Disaster Recovery: Data Replication and the WAN

Presented by:
Stephanie Balaouras, Senior Analyst, Forrester Research
Kevin Hohenbrink, Product Manager, F5 Networks

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The Impact Of The WAN On DR Capabilities

Stephanie Balaouras
Senior Analyst
Forrester Research

March 21st, 2007

Agenda

- Survey fielding and methodology
- Current state of disaster recovery preparedness
- Enterprise demand for improved recovery capabilities
- Impact of the WAN on recovery capabilities
- Market awareness of WAN optimization technologies to facilitate disaster recovery

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Survey fielding and methodology

- 504 web-based surveys
- Respondents
  - » Decision-makers and influencers in planning for and/or purchasing BC/DR related solutions
    - – CIO, VPs, Directors, and Managers
    - – IT Operations, Enterprise Architecture, Network
- Geographic focus:
  - » 200 North America: US, Canada
  - » 304 Europe: UK, Germany, France
- Company size
  - » Firms with 1,000 or more employees (Enterprises)
  - » Firms with a backup data center

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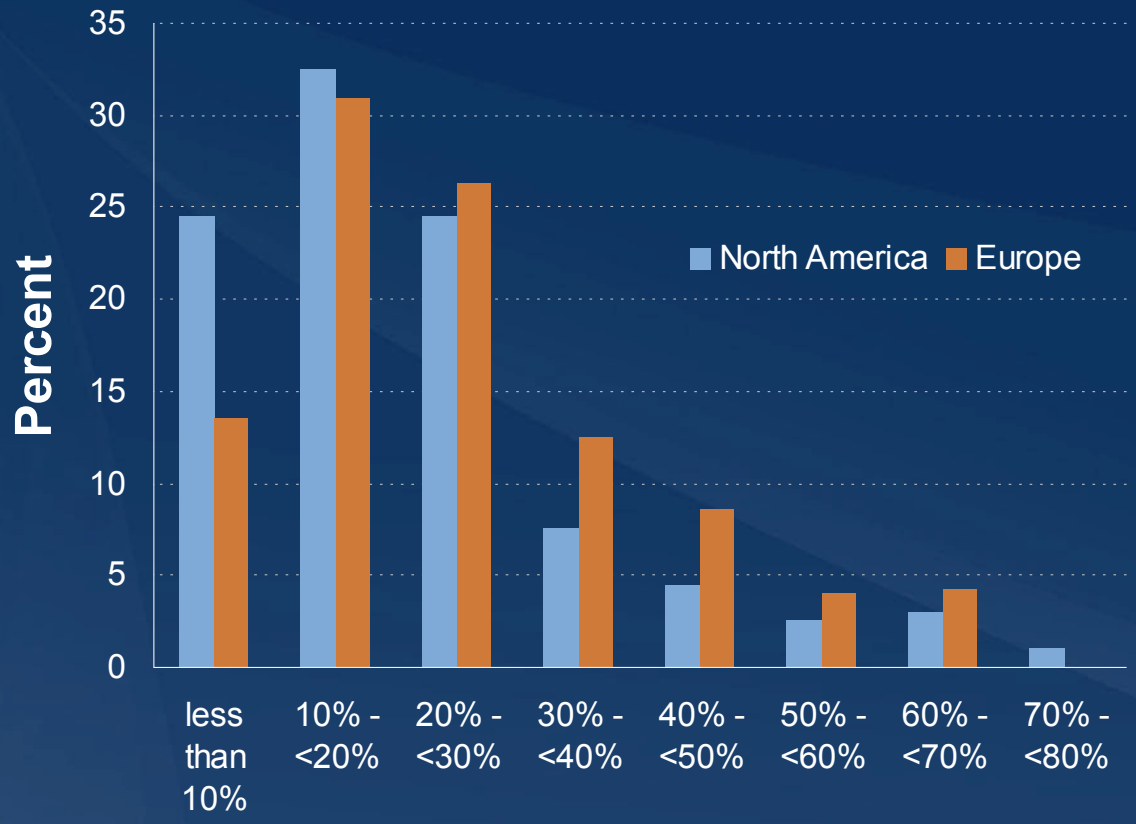
Enterprises spend 21% of the IT budget on BC/DR

"Using your best estimate, what % of your IT budget is spent on BC/DR?"



Base: North America 200, Europe 304

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

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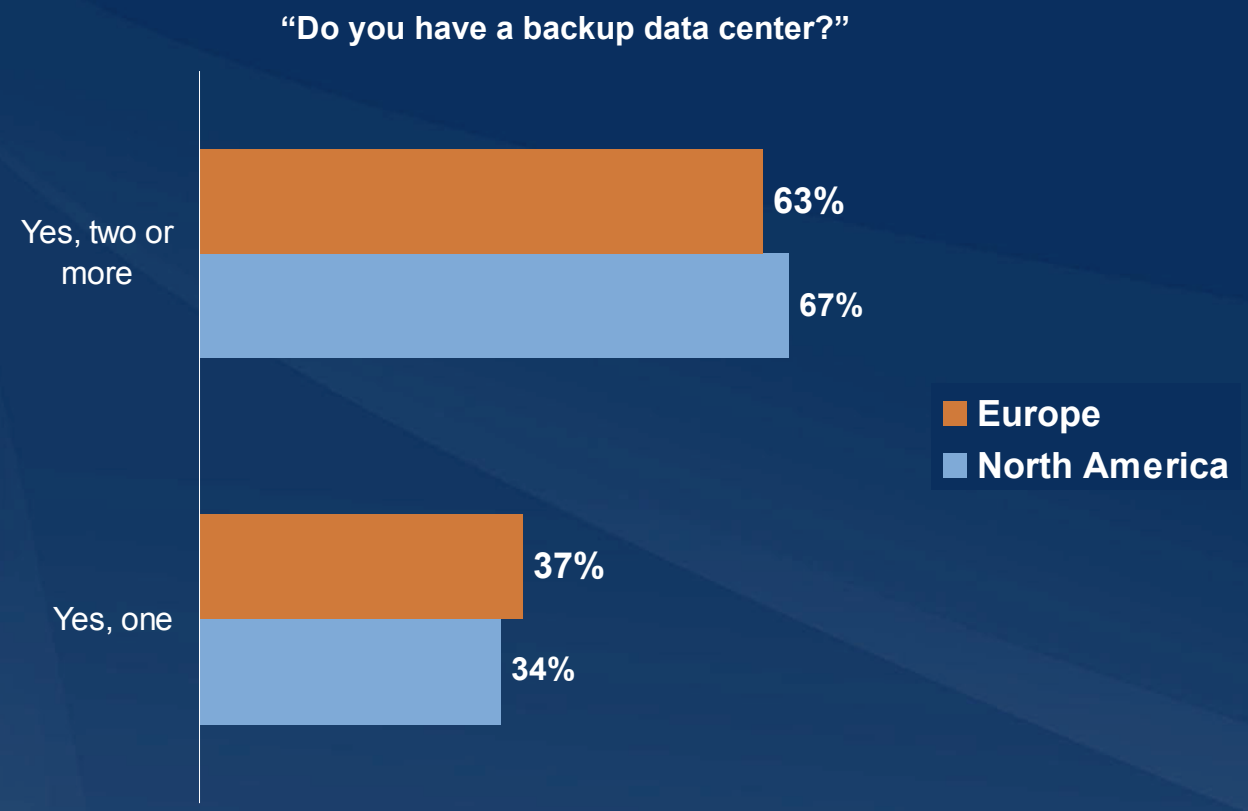
2/3 of enterprises have more than one DR site



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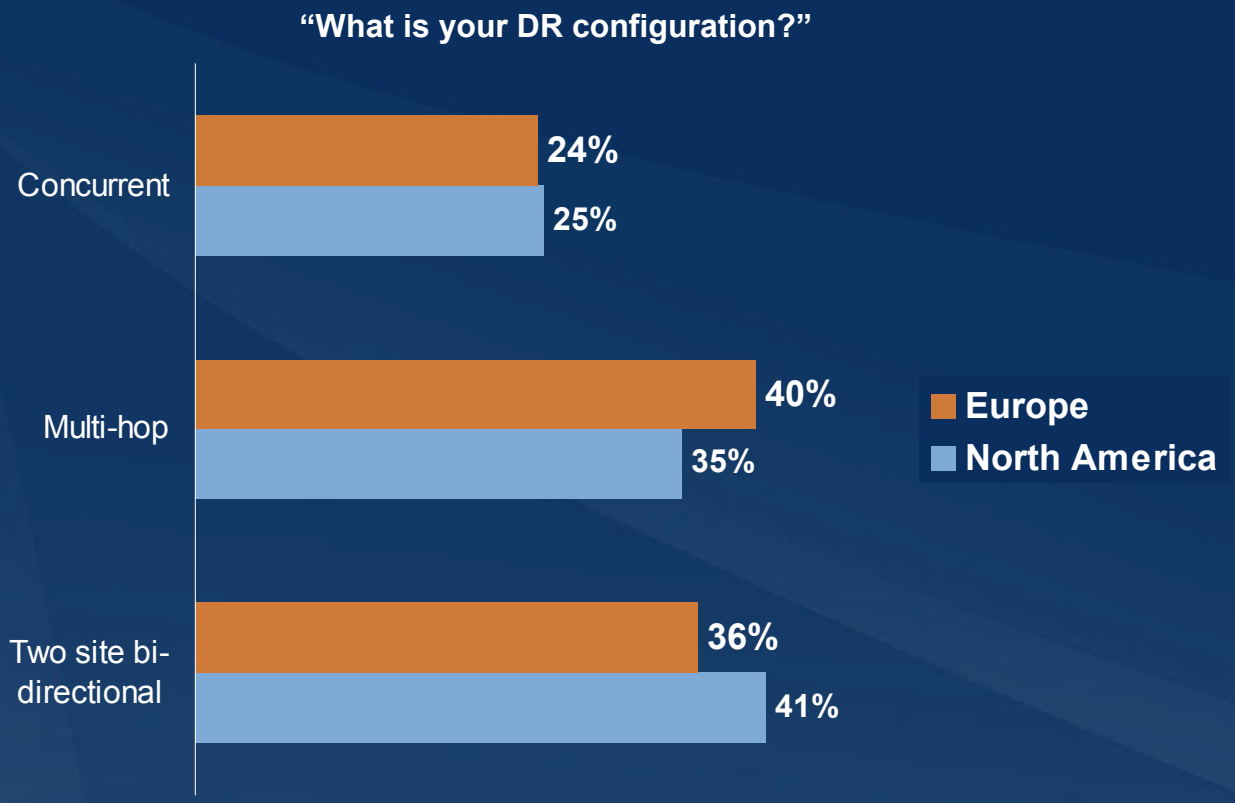
Enterprises with multiple DR sites prefer multi-hop or bi-directional DR configurations



Base: North America 133, Europe 193
Respondents with more than one back-up data center

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

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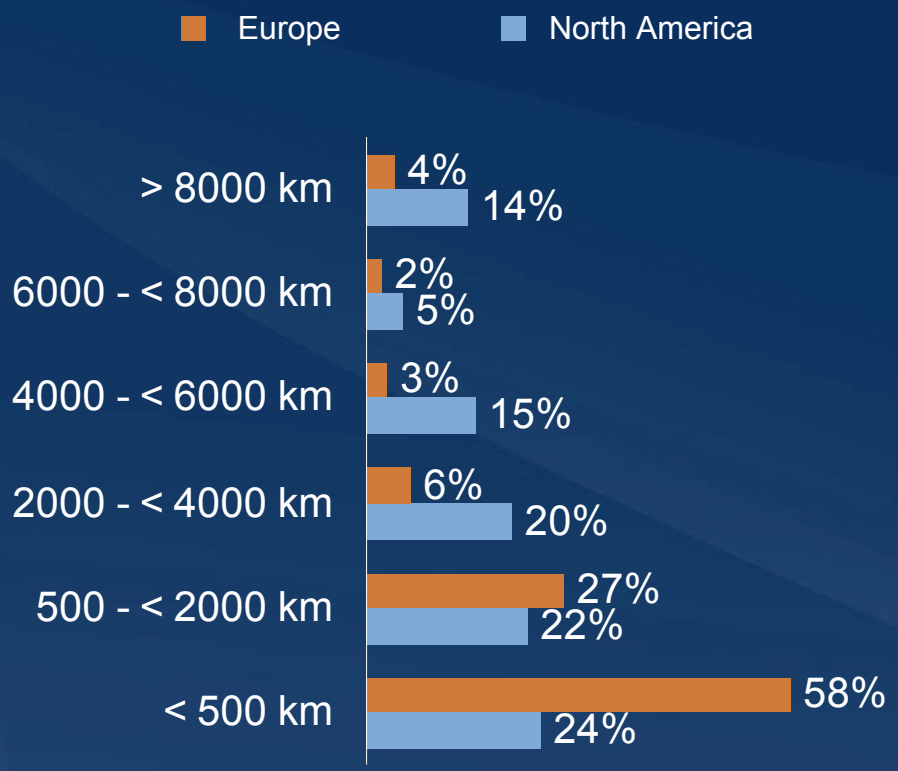
Enterprises favor much shorter distances between sites

"What is the distance between your primary and backup data center (s)?"



Base: North America 200, Europe 304

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

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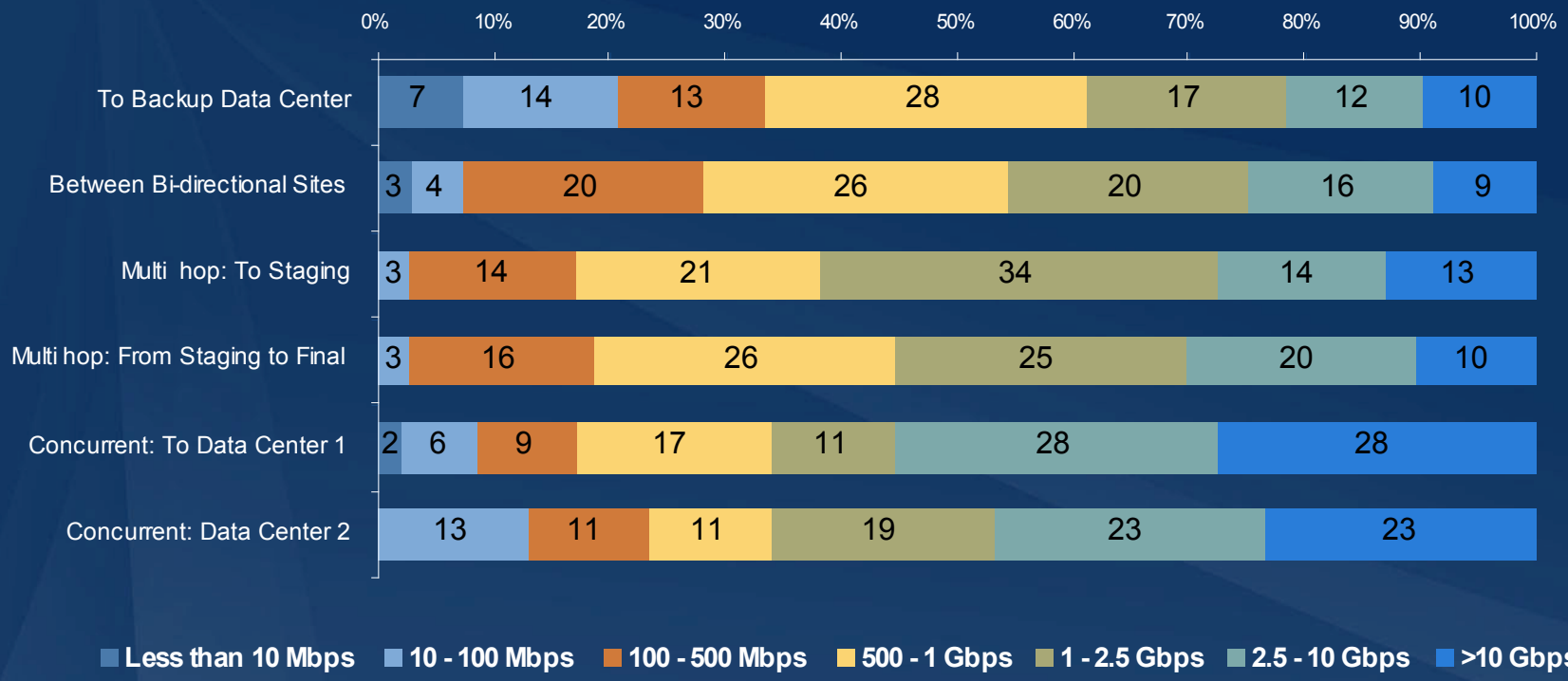
Europe uses 500 Mbps to 2.5 Gbps between data centers

On average, how much wide-area network bandwidth do you have between your primary data center and your backup data center(s)?

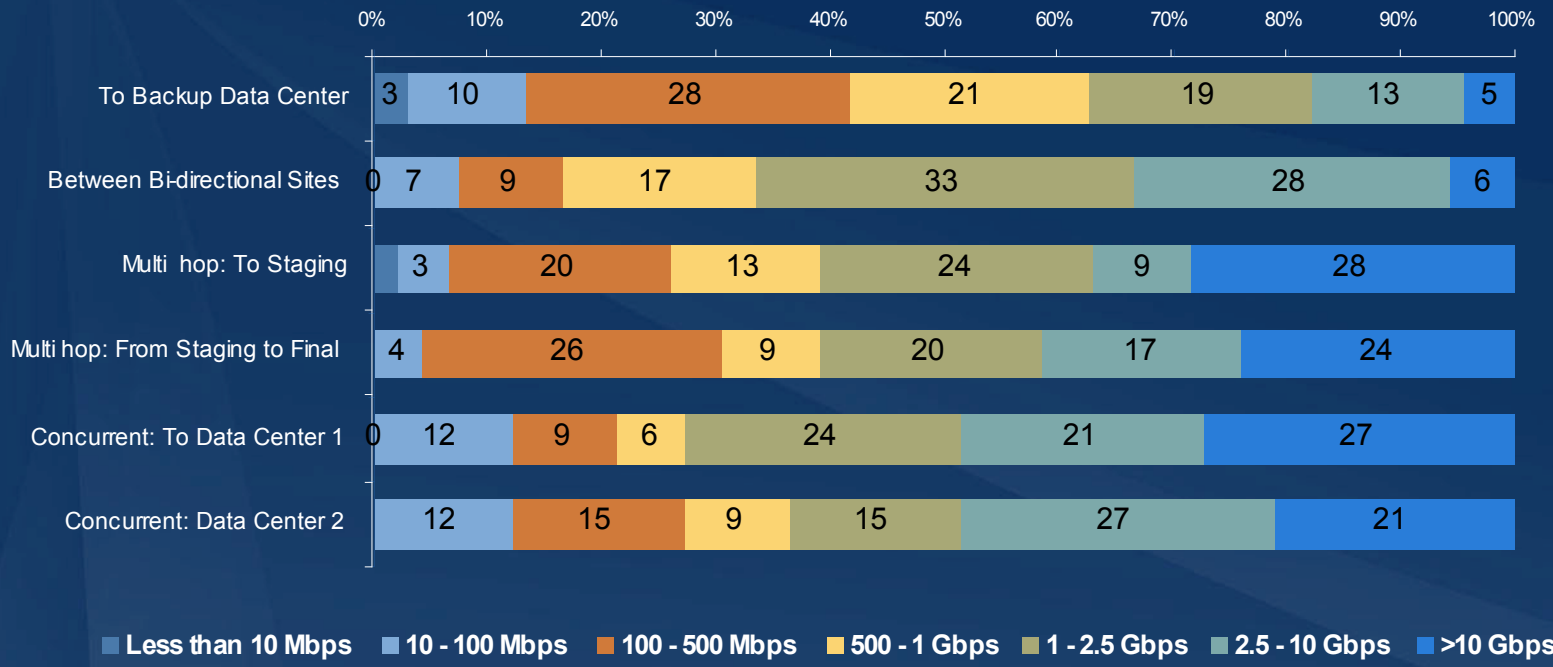


Base: 304
European respondents

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

North America relies on much more bandwidth between sites

On average, how much wide-area network bandwidth do you have between your primary data center and your backup data center(s)?

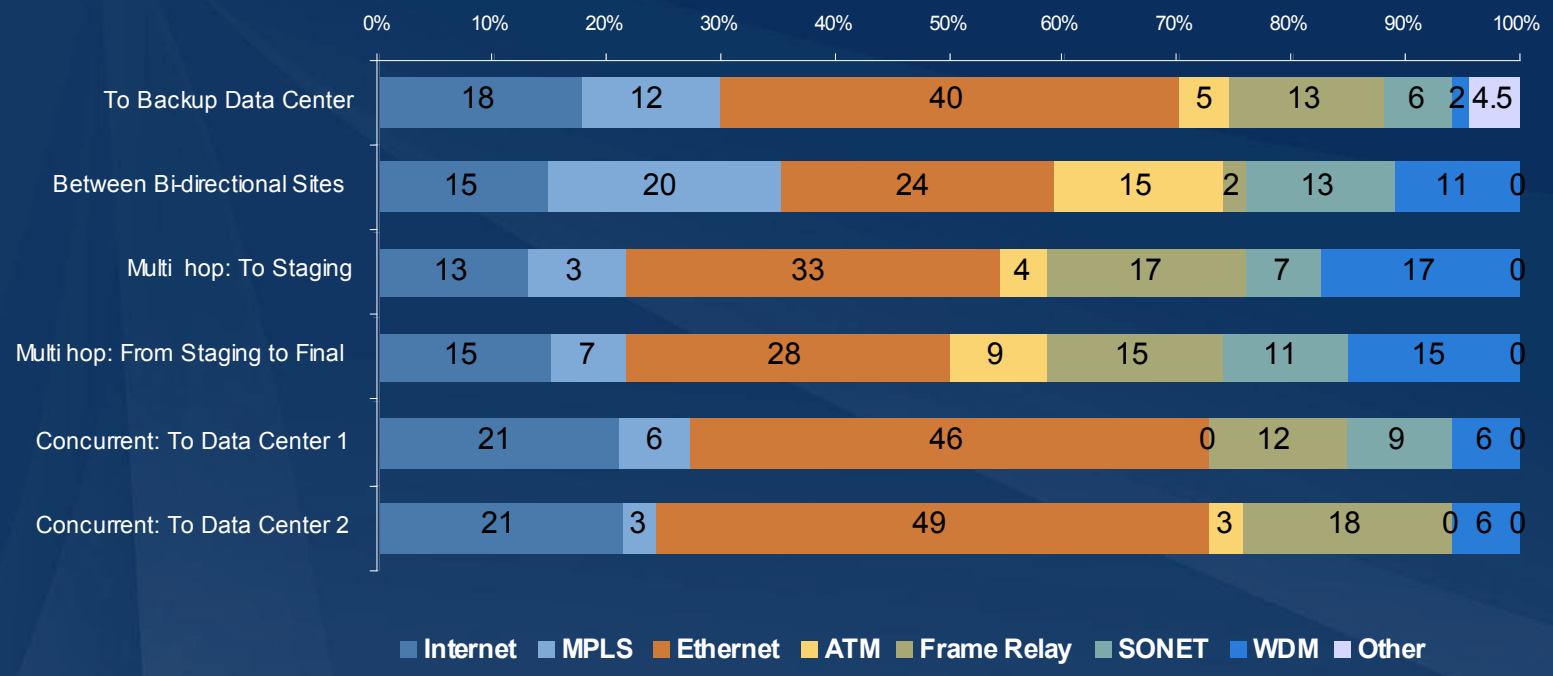


Base: 200
North American respondents

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

Ethernet is the dominant transport in North America

What type of wide-area network transport do you use between the primary data center and your backup data center(s)?



Base: 200
North American respondents
(percentages may not total 100 because of rounding)

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

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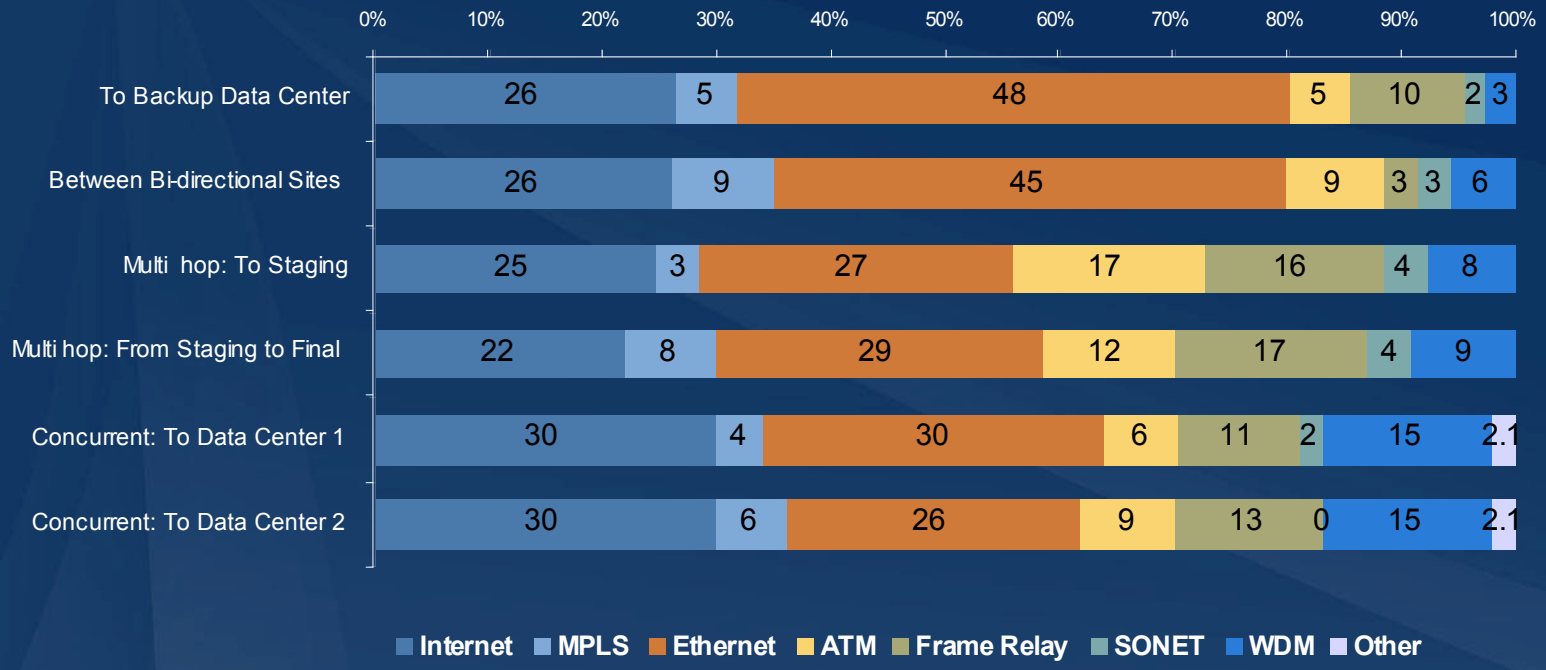
Internet and Ethernet dominant transport in Europe

What type of wide-area network transport do you use between the primary data center and your backup data center(s)?



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European respondents
(percentages may not total 100 because of rounding)

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

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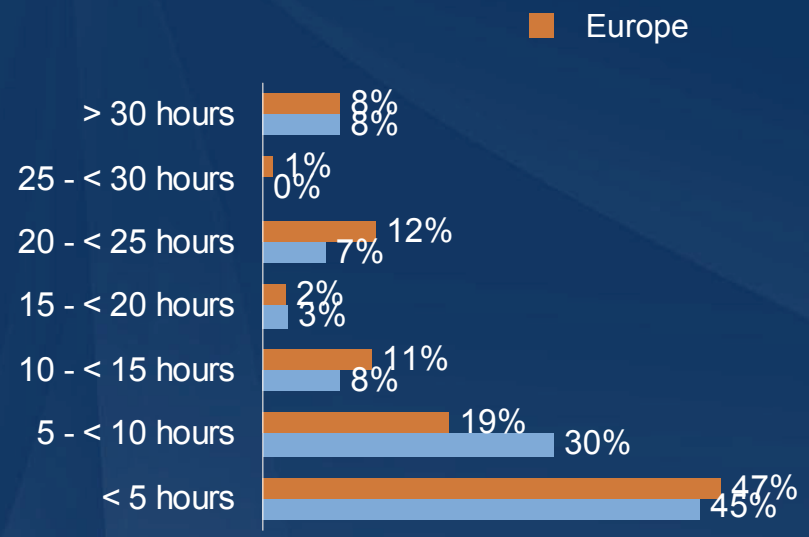
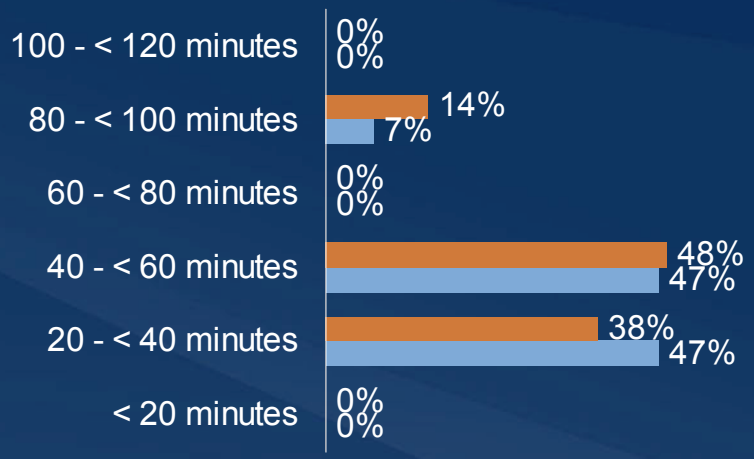
Most enterprises can recover operations in 2 - 5 hrs

"In the event of a primary data center site failure, what is your expected recovery time in hours?"



Base: 200 North America, 304 Europe

"If your expected recovery time is less than 2 hours, please estimate your recovery time in minutes?"



Base: 15 North America, 21 Europe

Due to small sample size, data is directional only

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

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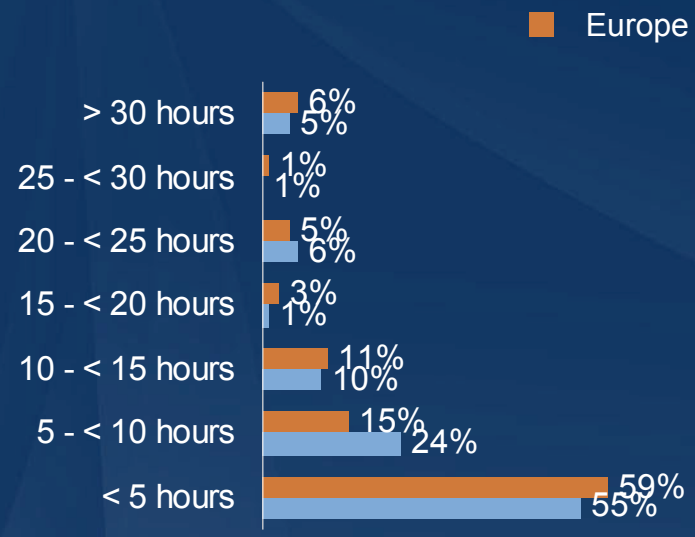
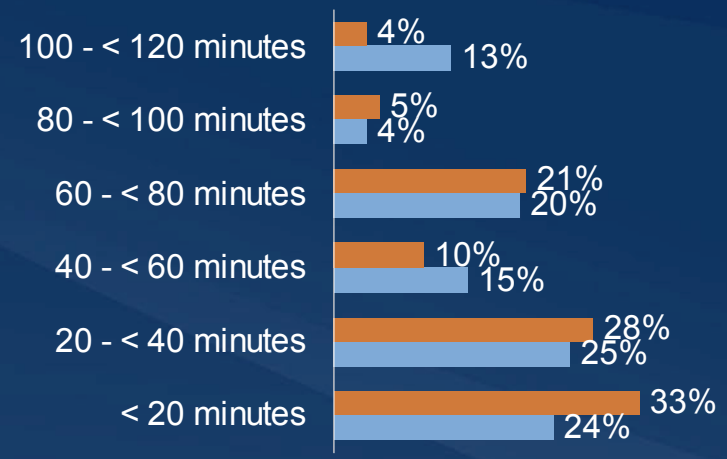
Most enterprises will lose between 2 – 5 hrs of data

"In the event of a primary data center site failure, how many hours of data will you lose?"



Base: 200 North America, 304 Europe

"If your expected data loss is less than two hours, please estimate your recovery time in minutes?"



Base: 55 North America, 82 Europe

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

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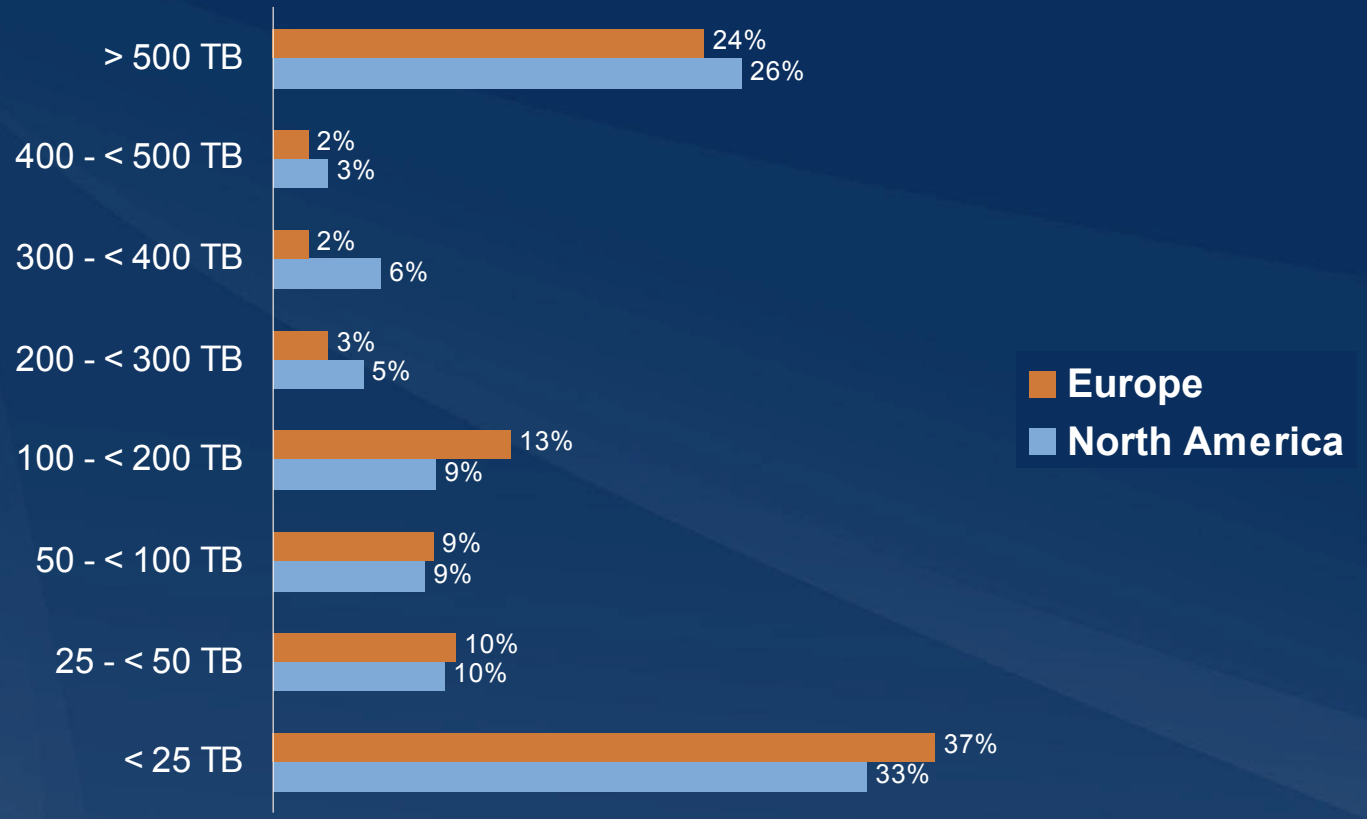
The amount of data to be replicated is increasing

"Please estimate the amount of data (in terabytes) that must be protected at the primary site?"



Base: North America 200, Europe 304

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

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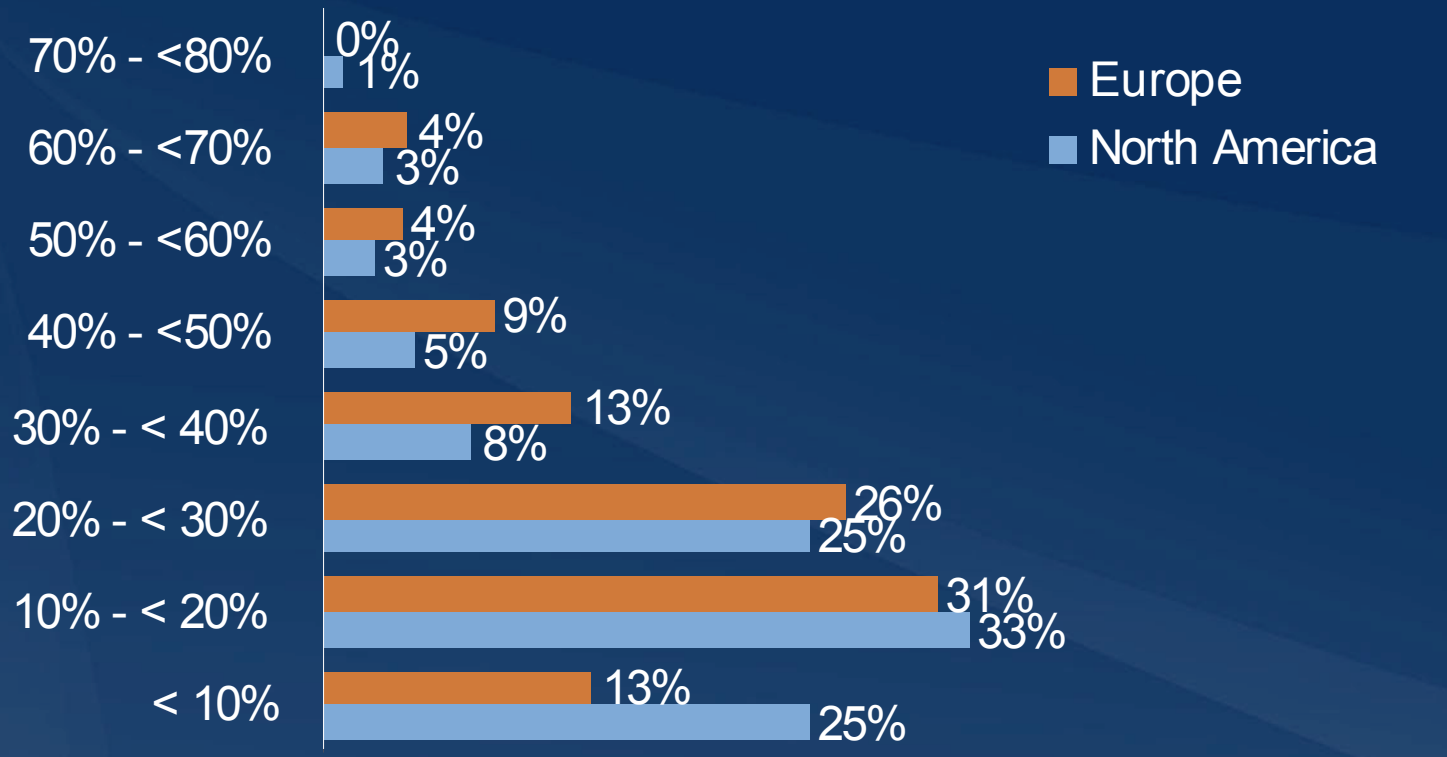
Bandwidth costs 29% of remote replication or backup solutions

"What percent of the total cost of your replication or remote backup solution can you attribute to the cost of bandwidth?"



Base: North America 200, Europe 304
(percentages may not total 100 because of rounding)

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

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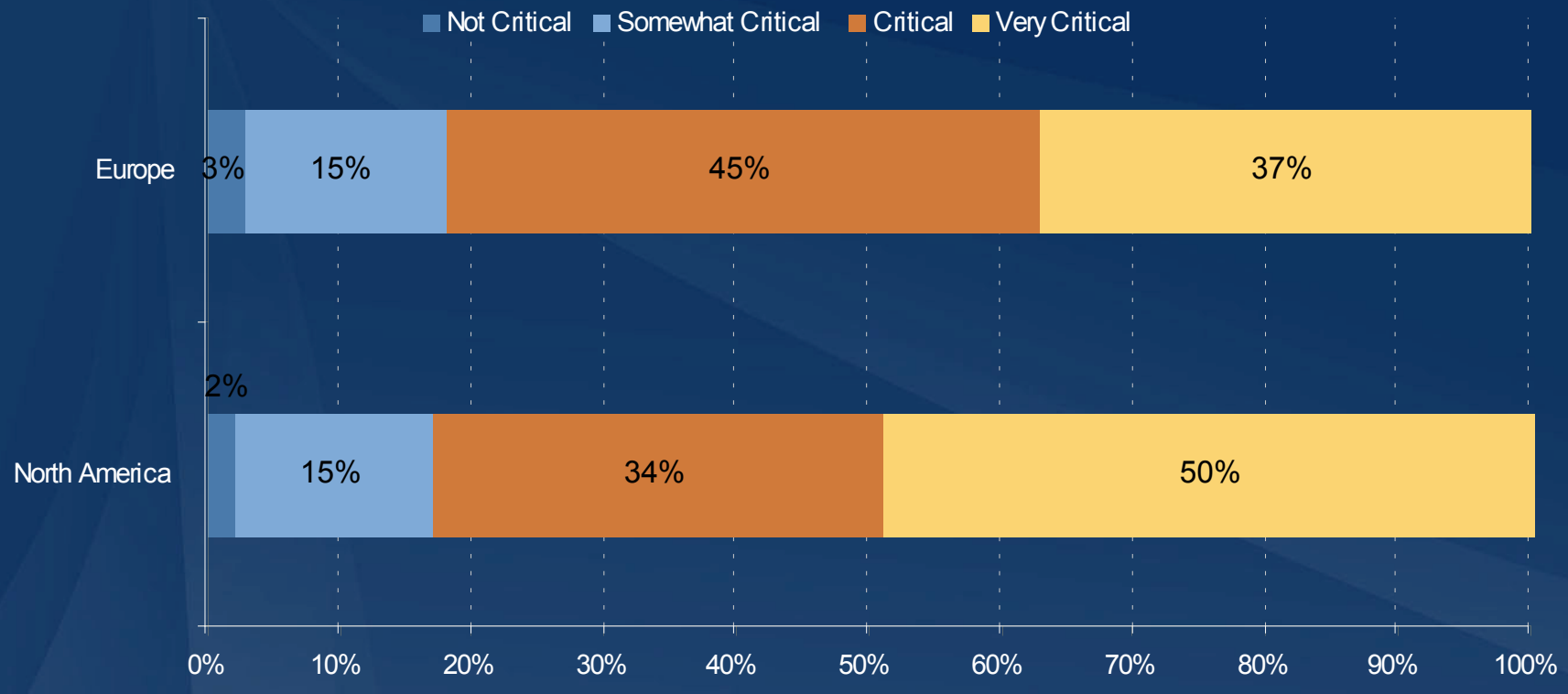
Majority of enterprises believe its critical or very critical to improve RTO and RPO

"On a scale of 1-4, where 1 is not critical and 4 is very critical, how important is it to improve your time to recovery at the backup data center and to limit data loss?"



Base: North America 200, Europe 304

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

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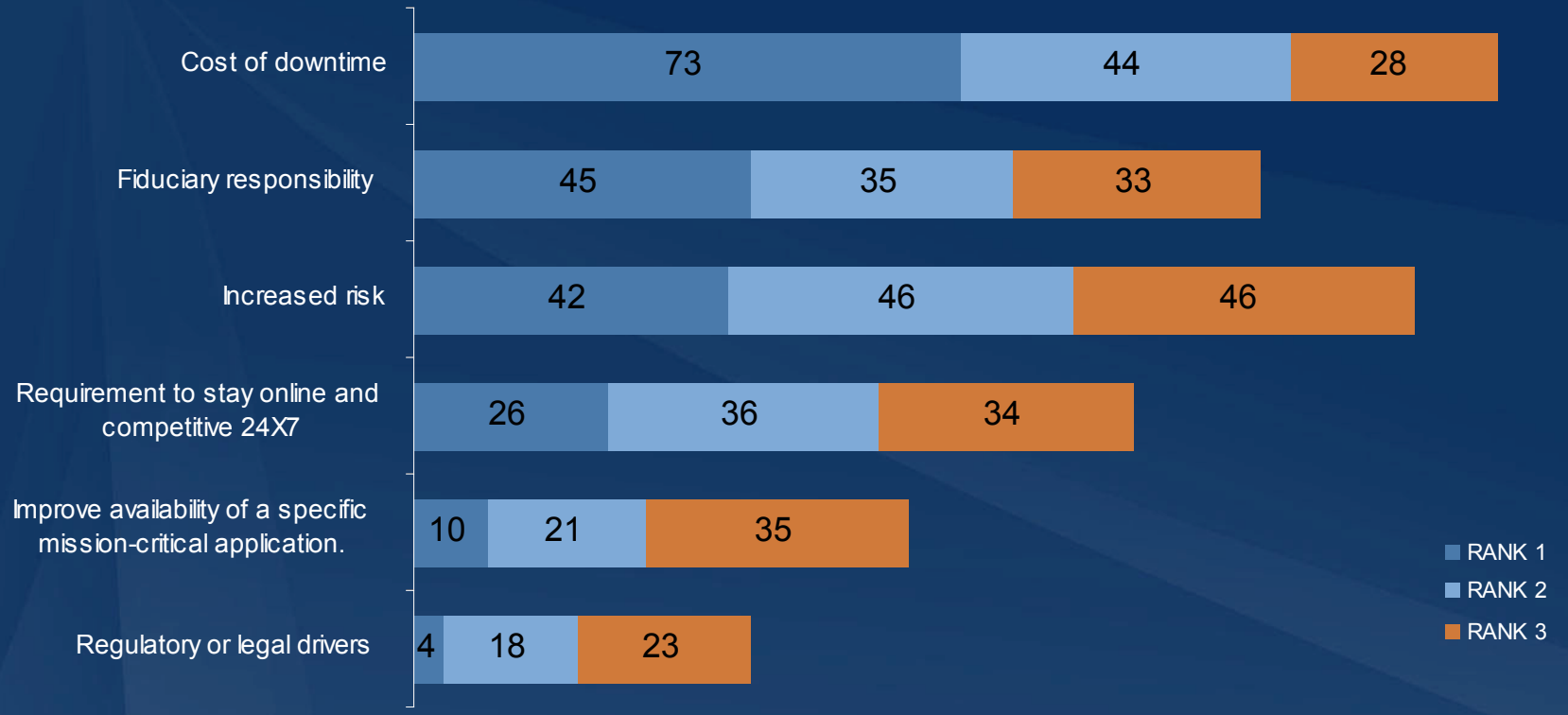
Cost of downtime and increased risk drive improved recovery in North America

"What is driving the need to improve time to recovery and to limit data loss? Rank the top 3?"



Base: 200
North American respondents

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

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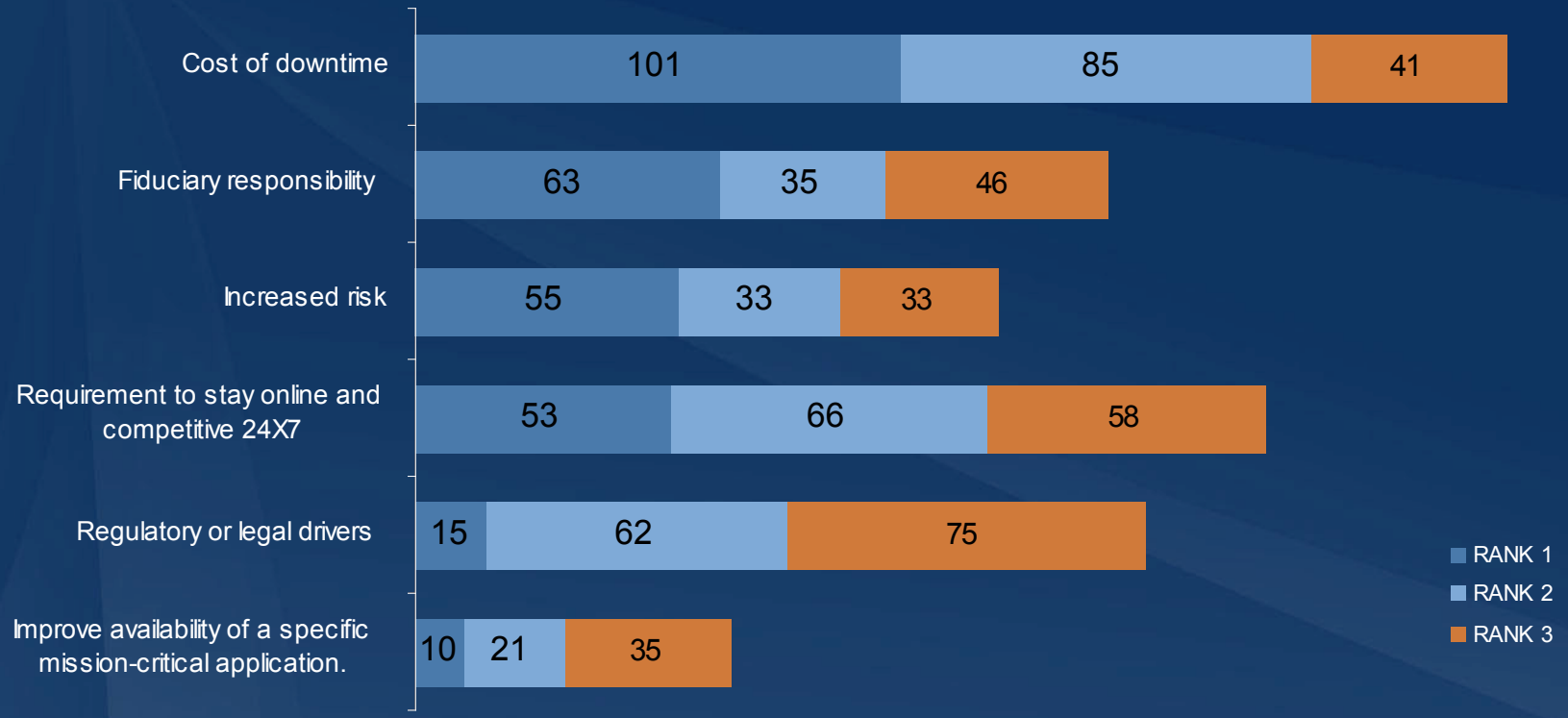
Cost of downtime and competition drive recovery improvements in Europe

"What is driving the need to improve time to recovery and to limit data loss? Rank the top 3?"

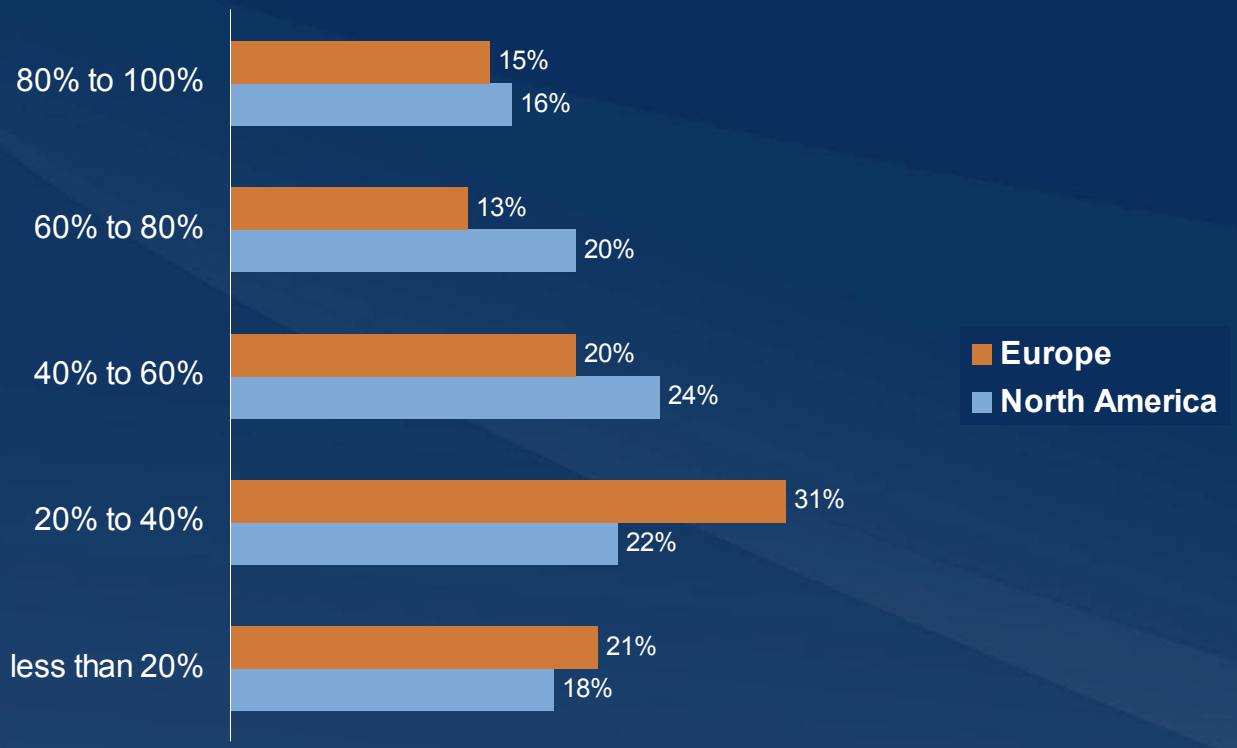


Base: 304
European respondents

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

Unprotected sites represent a significant risk

What % of remote sites replicate or backup data to data center or central facility?

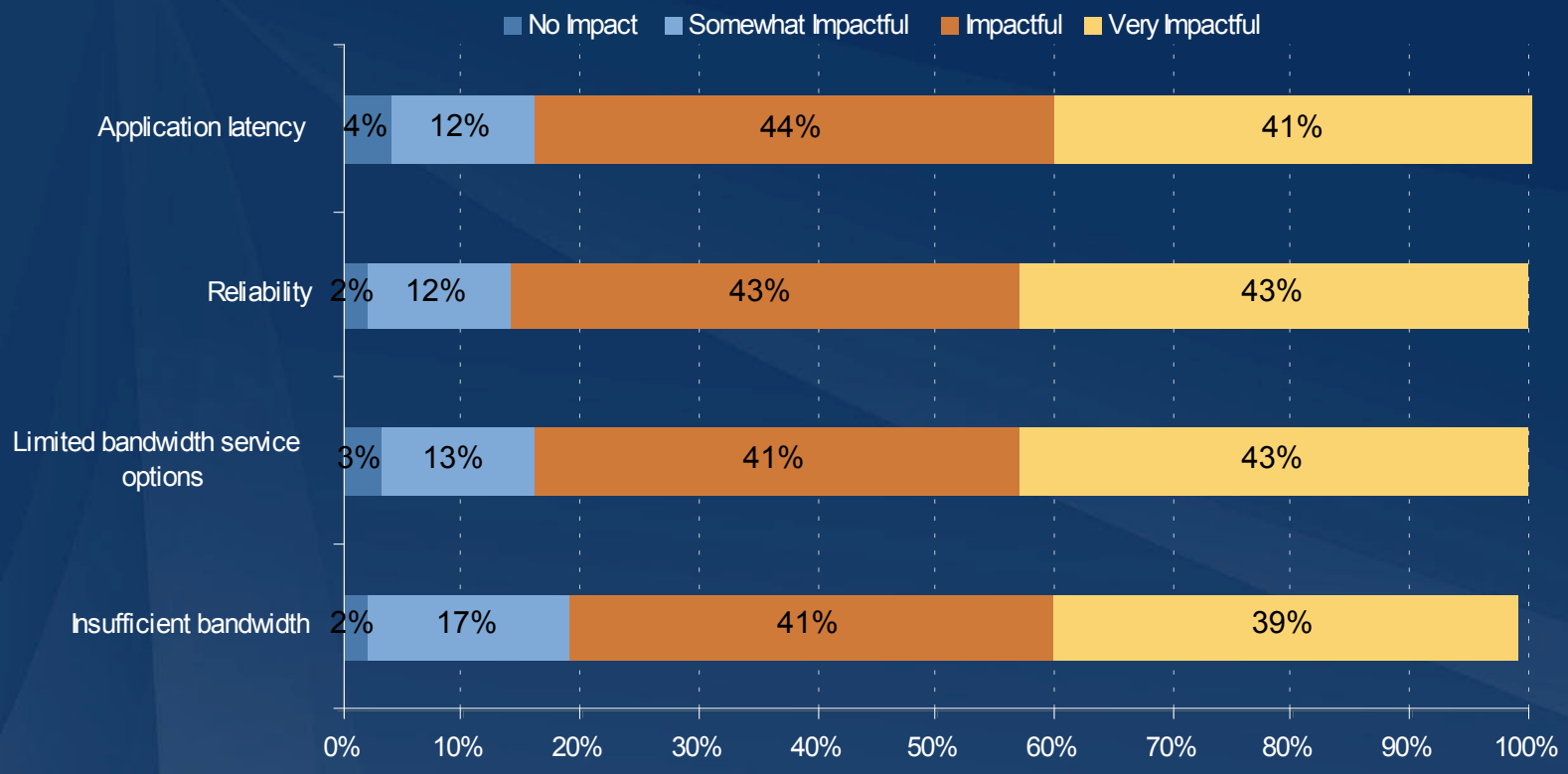


Base: North America 200, Europe 304

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

Impact of bandwidth on North American recovery objectives

On a scale of 1 to 4, where 1 equals “no impact” and 4 equals “very strong impact”, please rate the impact of the following to your ability to improve your time to recovery and to limit data loss.



Base: 200
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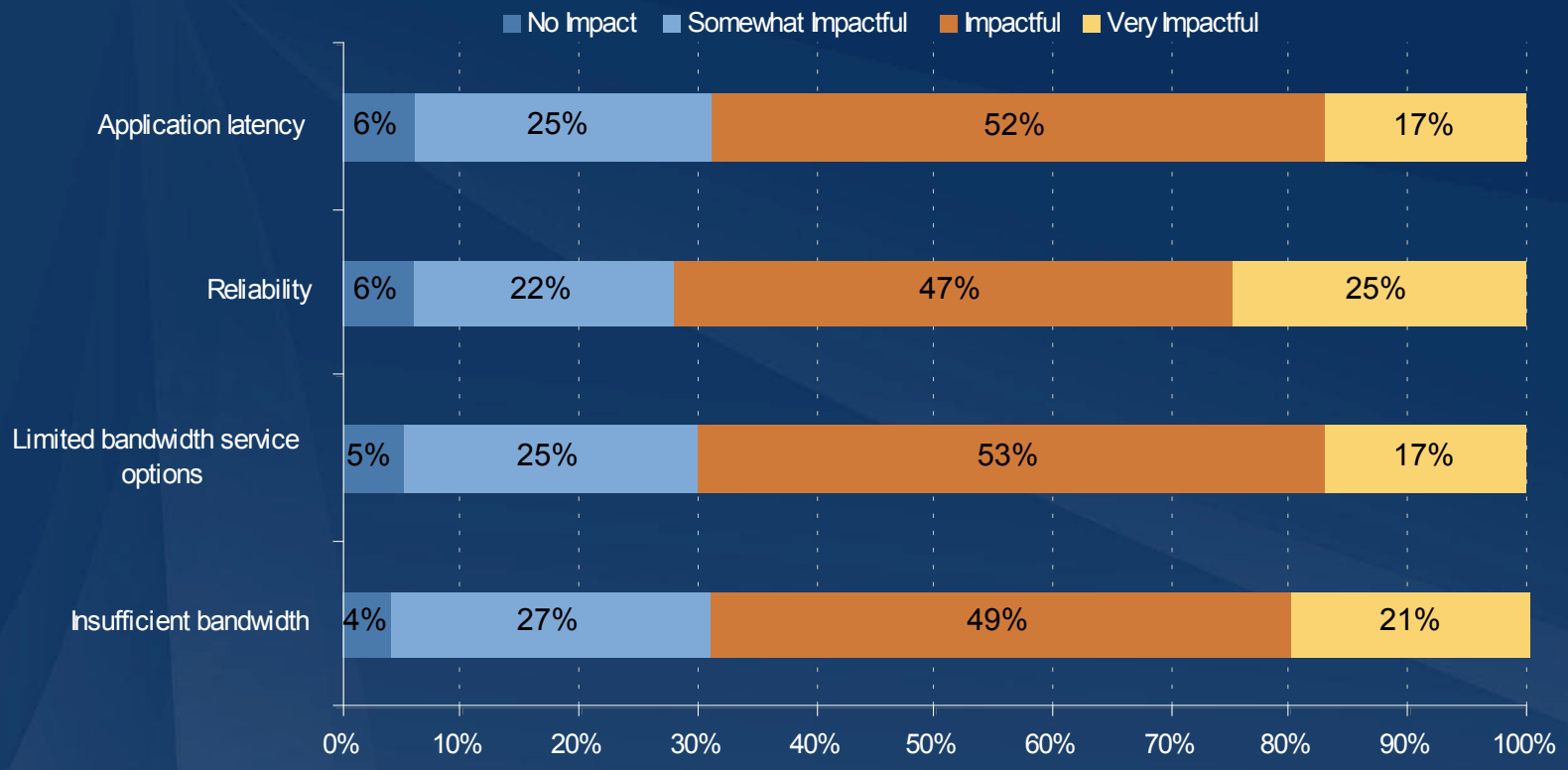
Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

Impact of bandwidth on European recovery objectives

On a scale of 1 to 4, where 1 equals “no impact” and 4 equals “very strong impact”, please rate the impact of the following to your ability to improve your time to recovery and to limit data loss.



Base: 304

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

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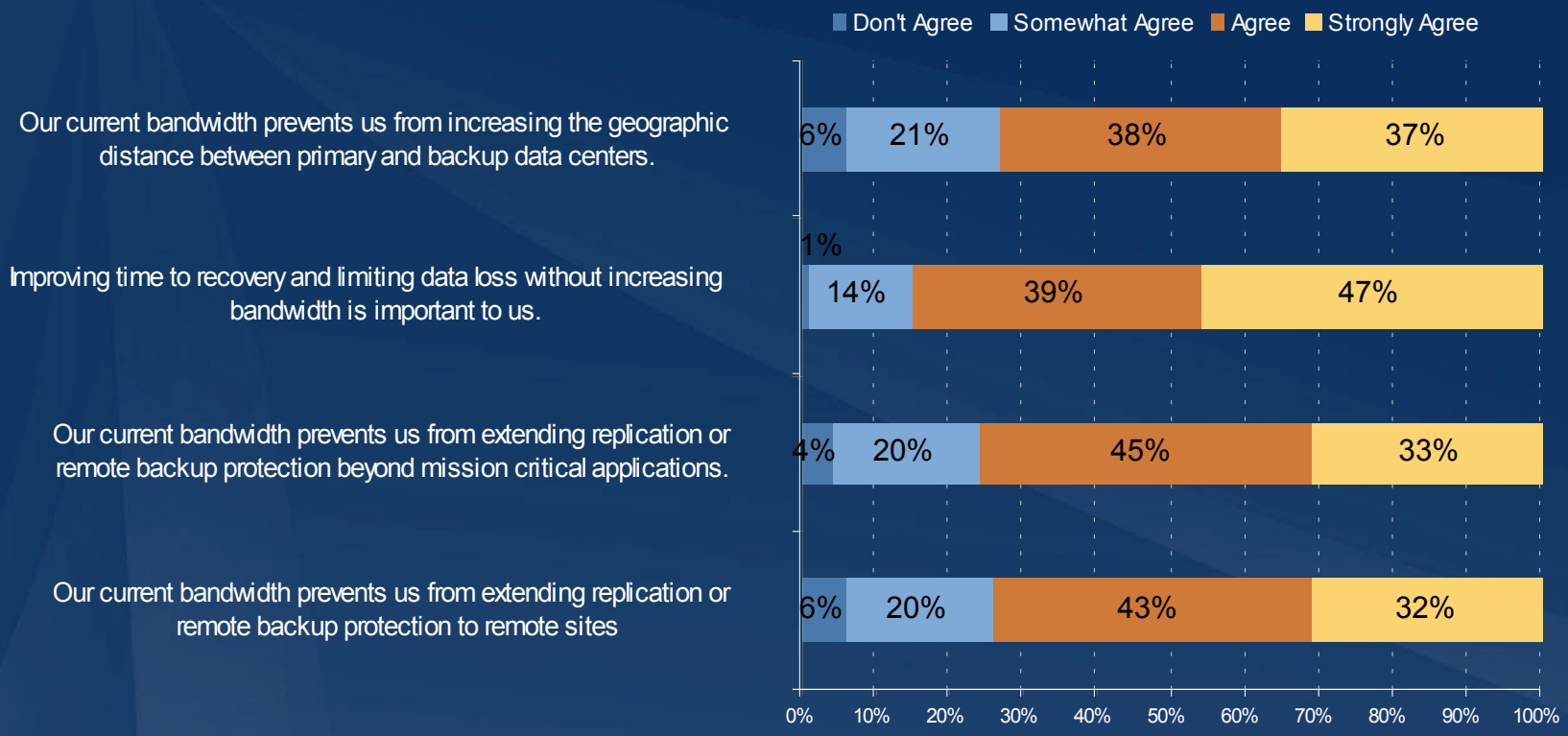
86% of North American enterprises want to improve recovery without increasing bandwidth

Please rate your level of agreement with the following statements regarding your WAN bandwidth.
(1 equals strongly disagree and 4 equals strongly agree)



Base: 200
North American respondents

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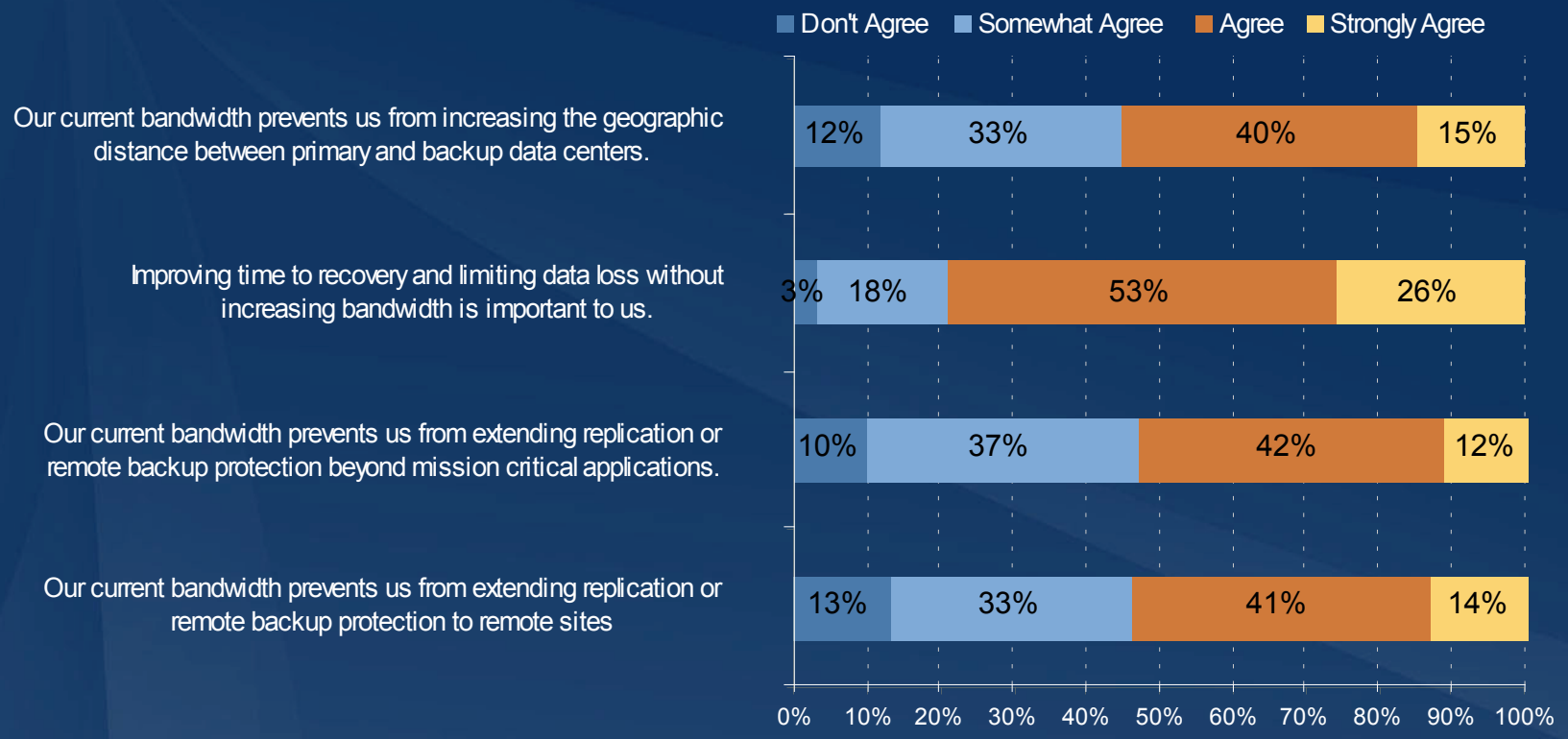
79% of European enterprises want to improve recovery without increasing bandwidth

Please rate your level of agreement with the following statements regarding your WAN bandwidth. 1 equals strongly disagree and 4 equals strongly agree.

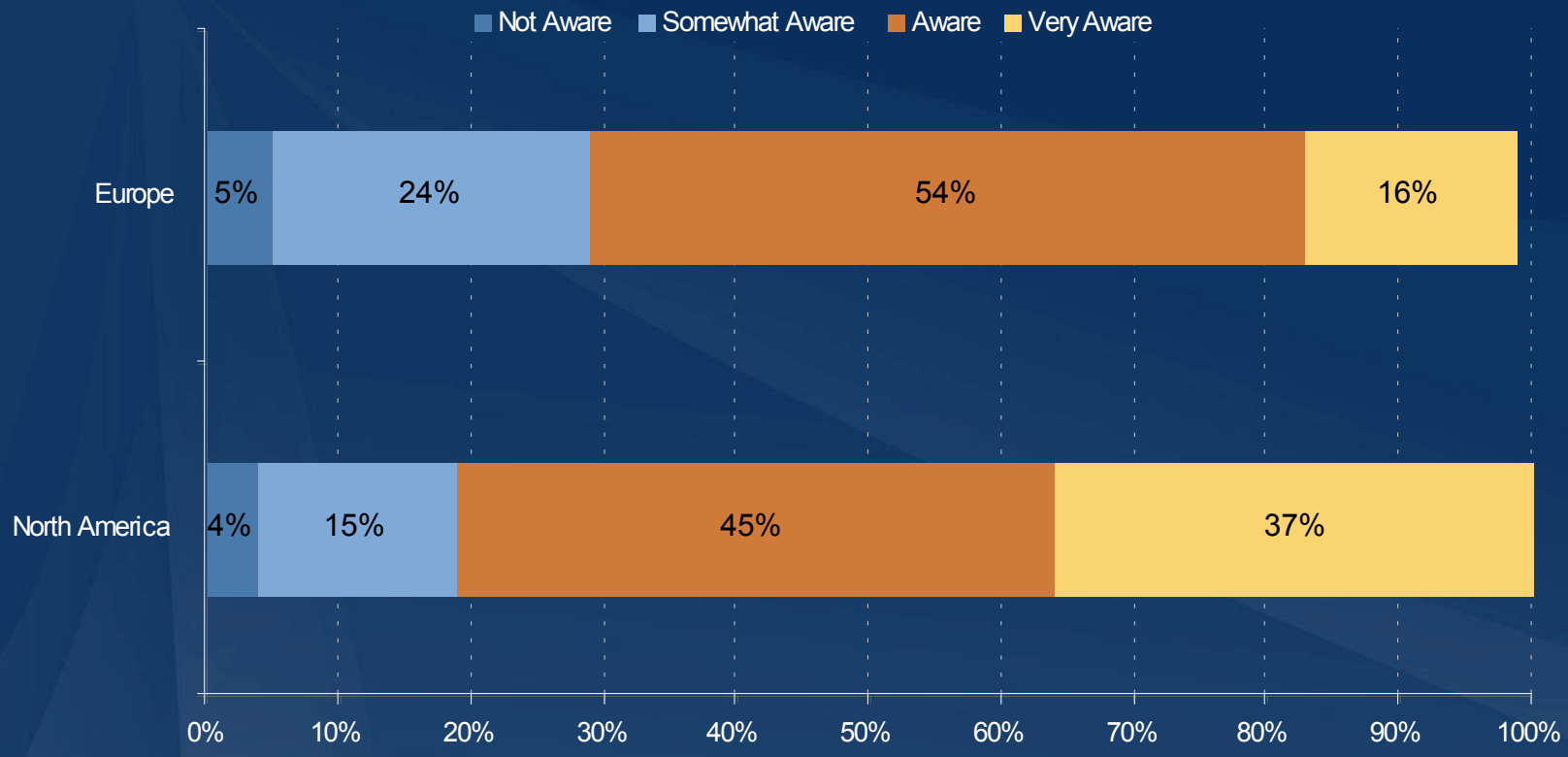


Base: 304
European respondents

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

Awareness of WAN optimization solutions is high

Please rate your level of awareness of WAN acceleration appliances as a way to improve the performance of replication and remote backup. (On a scale of 1-4, where 1 is not at all aware and 4 is very aware)



Base: North America 200, Europe 304

Source: Disaster recovery and data replication study conducted by Forrester Consulting and commissioned by F5 Networks, January 2007

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Recommendations

- Don’t selectively replicate only the most mission-critical applications.
  - » Business processes rely on multiple integrated applications
- Protect your remote sites
- Before investing in additional bandwidth to support remote sites, consider WAN optimization offerings
- When evaluating WAN optimization vendors to accelerate replication or remote backup:
  - » Focus on the vendors that have made the time and investment to test the interoperability of their appliance with ISVs, storage vendors, and storage networking vendors
  - » Insist on case studies and/or customer references that prove its capabilities and intended benefits.

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Thank you

Stephanie Balaouras

+1 617/613-6440

sbalaouras@forrester.com

www.forrester.com

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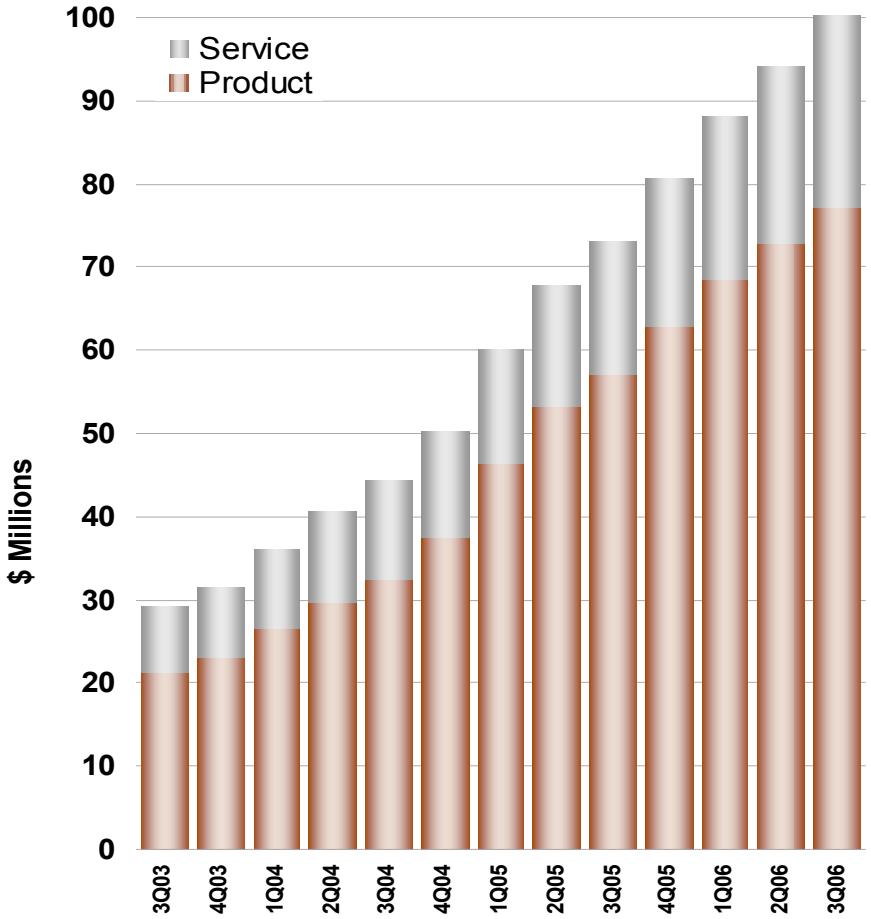
Data Replication: F5 and WAN Optimization

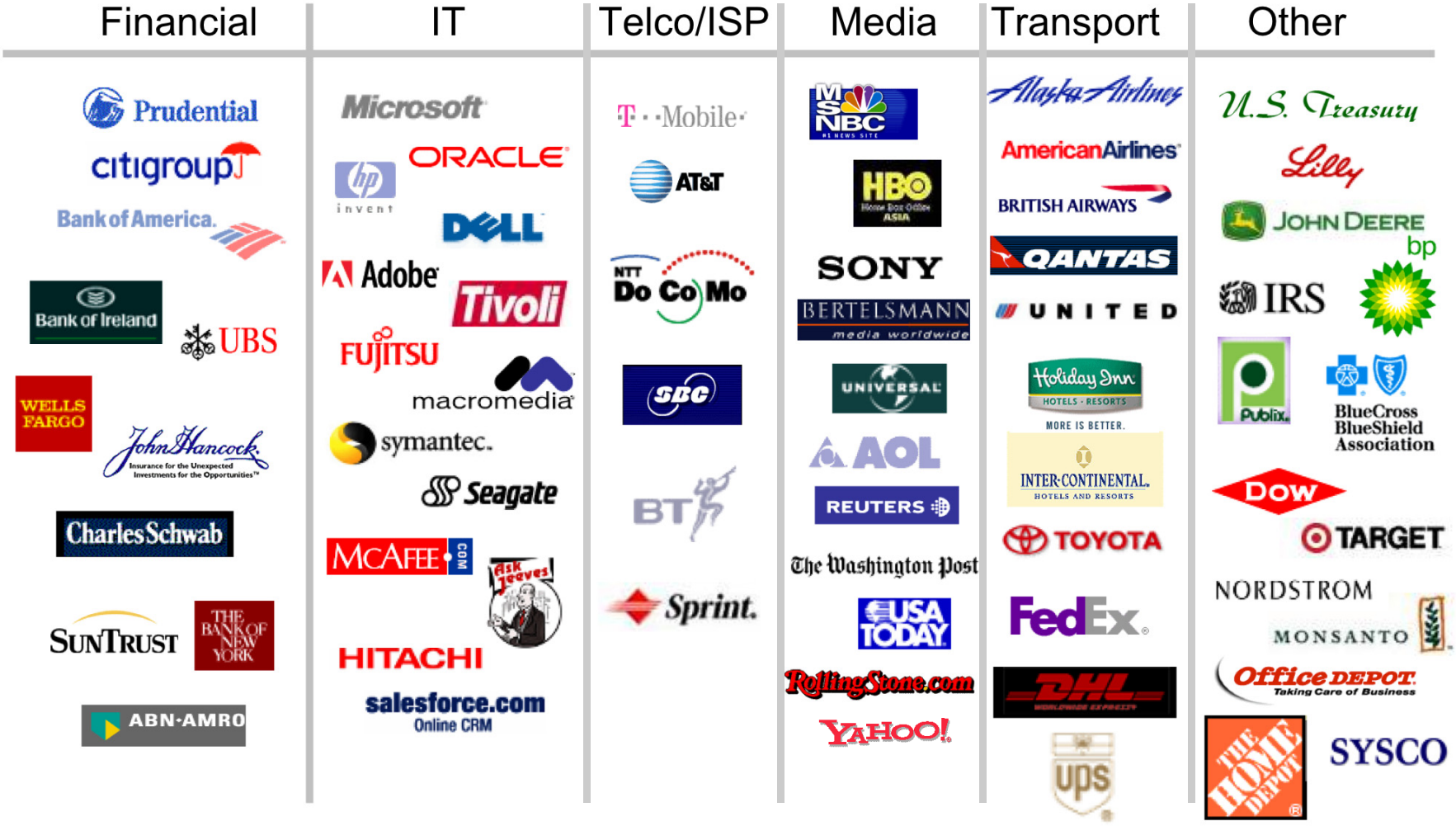
Who is F5?

- Public company FFIV (Nasdaq)
- Founded 1996
- FY'06 revenue $394.0 million
- 40% YoY growth
- 1,000+ employees
- Products:
  - Application Delivery Networking
  - Network Optimization
  - Network and Application Security



Corporate Customers

9 of top-10 Global Finance firms, and 60% of the Global 1000



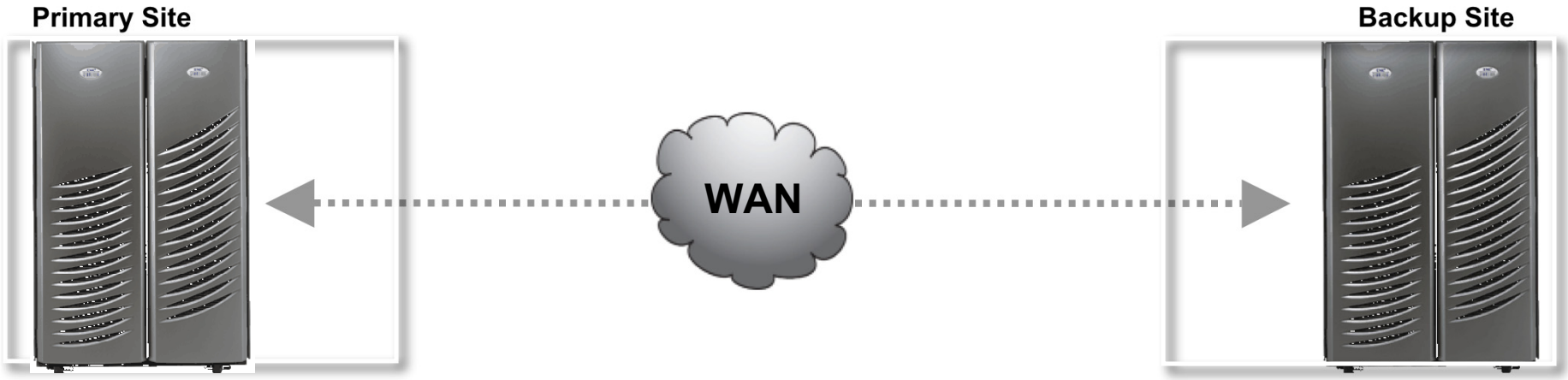
Common Symptoms of Replication with Network Problems

- Unable to meet storage SLA's (RPOs and RTOs)
  - Expanding distance between DR sites
- Performance and uptime problems
- Expectation of need to purchase more bandwidth

- Root Causes:
  - Bandwidth is limited
  - Latency, packet-loss, congestion variable
  - Volume of data keeps growing
  - TCP/IP more common

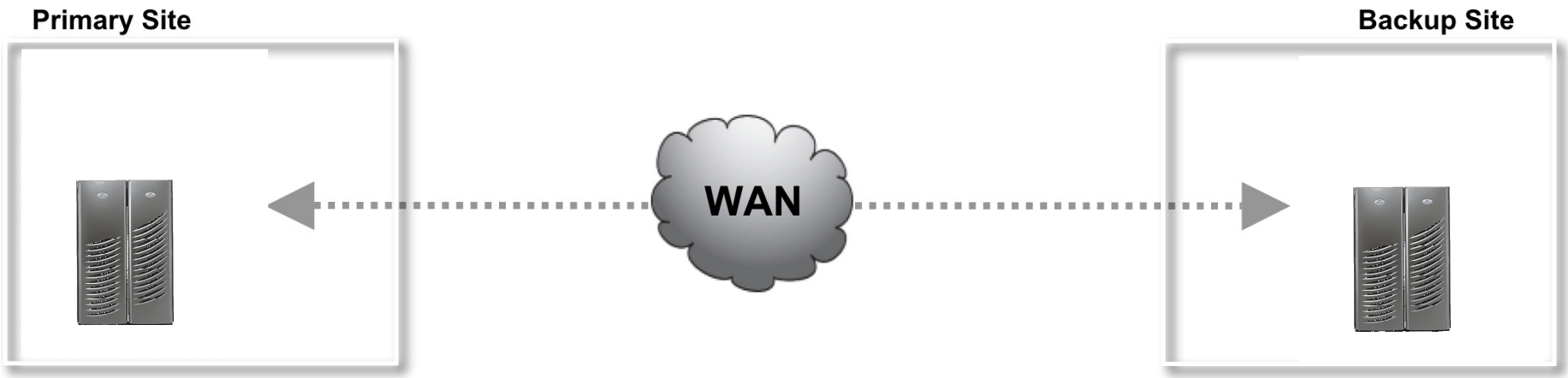
How Can The Problem Be Solved?

1. Replicate less data?



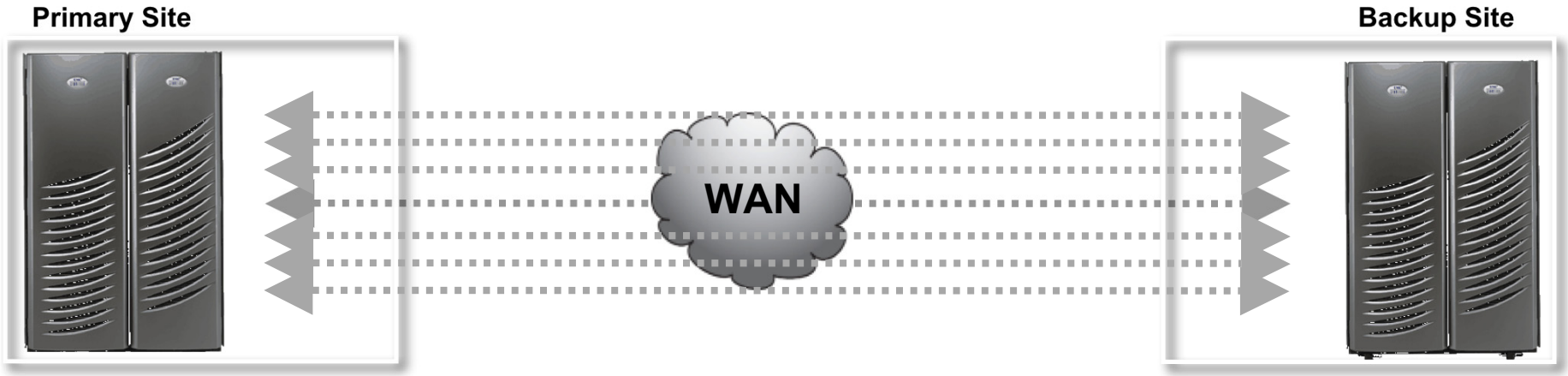
How Can The Problem Be Solved?

1. Replicate less data? NO!



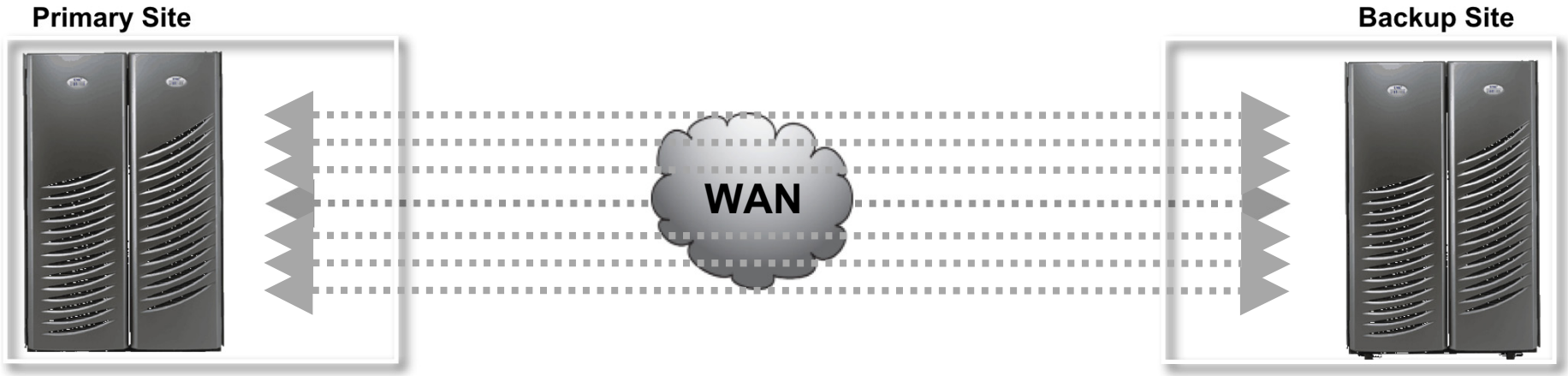
How Can The Problem Be Solved?

1. Replicate less data? NO!
2. Lease more WAN bandwidth?



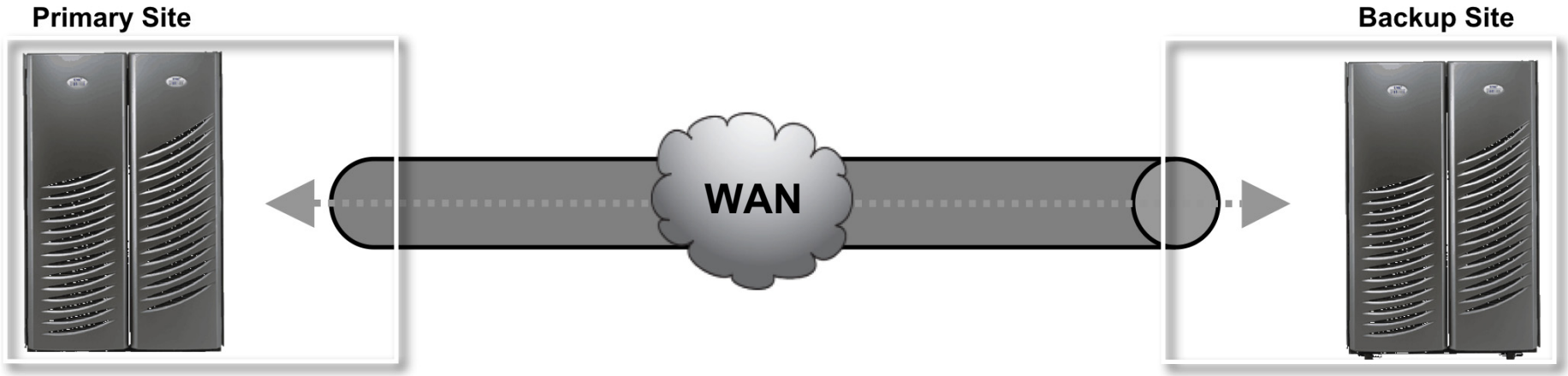
How Can The Problem Be Solved?

1. Replicate less data? NO!
2. Lease more WAN bandwidth? Expensive, recurring, ineffective



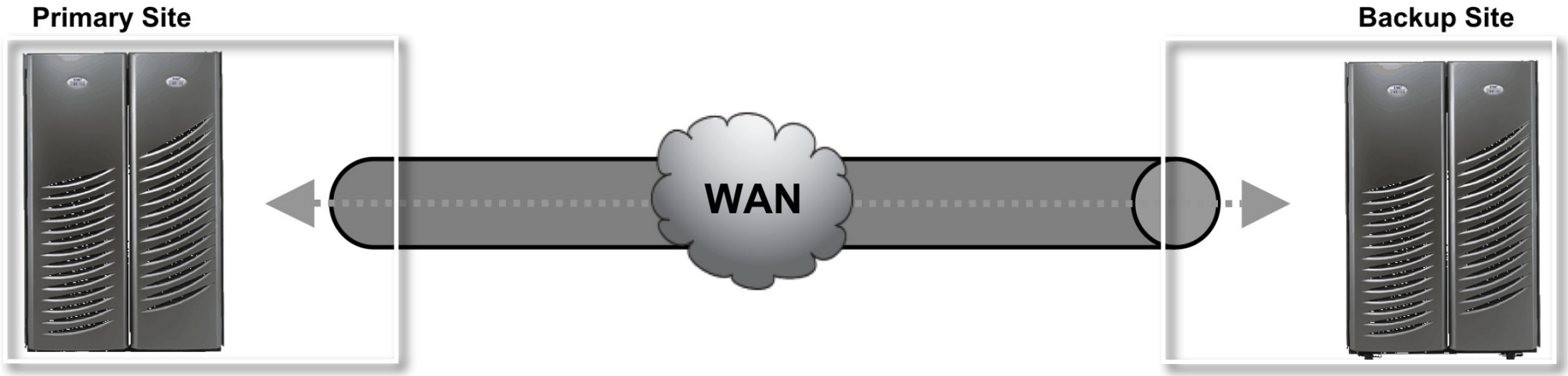
How Can The Problem Be Solved?

1. Replicate less data? NO!
2. Lease more WAN bandwidth? Expensive, recurring, ineffective
3. Accelerate DR traffic?



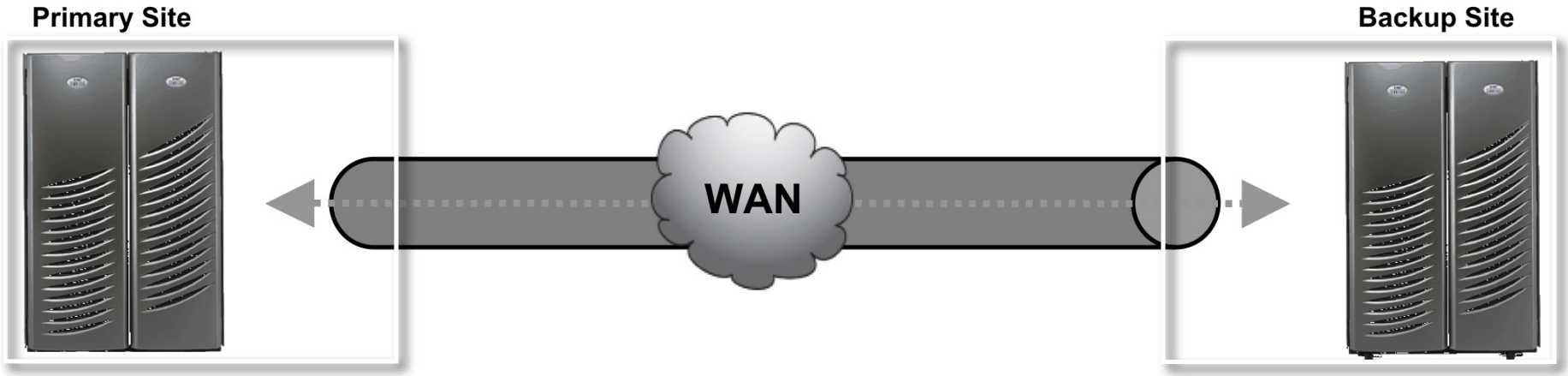
How Can The Problem Be Solved?

1. Replicate less data? NO!
2. Lease more WAN bandwidth? Expensive, recurring, ineffective
3. Accelerate DR traffic? Cost effective solution



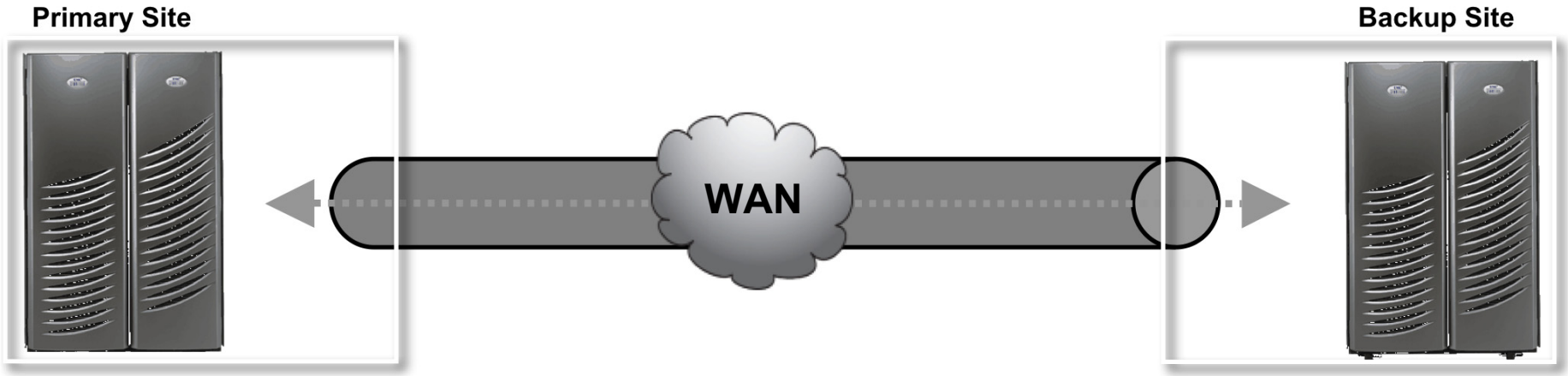
How Can The Problem Be Solved?

1. Replicate less data? NO!
2. Lease more WAN bandwidth? Expensive, recurring, ineffective
3. Accelerate DR traffic? Cost effective solution
4. Prioritize DR traffic and guarantee bandwidth?



How Can The Problem Be Solved?

1. Replicate less data? NO!
2. Lease more WAN bandwidth? Expensive, recurring, ineffective
3. Accelerate DR traffic? Cost effective solution
4. Prioritize DR traffic and guarantee bandwidth? Most effective when combined with #3



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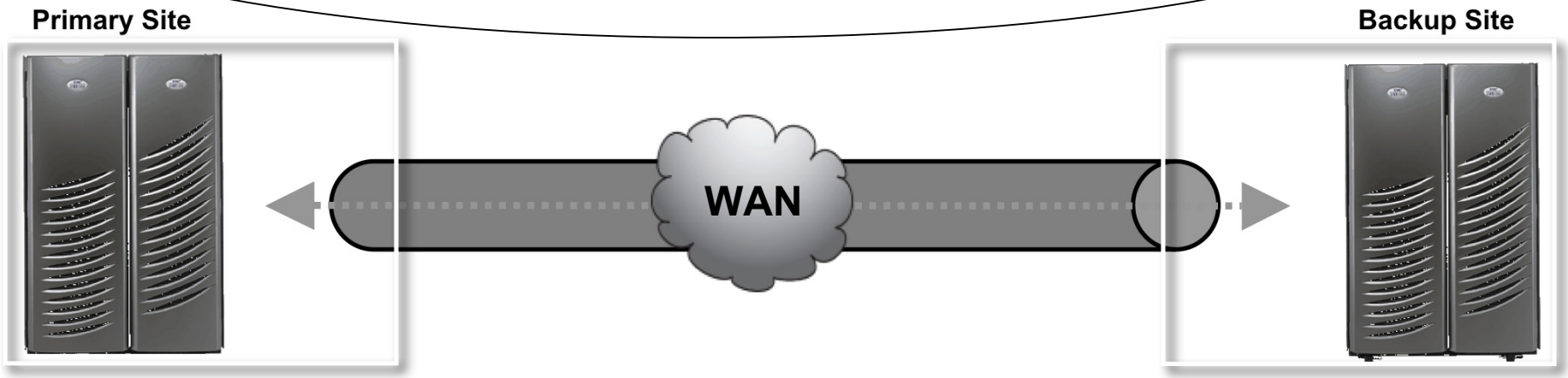

Solution: F5 WANJet WAN Optimization

- 2 ½ years in the market
- Rack-mountable appliance
- Enables LAN-like performance across a WAN
- Symmetric deployment architecture (one on each side of the WAN)

WANJet Value Proposition

Meet RPOs and RTOs without upgrading bandwidth or Data Replication (DR) infrastructure

- **Accelerate DR replication up to *5 to 10 times faster****
- **Utilize *70-90% less bandwidth****
- **Guarantee bandwidth and *prioritize DR traffic* over non-DR traffic**
- **Mitigate the effects of *latency***
- **Enable the network to *adapt dynamically* to DR needs and congestion**

*Performance varies depending on a number of customer-specific factors .

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Reduce the cost of meeting RPOs and RTOs

- **Use a *fraction of the bandwidth* to replicate the same data**
- **Provide a comprehensive view of *WAN* performance metrics and *bottlenecks***
- **Reduce the tangible and intangible *costs of troubleshooting***

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Gain more control over *WAN resources* allocated to *storage*

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Gain more control over *WAN resources* allocated to *storage*

Provide *Security* through SSL Encryption of all traffic

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WANJet Value Proposition

Meet RPOs and RTOs without upgrading bandwidth or Data Replication (DR) infrastructure

- Accelerate DR replication up to *5 to 10 times faster**
- Utilize *70-90% less bandwidth**
- Guarantee bandwidth and *prioritize DR traffic* over non-DR traffic
- Mitigate the effects of *latency*
- Enable the network to *adapt dynamically* to DR needs and congestion

Reduce the cost of meeting RPOs and RTOs

- Use a *fraction of the bandwidth* to replicate the same data
- Provide a comprehensive view of *WAN* performance metrics and *bottlenecks*
- Reduce the tangible and intangible costs of *troubleshooting*

Gain more control over *WAN resources* allocated to *storage*

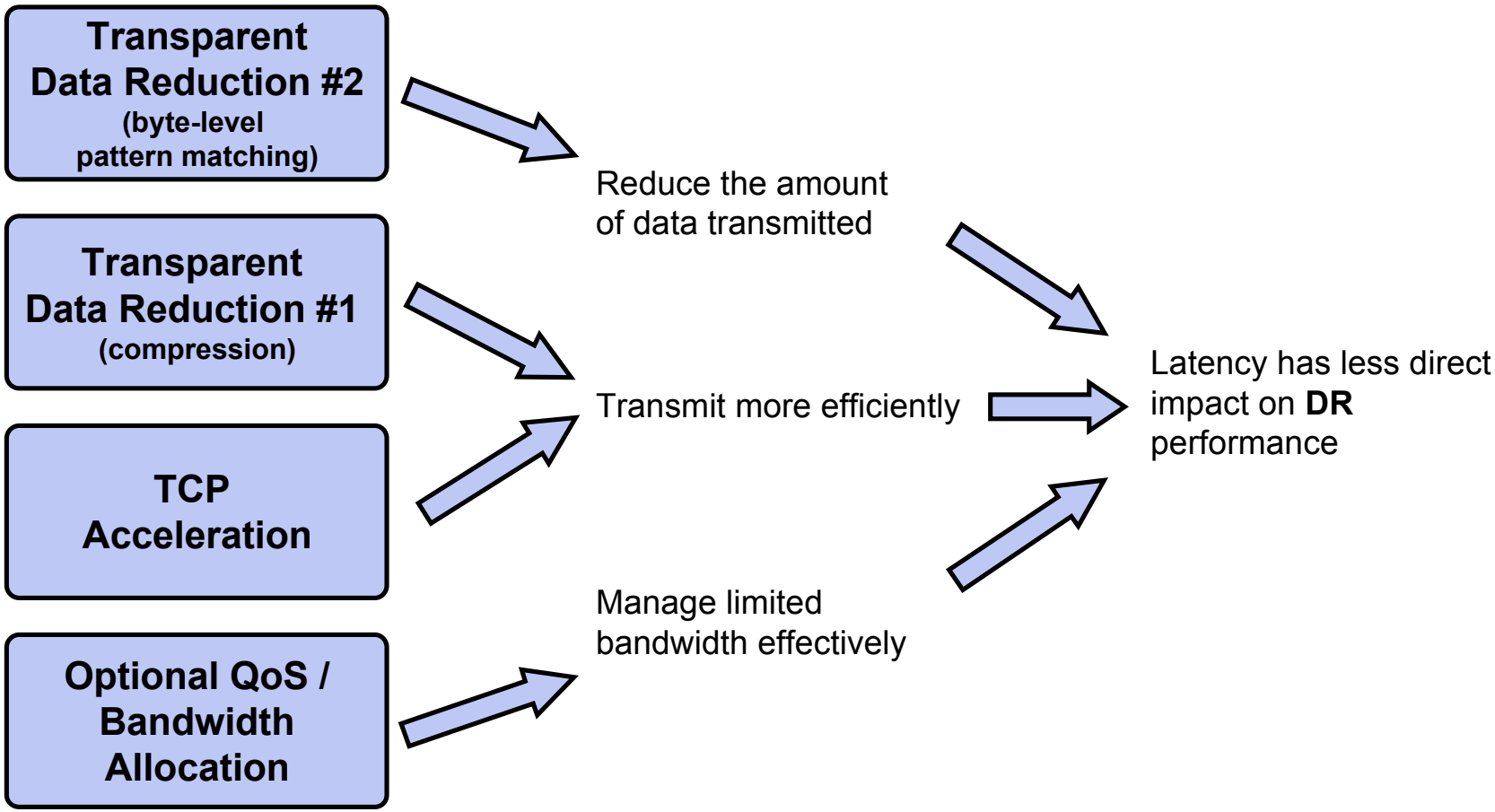
Provide *Security* through SSL Encryption of all traffic

Demonstrated *experience* with data replication

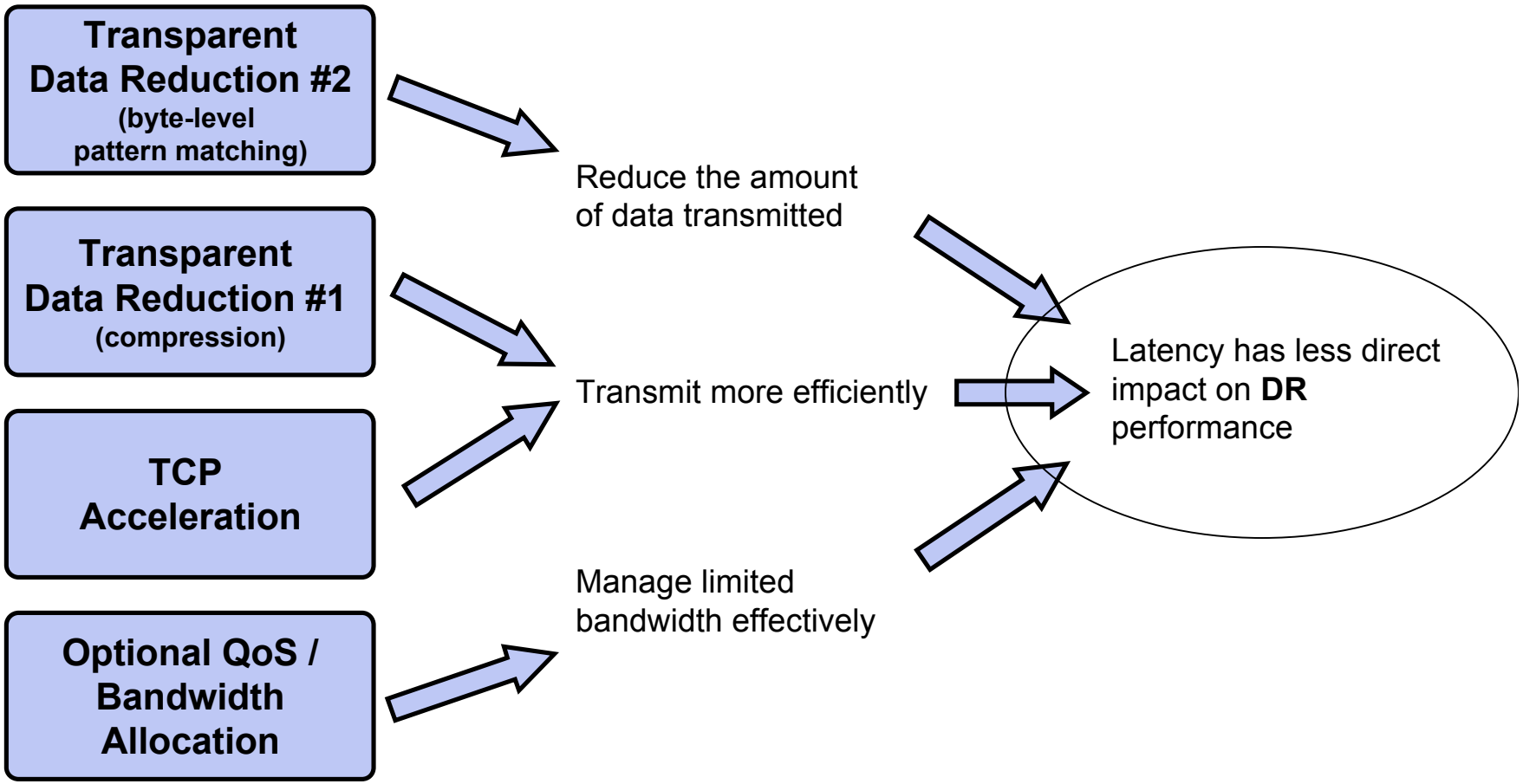
- Double-take
- EMC common customers

*Performance varies depending on a number of customer-specific factors .

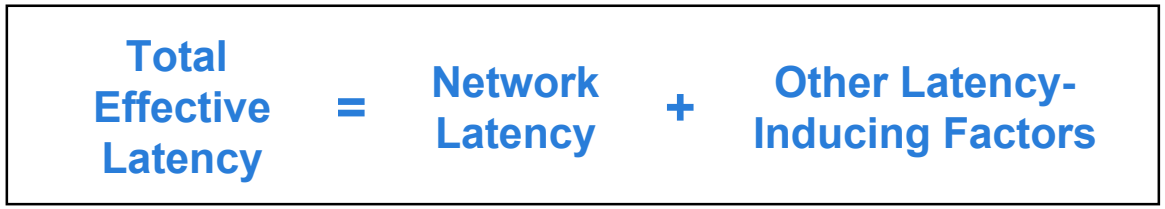
How Latency Effects are Mitigated by WANJet



How Latency Effects are Mitigated by WANJet



What Is Total Effective Latency



This is what impacts Data Replication performance

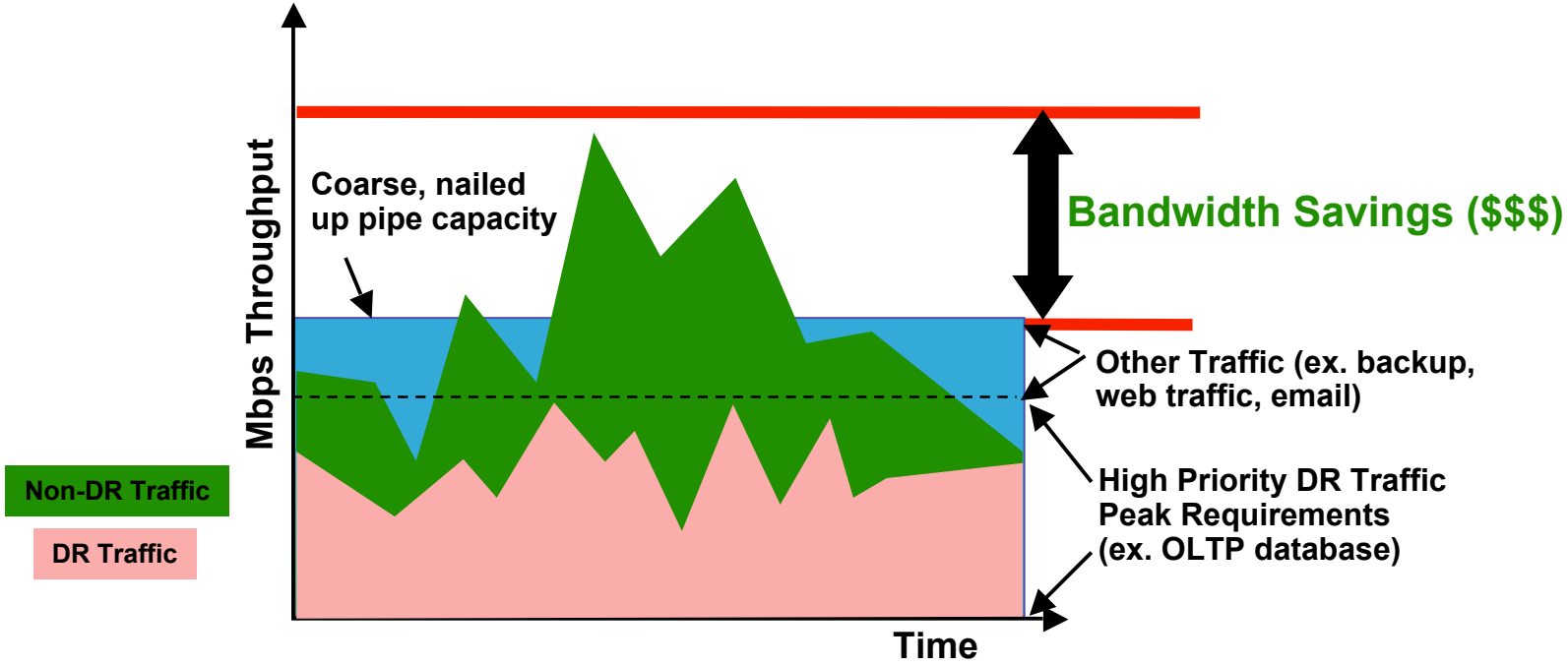
This is determined by point-to-point distance, and the speed of light.

This artificial latency is caused by many factors including:
- *Congestion on the network (Amount of data divided by size of link)*
- *Network device latency (routers, switches, firewalls,…)*

Data Replication performance is impacted by the ***Total Effective Latency***, not just Network Latency. ***Often Network Latency represents less than 25% of Total Effective Latency***.

WanJet Data Replication Prioritization & Bandwidth Allocation

(a) Prioritize **DR** traffic over non-**DR** traffic (by port or IP address)
(b) Allocate minimum bandwidth to **Data Replication** to protect it from high-congestion situations

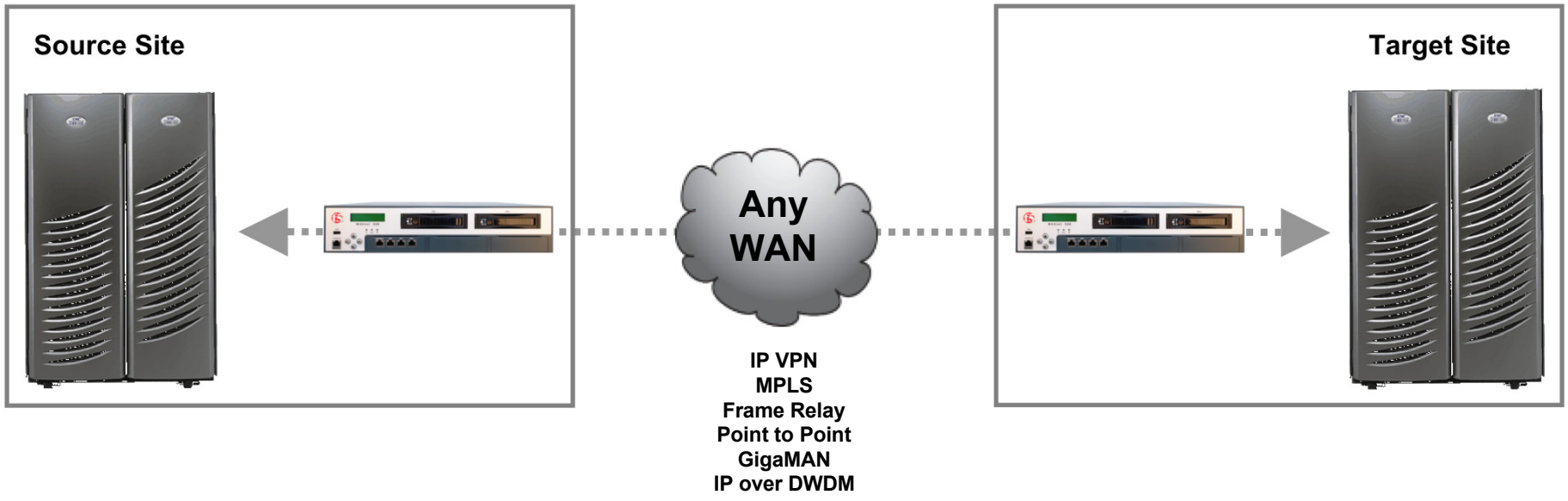


Less bandwidth needed to meet any given Data Replication RPO or RTO
- Lower recurring bandwidth expenses
- Enables links to be sized according to average (or thereabouts) rather than peak volume

Helps guarantee delivery of high priority Data Replication traffic
- Customers are able to meet SLAs for mission critical applications

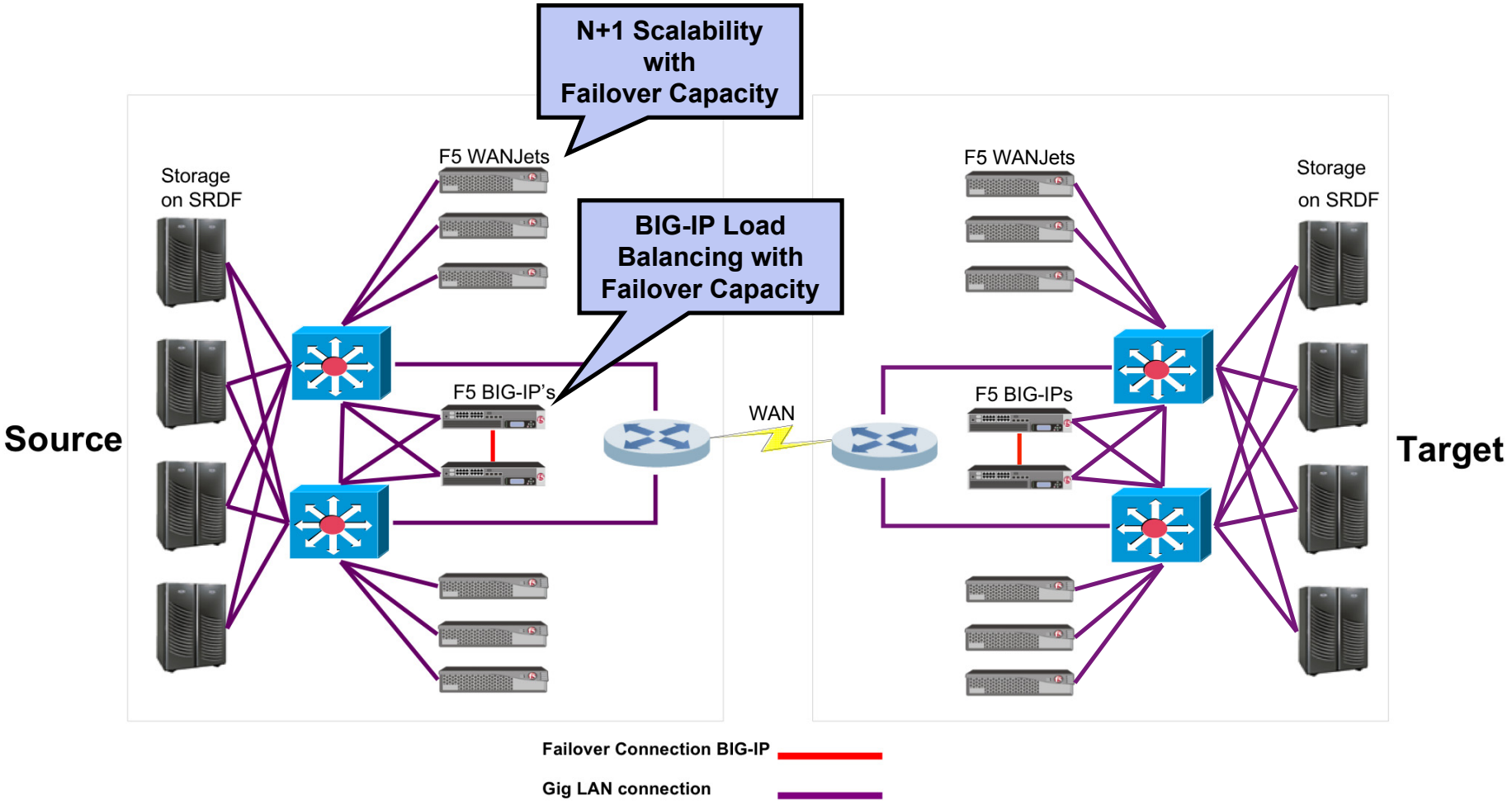
WANJet Changes to Data Replication traffic: None

- Transparent to Data Replication Traffic
- WANJet acts as an inline accelerator.
  It does *not* alter or redirect Data Replication traffic.
- WANJet "fails-to-wire" (i.e. traffic keeps passing through)
- Multiple WANJets can be load balanced for high availability



Sample Configuration

Example Below: 2.4 Gbps data throughput over a 300 Mbps WAN with 8X Compression and redundant failover architecture



Case Study: US Government Agency

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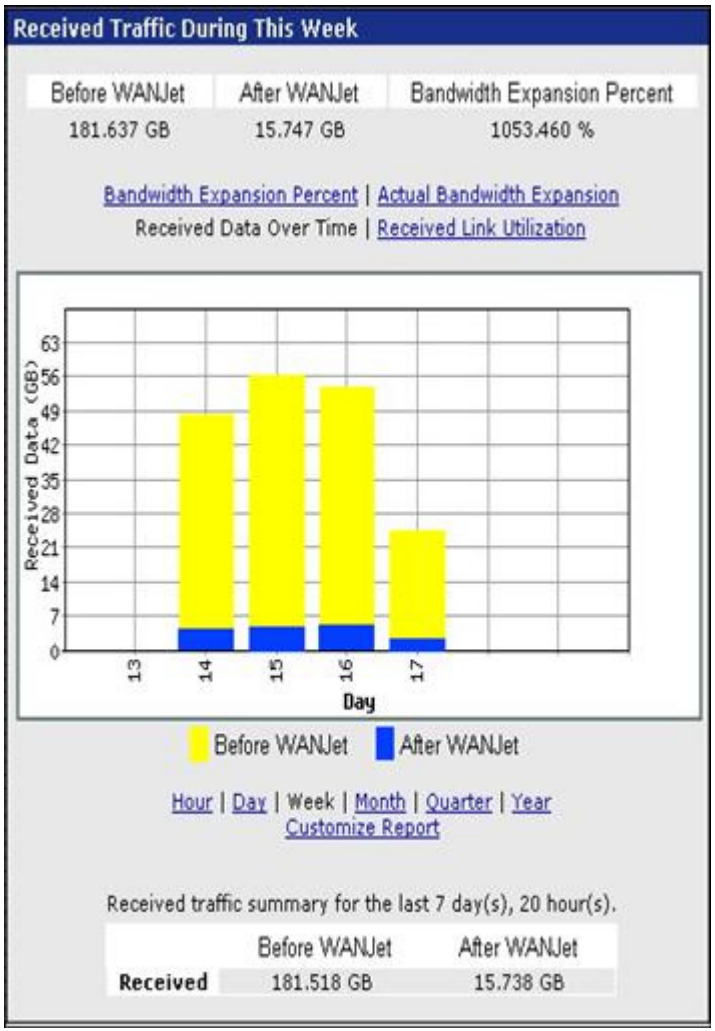
CHALLENGES

- SRDF/A on EMC storage
- 1,000+ miles between sites
- 18 Mb/sec of bandwidth provided, but over 90 Mb/sec needed based on 2:1 compression rate to run replication

RESULTS

- 5:1 Optimization/Compression rate achieved
- SRDF/A replication able to run on 18 Mb/sec link in production
- Avoided leasing additional bandwidth

Case Study: Fortune 10 Financial



WANJet

CHALLENGES

- Replication Performance
- 20 mile, Dual T3 Links
- Weekly copy back-up took 9 Days

RESULTS

- Weekly copy reduced to 2 Days
- 2/3 of bandwidth usage saved
- Application Response Near Real-Time
- Payback period in less than 6 mo's
- Avoided potential bandwidth upgrade expenses of $400,000/year

For More Information

- www.f5.com
  - Independent report: Forrester Impact of the WAN on Disaster Recovery Capabilities
  - Solution Center: Optimization for white papers, success stories
  - WANJet product section
  - WANJet demo-on-demand
  - Podcasts: www.f5.com/communication/podcasts.html
- www.f5resources.com (register)
  - Disaster recovery and data replication guides
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