Carrier-provided Services for Improving Application Performance

FutureNet Conference

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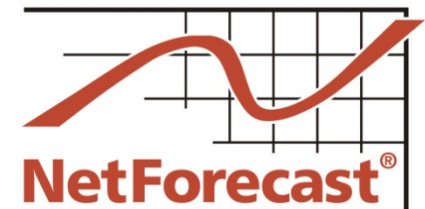
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The Application Performance Experts
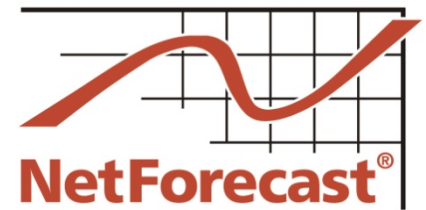
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Outline

The Problem and Solution

Carrier Service Offerings

Forces Conspire to Slow Applications

- **Globalization**
  - Increases user-to-server distance - links often slow/unreliable

- **Server Centralization**
  - Increases user-to-server distance

- **Inter-Office Collaboration**
  - Increases user-to-server distance and WAN payload size

- **Application "Webification"**
  - Increases payload and application turn count

Response Time Formula

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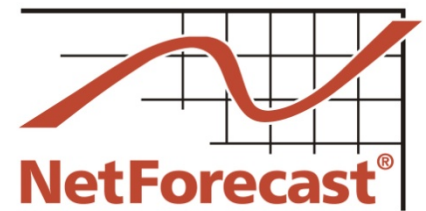
$$R \approx \frac{Payload}{Bandwidth} + AppTurns(RTT) + Cs + Cc$$

Where:

R = Task response time (sec)

Payload = the amount of information (bytes) that must be delivered to the user's device

Bandwidth = minimal bandwidth across all network links between the user and the application server; typically the user's access line to the network) (bits per second)

AppTurns = application client-server software interactions (turn count) needed to generate a user-level system response or task (see above)

RTT = round-trip-time (seconds) between the user and the application server.

Cs = Compute Server, is the total processing time required by the server(s)

Cc = Compute Client, is the total processing time required by the client device

What Raises Response Time
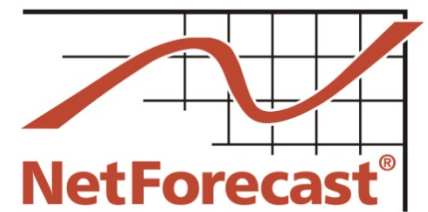
Big Payloads: The larger the files and/or more complex the data transferred, the longer the response time

High Turn Counts: The chattier the application, the longer the response time

**Server Bottleneck:** The more stressed or busy the server, the longer the response time

$$\uparrow \quad R \approx \frac{Payload}{Bandwidth} + AppTurns(RTT) + Cs + Cc$$

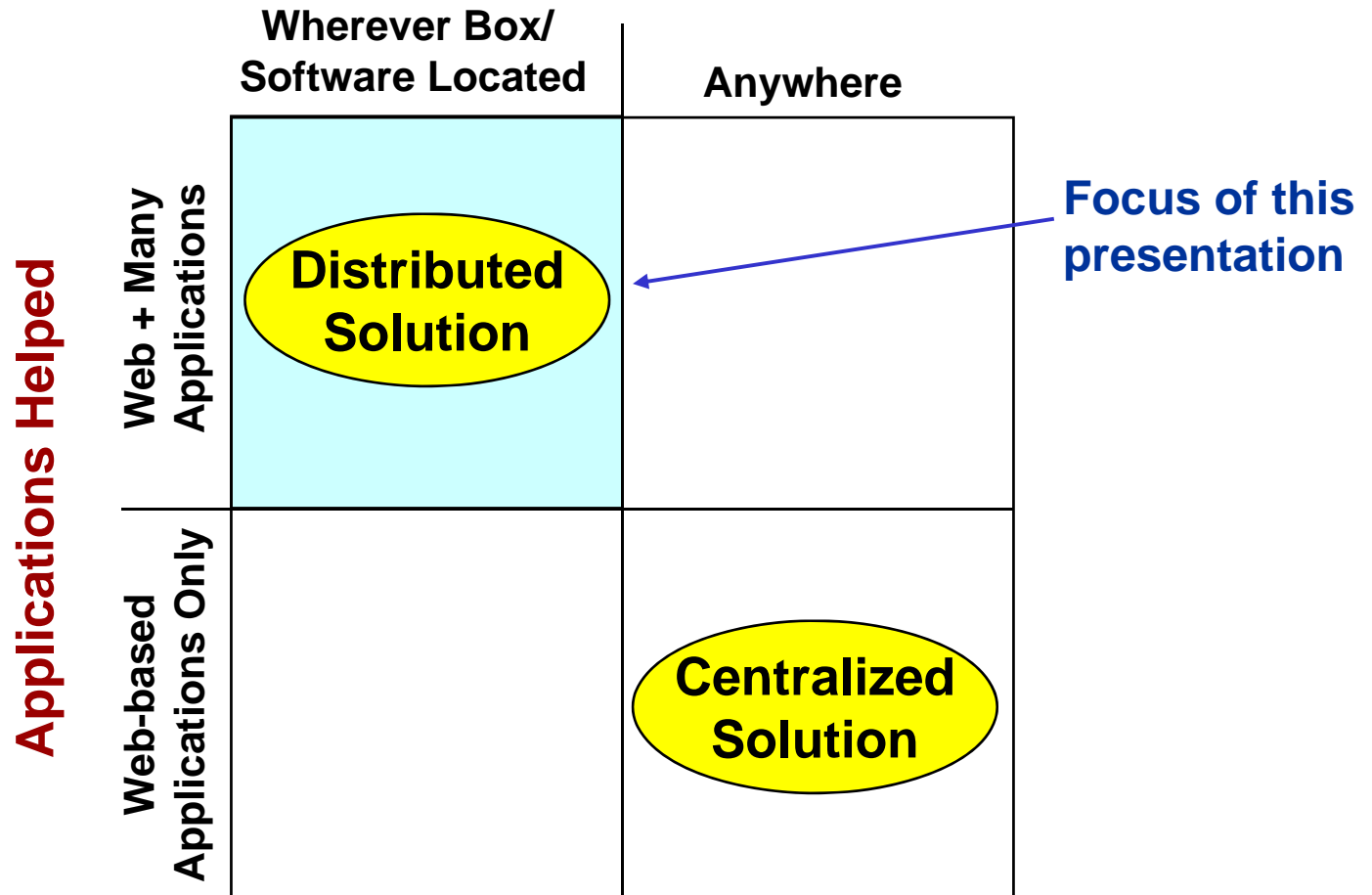**Insufficient Bandwidth:** Low or congested bandwidth, the longer the response time

Long Distances: The longer the distance between user and server, the longer the response time

Weak Client: Low CPU power or CPU busy with other applications, the longer the response time
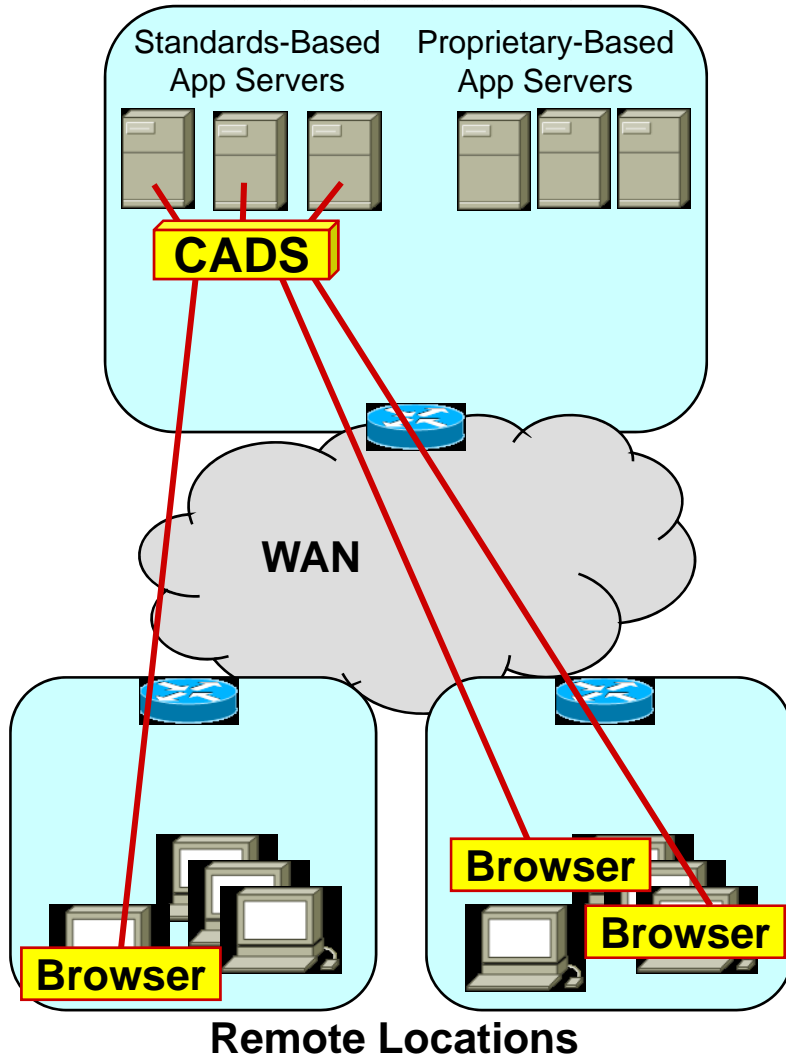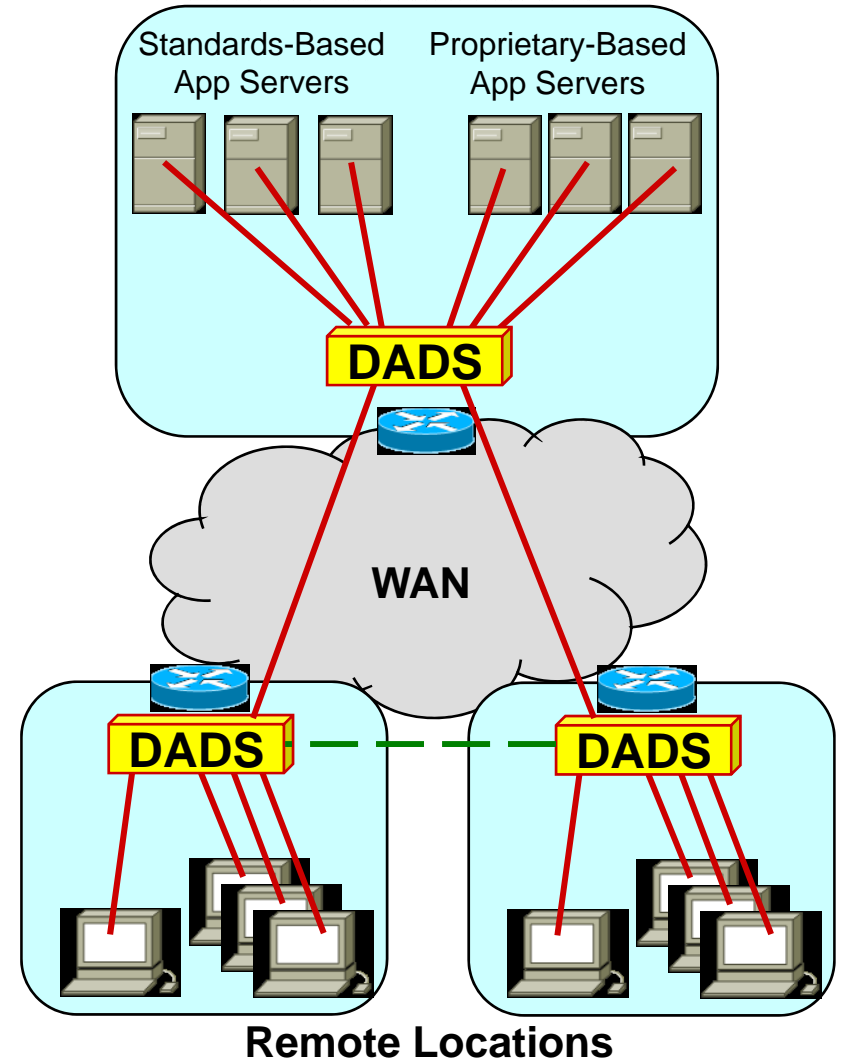
Two Approaches

Where Approach Works

Focus of this presentation
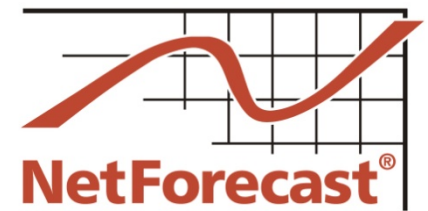
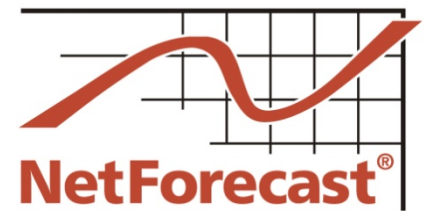# How the Two Solutions Are Deployed
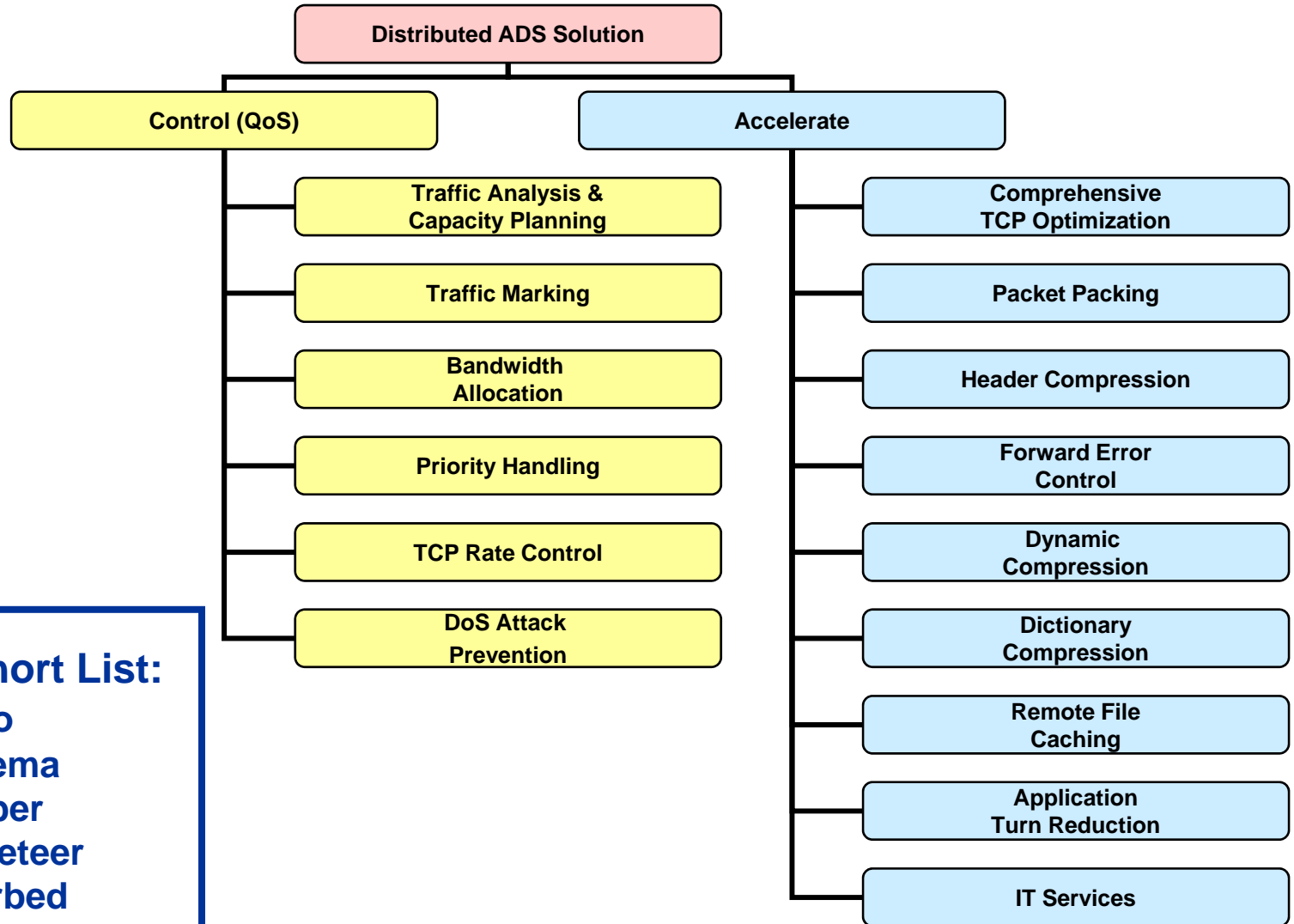

Centralized ADS

Distributed ADS

Performance Objectives

- **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**
        - Stress = too much traffic, resource loss, congestion, conflicting traffic
    - **Optimize the application delivery system**
    - **Effect is evident only during times of stress**
- **Improve (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**

What Distributed ADS Solutions Do

Distributed ADS Solution

Control (QoS)
- Traffic Analysis & Capacity Planning
- Traffic Marking
- Bandwidth Allocation
- Priority Handling
- TCP Rate Control
- DoS Attack Prevention

Accelerate
- Comprehensive TCP Optimization
- Packet Packing
- Header Compression
- Forward Error Control
- Dynamic Compression
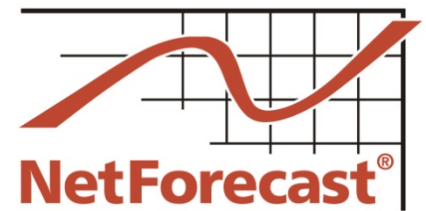- Dictionary Compression
- Remote File Caching
- Application Turn Reduction
- IT Services

Vendor Short List:
- Cisco
- Ipanema
- Juniper
- Packeteer
- Riverbed

ADS Solutions as Services

- **"Wrap" service offerings around commercial off-the-shelf ADS products**
- **A natural add on to VPN and network management services**
- **Carriers can do things you aren't prepared to do or don't have time to do**
  - Hiring/training employees, running gauntlets of import/export laws, and deploying, tuning and maintaining equipment in multiple countries
- **Professional services are often part of the mix:**
  - Assessment/Proof of Concept
  - Consulting
  - Working with you to define application performance SLAs
  - Ongoing reporting

Who Buys Distributed ADS Services
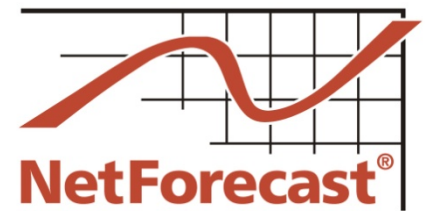
- **Global Enterprises**
  - **Must deliver acceptable performance to far-flung users**
  - **Experience painful distance-induced latency**
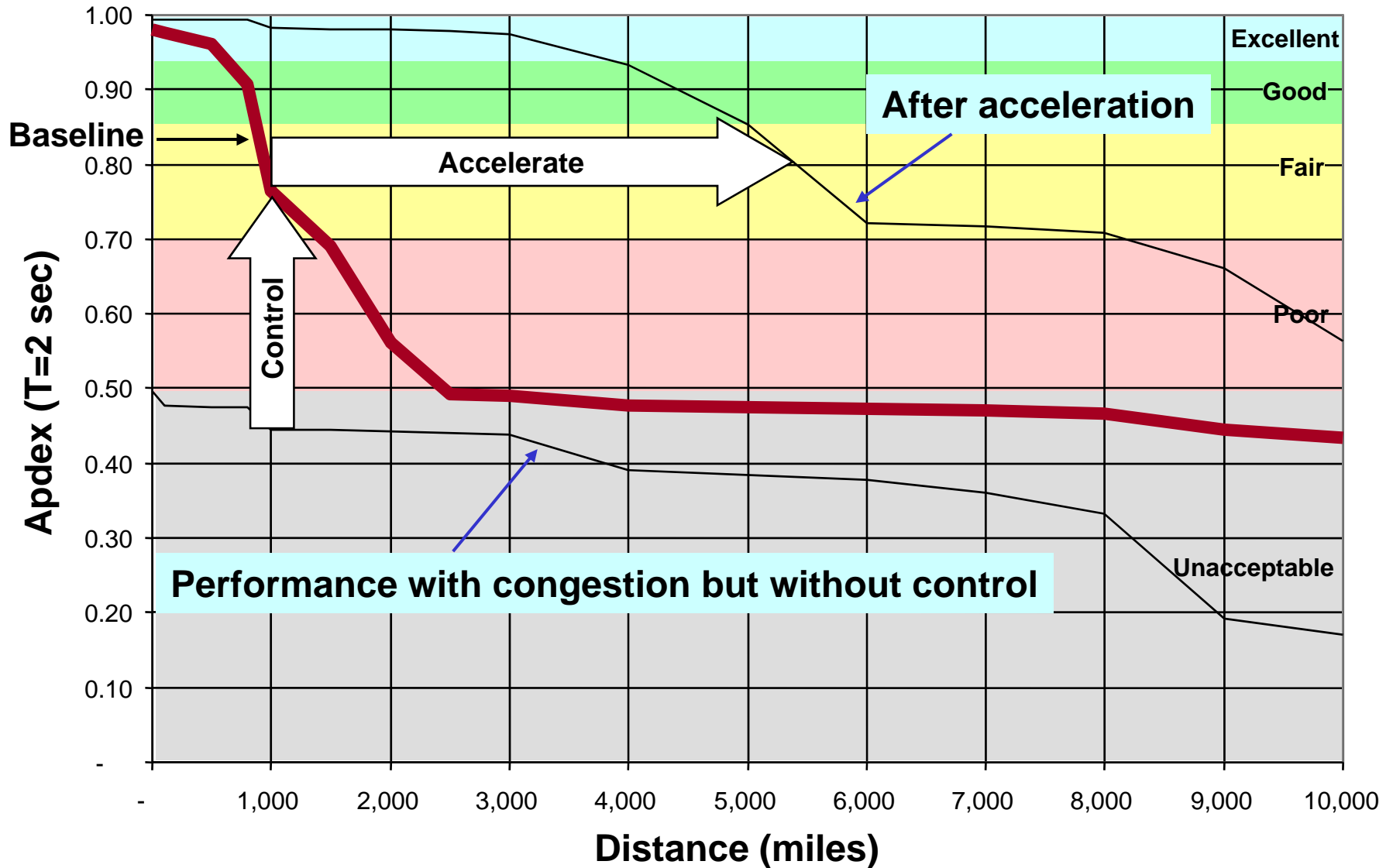 - **Find it hard to deploy/manage devices around the world**

- **Limited Need within Continental US**
  - **Distances manageable**
  - **Existing network infrastructure supports business needs**
  - **Basic MPLS is good enough**

Distributed ADS Services "Shrink" the World
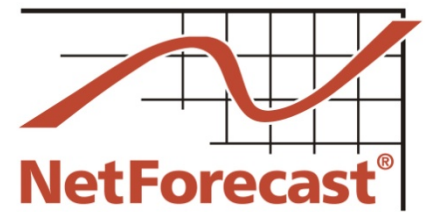
Example: Effects of Control and Acceleration on SAP Web

Outline
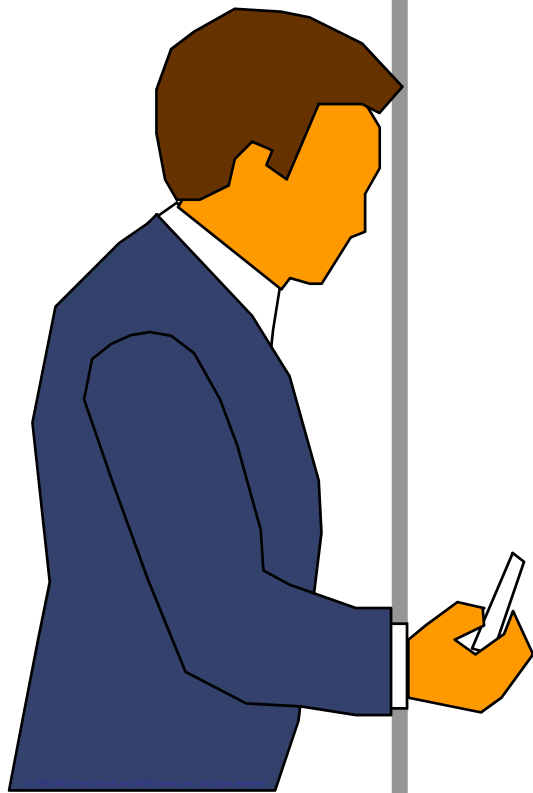
The Problem and Solution

Carrier Service Offerings

The Current Carrier Lineup

- **Orange Business Services**
- **Verizon**
- **Vanco**
- **BT Global Services**
- **AT&T**
- **Cable & Wireless**
- **Swisscom Corporate Business**
- **Telindus (Belgacom)**

Orange Business Services

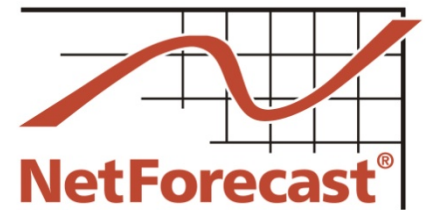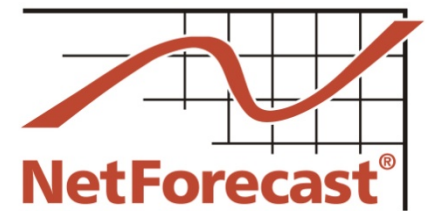- **Business Acceleration Service Family**

Measure	Control/Accelerate
Network Boost (Ipanema): ▪ **Packaged IP VPN service enhancement** ▪ **Identifies WAN applications** ▪ **Provides bandwidth usage breakdown**	▪ **Dynamically optimizes performance by adjusting throughput to favor critical applications** ▪ **Includes application performance SLAs (e.g. guaranteed MOS score of 4)** ▪ **Accelerates applications based on Ipanema product capabilities**
Application Performance Analysis (Packeteer): ▪ **Custom offering** ▪ **Identifies WAN applications** ▪ **Provides bandwidth usage breakdown**	▪ **Dynamically optimizes performance by adjusting throughput to favor critical applications** ▪ **Accelerates applications based on Packeteer product capabilities**
	Application Acceleration (Riverbed, Juniper) ▪ **Custom offering** ▪ **Accelerates applications based on Riverbed/Juniper product capabilities**

Verizon Business

Measure	Control/Accelerate
Private IP Application Performance Management (Centrisoft): ▪ **Identifies WAN applications and provide bandwidth usage breakdown** *to the desktop*	▪ **Dynamically optimizes performance by adjusting throughput to favor critical applications** *to the desktop*
Managed WAN Optimization Service (Juniper): ▪ **Identifies WAN applications and provide bandwidth usage breakdown**	▪ **Controls applications by priority** ▪ **Accelerates applications based on Juniper product features**
Network Management Reporting – Visual Application Integrity (Fluke): ▪ **Provides real-time resource usage and performance information for application flows**	

Vanco

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- ## Application Aware Networking Service Family

Measure	Control/Accelerate
Packaged Service (Ipanema): • **IP VPN service enhancement** • **Identifies WAN applications** • **Provides bandwidth usage breakdown**	• **Dynamically optimizes performance by adjusting throughput to favor critical applications** • **Accelerates applications based on Ipanema product capabilities**
	Custom Acceleration Services (Riverbed, Juniper, Cisco): • **Vanco wraps managed services around products from Riverbed, Juniper and Cisco** • **Service features depend upon the specific product capabilities**

BT Global Services

- **Applications Assured Infrastructure Service Family**

Measure	Control/Accelerate
Application Centric VPN (Ipanema): • On-net VPN service enhancement • Identifies WAN applications • Provides bandwidth usage breakdown	• Includes application performance SLAs • Accelerates applications based on Ipanema product capabilities • Dynamically optimizes performance by adjusting throughput to favor critical applications
Application Optimization (Ipanema): • Off-net service offering • Identifies WAN applications • Provides bandwidth usage breakdown	• Accelerates applications based on Ipanema product capabilities • Dynamically optimizes performance by adjusting throughput to favor critical applications
Infrastructure Monitoring (Compuware): • Monitors the user experience, application performance, and server health	

AT&T

▪ Managed Networking Services Options

Measure	Control/Accelerate
Appliance Based Measurement (Fluke): ▪ **Identifies WAN applications** ▪ **Provides real-time resource usage and performance information for application flows**	**Static Control (Cisco):** ▪ **Implements static policies for bandwidth allocation by application**
Netflow-based Measurement (Proprietary reporting software): ▪ **Identifies near real-time bandwidth usage breakdown**	**Custom Dynamic Control (Packeteer):** ▪ **Service available by "special request"** ▪ **Dynamically allocates bandwidth by application**
	Custom Acceleration (Cisco, Blue Coat, Riverbed): ▪ **AT&T wraps managed services around products from Riverbed, Juniper and Cisco** ▪ **Service features depend upon the specific product capabilities**

Cable & Wireless

- **Application Performance Management Service**

| Measure	Control/Accelerate
Packaged Service (Ipanema, Cisco): ▪ **Available to on-net, off-net, and hybrid customers** ▪ **Identifies WAN applications** ▪ **Provides bandwidth usage breakdown**	▪ **Dynamically optimizes performance by adjusting throughput to favor critical applications** ▪ **Includes application performance SLAs (for on-net customers)** ▪ **Accelerates applications based on Cisco and Ipanema product capabilities**

Swisscom Corporate Business

- **Application Performance Management**

Measure	Control/Accelerate
Packaged Service (Ipanema): • **IP VPN service enhancement** • **Identifies WAN applications** • **Provides bandwidth usage breakdown**	• **Dynamically optimizes performance by adjusting throughput to favor critical applications (available in Q2)** • **Accelerates applications based on Ipanema product capabilities (available in Q2)**

Telindus/Belgacom


- **Real-Time Application Control**

Measure	Control/Accelerate
Packaged Service (Ipanema): • **Identifies WAN applications** • **Provides bandwidth usage breakdown**	• **Dynamically optimizes performance by adjusting throughput to favor critical applications** • **Accelerates applications based on Ipanema product capabilities**

Conclusions
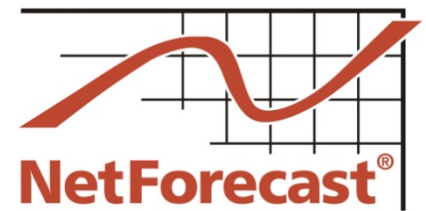
- **ADS services are reaching critical mass among international carriers**

- **Most popular ADS service = packaged measurement/control enabling applications to perform well under "bad" conditions**
  - Six of the eight of offerings we know of are built on Ipamena's products

- **Control services are usually layered over carriers' IP VPN offerings**
  - . . . although many carriers also offer them off net

- **Acceleration services are still new, but coming into their own**
  - expect more packaged offerings after vendors develop carrier-friendly products

- **Professional services "wraps" are common among carriers with strong integration capabilities**

- **Expect more application performance SLAs in future**

Thank You
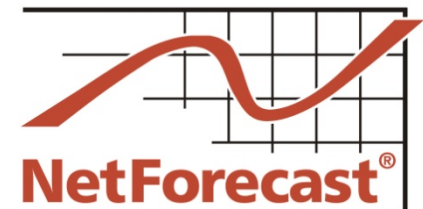
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