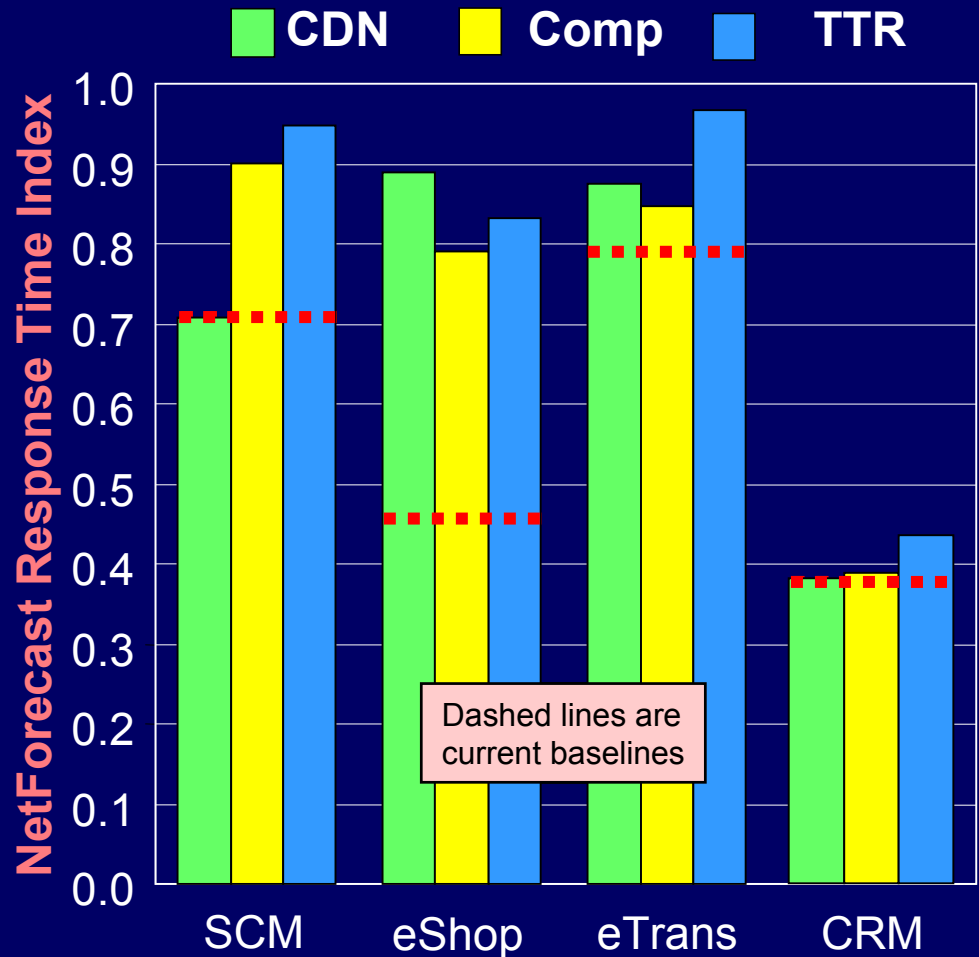
- Effectiveness is different depending upon the
 - Single vs. dual devices
 - Row vs. column strategy
 - Level in the protocol and logic stack the solution operates
- Best depends on
 - Application profile
 - User profile
 - User-to-server distance
 - Network conditions
- Compression Example →
 - Efficiency for high content Web



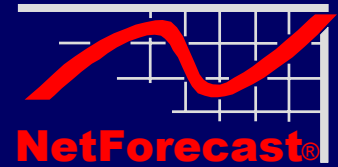
Transaction Quality Results From Case Studies



- Unique results based on
 - Application profile
 - User profile
 - User-to-server distance
 - Network conditions
 - Existing delivery system
- Compression was most cost effective for SCM
- CDN was best for eShop
- TTR was best for eTrans
- CRM cannot be improved
 - Move the data center, or
 - Change application design

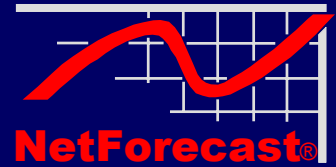


Market Trends



- **Vendors covering many squares of the frameworks**
 - Multi-function boxes are becoming prevalent
 - Each vendor supplies a unique mix of technologies
 - Matching a specific solution to your requirements is a challenge
 - **Objectives are merging**
 - Control features supplied by measurement and extension solutions
 - **More direct competition**
 - Vendors are moving into each other's competitive spaces
 - **Mergers and acquisitions**
 - **Partnerships across approaches**
 - Single and dual ended
 - Device and service
- Predictions**

Current View: Vendor Row or Column Strategies



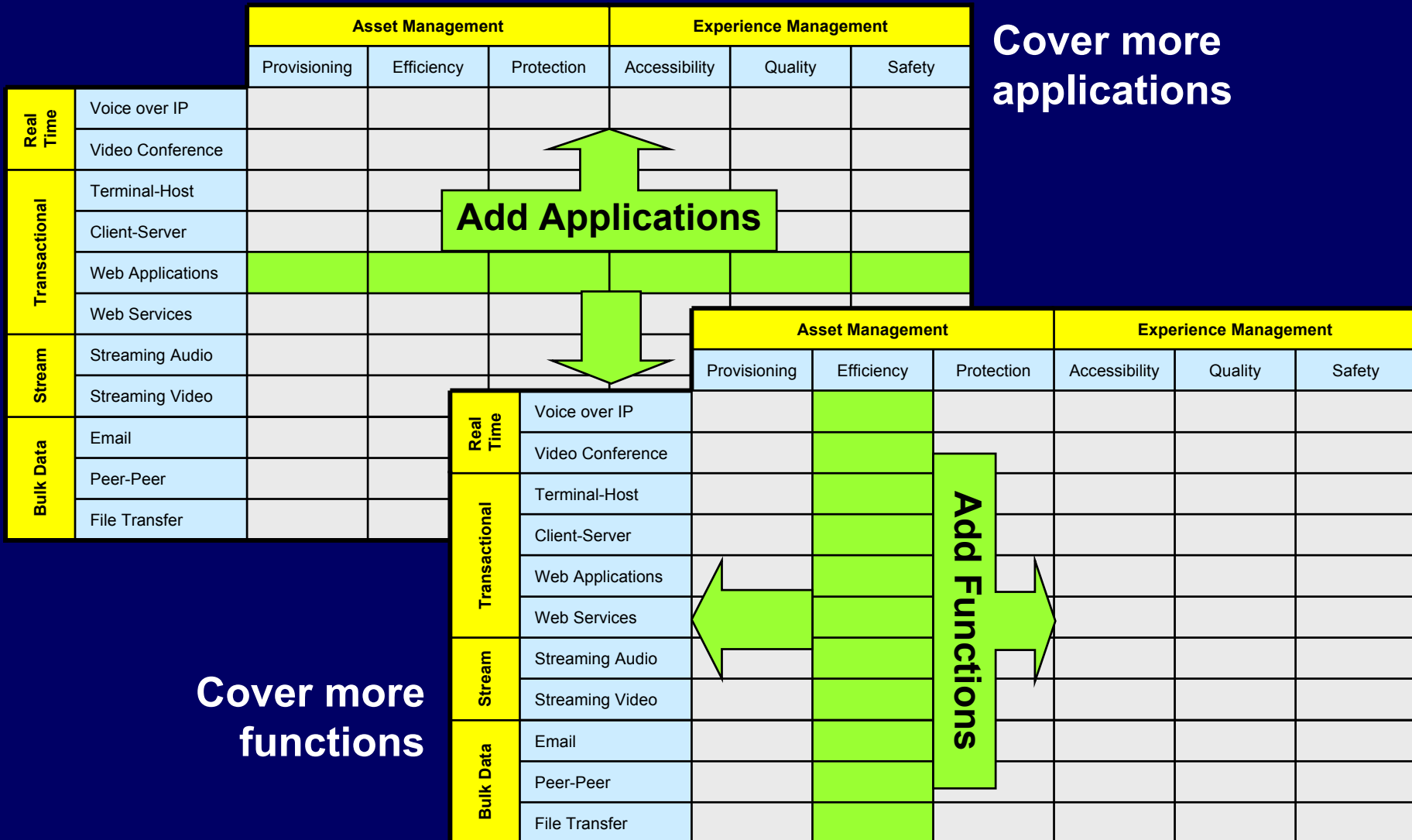
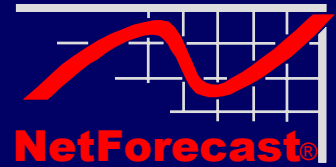
| | | Asset Management | | | Experience Management | | |
|---------------|------------------|------------------|------------|------------|-----------------------|---------|--------|
| | | Provisioning | Efficiency | Protection | Accessibility | Quality | Safety |
| Real Time | Voice over IP | | | | | | |
| | Video Conference | | | | | | |
| Transactional | Terminal-Host | | | | | | |
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| | Web Applications | | | | | | |
| | Web Services | | | | | | |
| Stream | Streaming Audio | | | | | | |
| | Streaming Video | | | | | | |
| Bulk Data | Email | | | | | | |
| | Peer-Peer | | | | | | |
| | File Transfer | | | | | | |
| | | | | | | | |

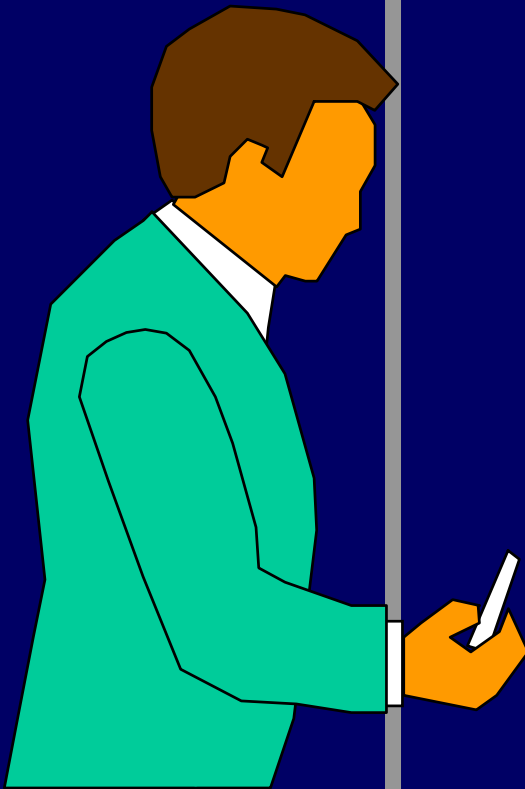
**Many Functions
Across Few
Applications**

| | | Asset Management | | | Experience Management | | |
|---------------|------------------|------------------|------------|------------|-----------------------|---------|--------|
| | | Provisioning | Efficiency | Protection | Accessibility | Quality | Safety |
| Real Time | Voice over IP | | | | | | |
| | Video Conference | | | | | | |
| Transactional | Terminal-Host | | | | | | |
| | Client-Server | | | | | | |
| | Web Applications | | | | | | |
| | Web Services | | | | | | |
| Stream | Streaming Audio | | | | | | |
| | Streaming Video | | | | | | |
| Bulk Data | Email | | | | | | |
| | Peer-Peer | | | | | | |
| | File Transfer | | | | | | |
| | | | | | | | |

**Few Functions
Across Many
Applications**

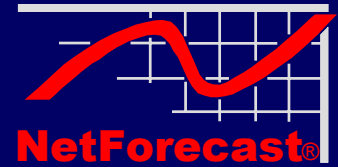
Emerging View: Growing Across the Framework





- The Application Delivery System
- Performance Framework
- Solutions in the Framework
- The N+I Performance Venue

The Show Performance Venue



● Performance program

■ Today

- Performance Analysis, Planning, and Testing
- Measuring and Managing System Performance
- Measuring and Managing the User Experience

■ Tomorrow

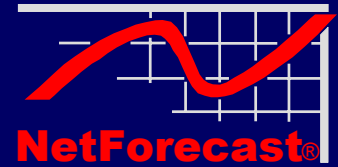
- Performance Grace Under Application Stress
- Delivering Applications Better and Faster
- Consolidating Network Functions in the Data Center
- Getting More Network Resources for Your Buck

● Show floor

- Performance Zone
- Performance Pavilion
- Performance Theater

**Get your
Web application
benchmarked at
the NetForecast
booth: 2753-16**

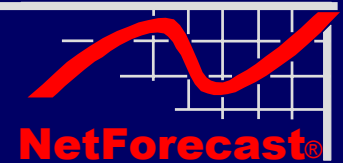
Performance Zone Vendors in the Framework



| | | Approach | | | | | |
|-----------|---------|------------------|---|-------------------------|--|-----------------------------------|---|
| | | Distributed | | Single Device | | Dual-Ended Device | |
| | | Data Mining | Real-Time | Server Edge | Net Edge | Datacenter +Browser | Datacenter +Appliance |
| Objective | Measure | Niksun Zenith | Fujitsu Quantiva Rocket Visual | NetQos Vieo | Coradiant Net Physics SeaNet | | |
| | Control | | | | Allot 8E6 Exinda Packeteer Tzolkin | Fortress | Internap |
| | Extend | | | F5 Pivia Teracruz | | Crescendo Netscaler Redline | Expand Netli Peribit Stratacache Riverbed |

Smart Strategies From Hard Data

Thank You



**A free guide to The NetForecast Performance Framework
is available at:**

www.netforecast.com/framework