



Data Replication and Wide Area Application Services (WAAS)



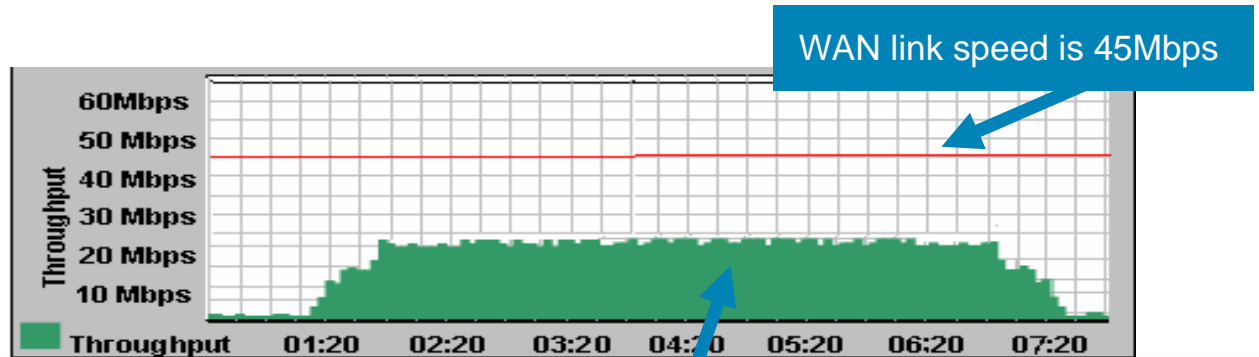
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Data Replication Challenges

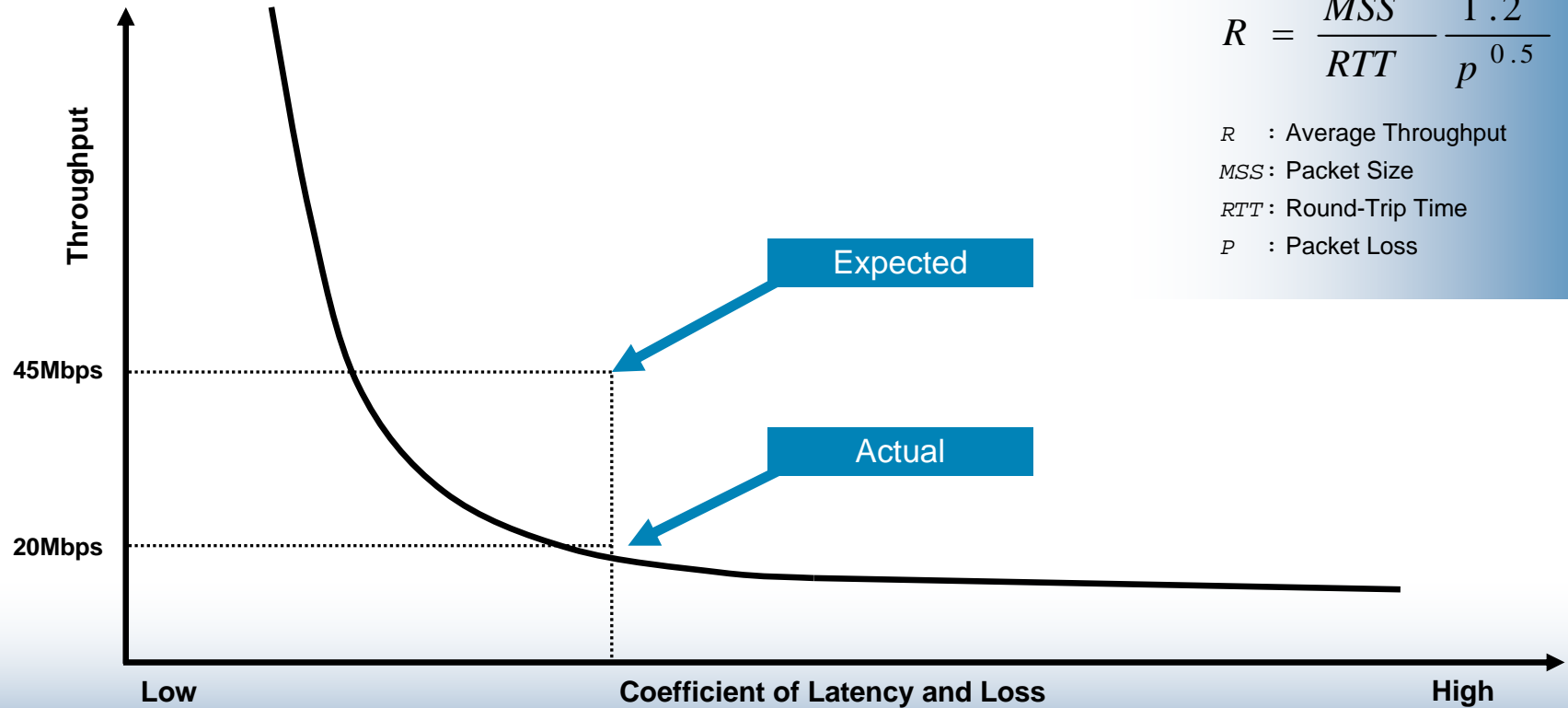
- Requires High Bandwidth Low Latency Links
- Inability of storage systems to fill WAN link due to latency/packet loss issues
- High cost of bandwidth for Data Replication
- Need to increase the distance of the disaster recovery site

Replication time takes several hours



Replication throughput is only 20Mbps

The Impact of Latency and Loss



$$R = \frac{MSS}{RTT} \frac{1.2}{p^{0.5}}$$

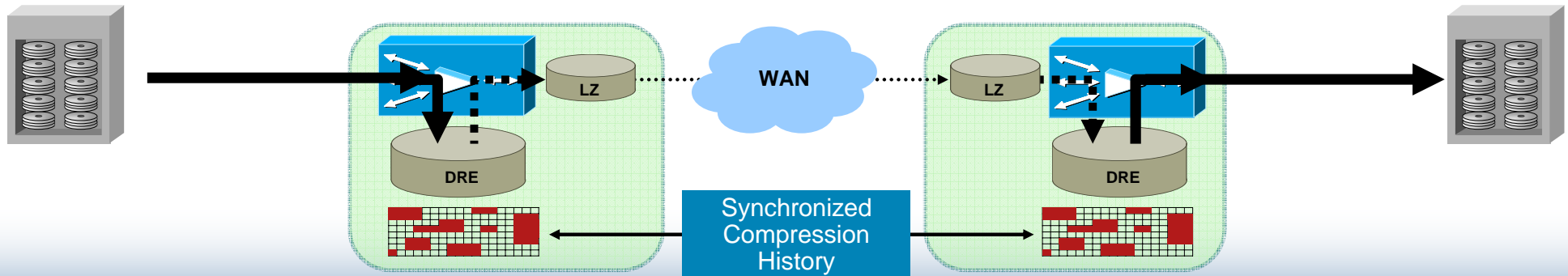
- R : Average Throughput
- MSS : Packet Size
- RTT : Round-Trip Time
- P : Packet Loss

Advanced Compression

- Cisco WAAS advanced compression nearly eliminates the transmission of redundant data patterns and compresses data that must traverse the WAN to improve application performance and save bandwidth

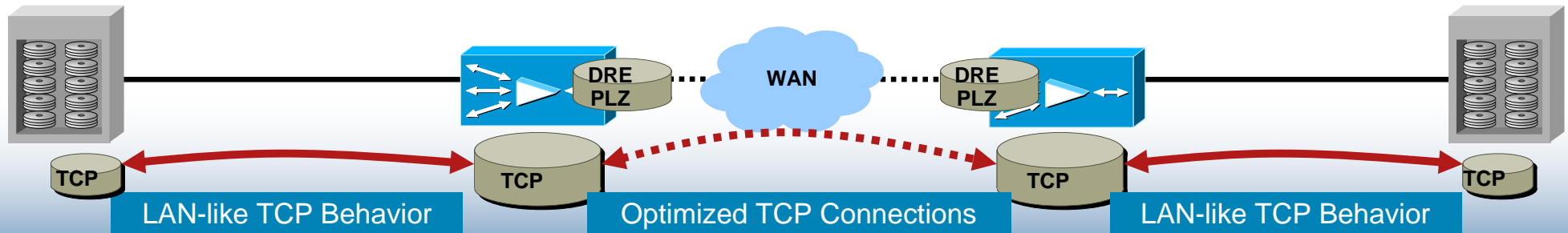
Data Redundancy Elimination (DRE): application-agnostic compression eliminates redundant data from TCP streams providing up to 100:1 compression

Persistent LZ Compression: session-based compression provides up to an additional 10:1 compression even for messages that have been optimized by DRE

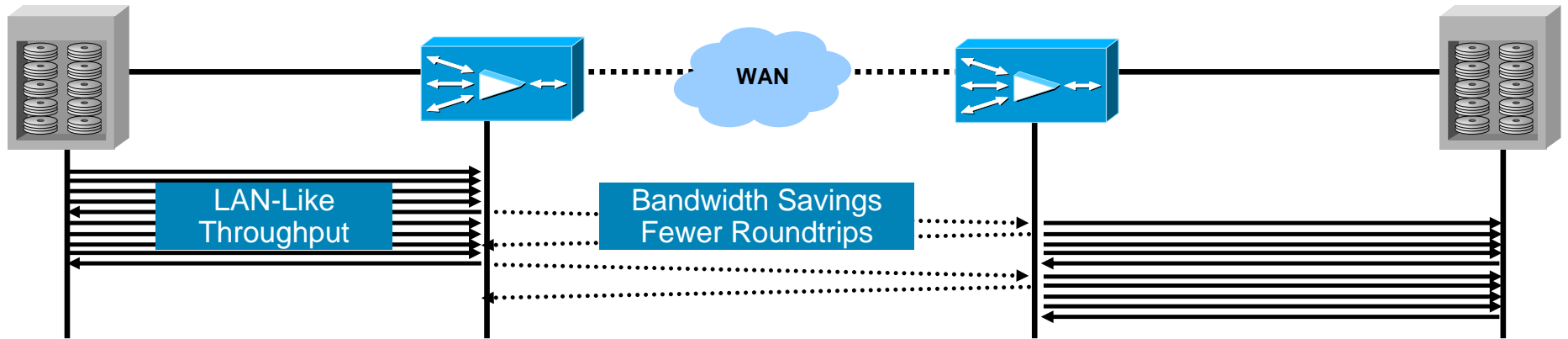


TCP Optimization

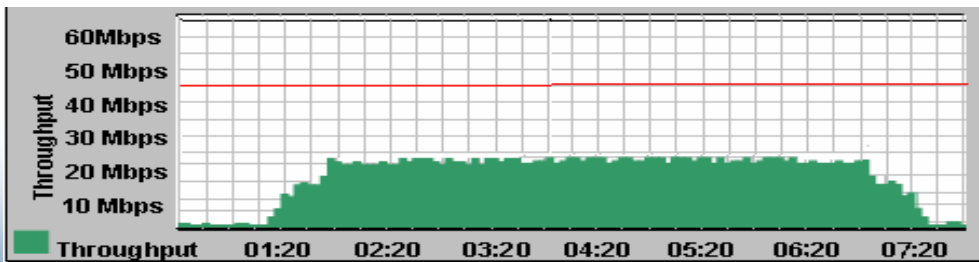
- Cisco WAAS employs TCP optimization to improve Replication throughput and better leverage existing WAN bandwidth capacity and shield end-nodes from unruly WAN conditions
 - Bandwidth scalability - help certain applications 'fill-the-pipe'
 - Connection fairness - ensure bandwidth is allocated fairly amongst flows
 - Loss mitigation - selective acknowledgement and retransmission
 - Slow-start mitigation - improve connection setup time
- TCP Proxy architecture provides LAN-like TCP behavior and provides higher levels of compression than per-packet compression



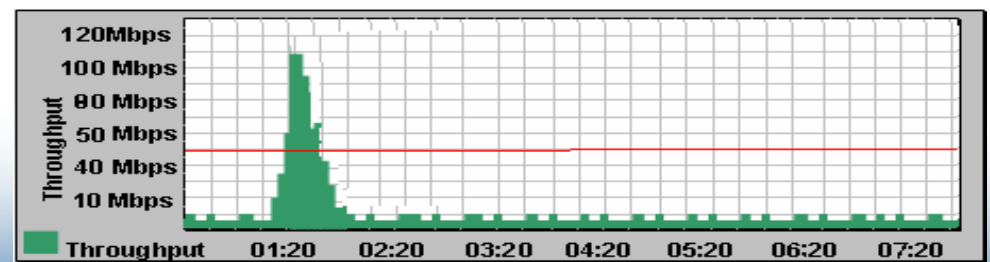
Combined Power of TCP Optimization and Advanced Compression



No WAAS



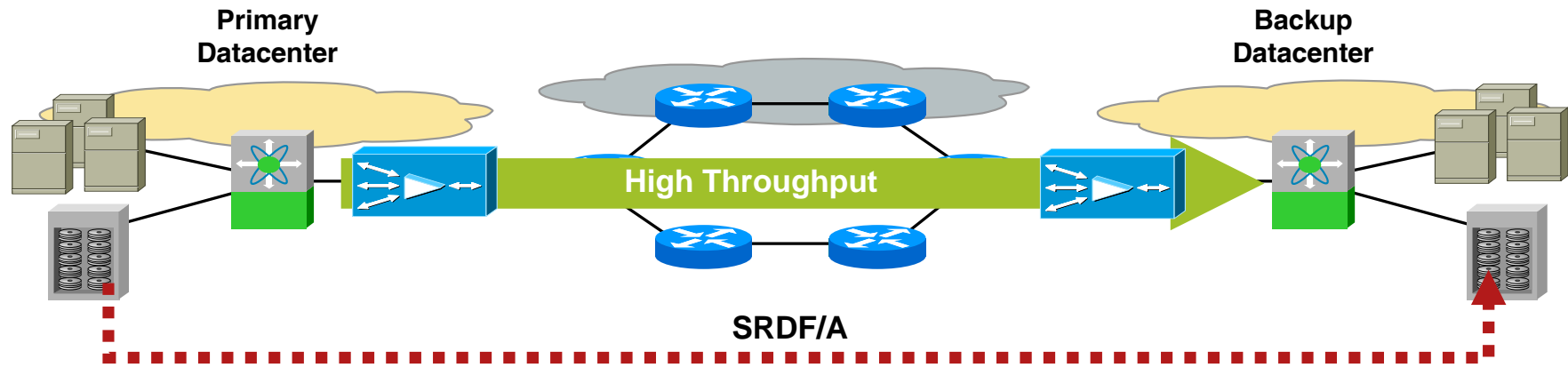
WAAS enabled with Replication Accelerator Mode



Replication Acceleration Mode Overview

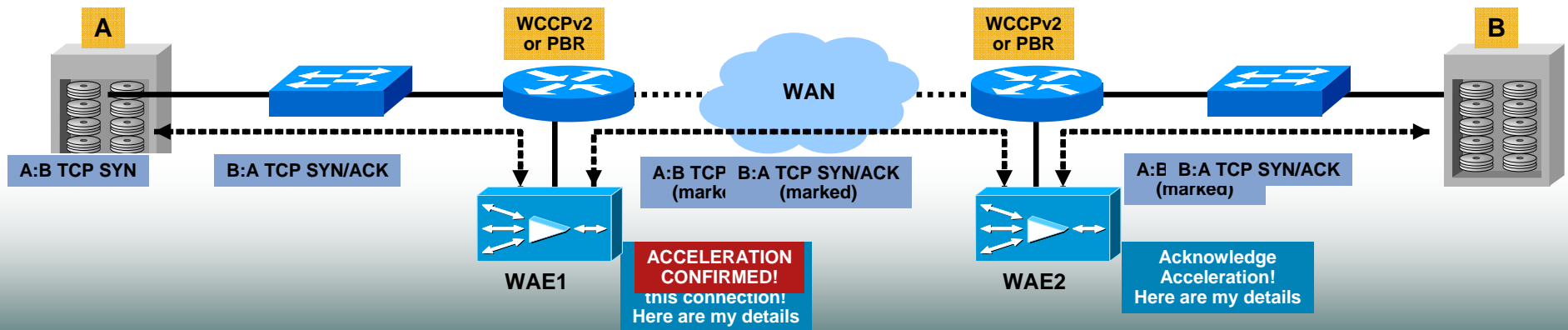
WAEs in Replication Accelerator mode have:

- TFO tuned to address TCP issues for high speed WAN links
- DRE tuned for low latency processing requirements for DC to DC Replication
- Default policy in Replication Accelerator mode is tuned for Replication Applications



Cisco WAAS Auto-Discovery

- Cisco WAAS devices automatically discover one another and negotiate optimization capabilities
- Eliminates the need for complex overlay networks with tunnels that could double management effort and break control, security, and monitoring systems



Cisco WAAS – Accelerates Applications

Category	Applications	2X	5X	10X	25X	50X	100X+	
File Sharing	CIFS NFS	2-20X Avg				>100X Peak		
Email	Microsoft Exchange Lotus Notes Internet Mail	2-5X Avg		20X Peak				
Web and Collaboration	HTTP WebDAV FTP Microsoft Sharepoint	2-10X Avg				100X Peak		
Software Distribution	Microsoft SMS Altiris HP Radia	2-20X Avg				>100X Peak		
Enterprise Applications	Microsoft SQL Oracle, SAP Lotus Notes	2-5X Avg		20X Peak				
Backup Applications	Microsoft NTBackup Legato Networker Veritas Netbackup CommVault Galaxy	2-10X Avg			50X Peak			
Data Replication	EMC SRDF/A EMC IP Replicator NetApp SnapMirror Data Domain Double-Take Veritas Vol Replicator	2-10X Avg			50X Peak			

* Performance improvement varies based on user workload, compressibility of data, and WAN characteristics and utilization. Actual numbers are case-specific and results may vary. Cisco WAAS can employ optimization on almost any TCP-based application.

WAAS Replication Accelerator Differentiators

Benefit	Features
Lowest TCO	<ul style="list-style-type: none">▪ Special TFO & DRE optimizations maximize throughput & minimize cost▪ Up to 10x reduction replication/backup times▪ DR site distance extended thousands of miles▪ SRDF/A Certified
Ease of Deployment	<ul style="list-style-type: none">▪ Auto-discovery and Auto-configuration simplifies deployment and eliminates manual configuration
Deployment flexibility into existing data center networks	<ul style="list-style-type: none">▪ WAE devices can be deployed in either Inline or WCCP mode
Automated separation of data replication traffic from application traffic	<ul style="list-style-type: none">▪ Ensures DC replication traffic volumes do not impact branch optimization performance
Resilient Network Integrated	<ul style="list-style-type: none">▪ Integrated solution w Cisco MDS to provides FCIP acceleration with Port Channels that improve resilience▪ N+1 clustering eliminates single point of failure▪ Full range of DC topologies supported w hardware accelerated out-of-path deployment with Cat 6K

Q & A





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