DATACENTERS DE PROXIMA GENERACION

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NETWORKING SOLUTIONS
CARRIER AND ENTERPRISE
THE CONNECTED CULTURE 2010-2020

PROLIFERATION OF DEVICES

CONTENT CONSUMPTION

CONNECTED SOCIALIZATION

MACHINE TO MACHINE
CONNECTED CULTURE DRIVES EXPONENTIAL GROWTH

Worldwide internet traffic, 1990-2020 PB/month

Forecast Model

MACHINE TO MACHINE?

WWW is born
Digital decade

17x Growth 2008-2020
+27% 2008-2020 CAGR

+32% Video
+20% Non-video

Source: Juniper, Cisco, MINTS
PROBLEMS WITH NETWORKS TODAY

The challenges:
- Too slow
- Too expensive
- Too complex

Multi-tier legacy network:
- Unnecessary layers add hops and latency
- Up to 50% of the ports interconnect switches, not servers or storage
- Spanning Tree disables up to 50% of bandwidth

Graph showing:
- Complexity increasing with scale
THE TYRANNY OF TREES

Typical tree configuration

Location matters in a tree architecture

Bubbles
Optimal performance

One Hop

VM
Operational Complexity: A function of devices + interactions

Number of managed devices
- Each switch is autonomous
- 7 managed devices

Number of potential interactions
- Shared protocols
- 21 potential interactions

\[ N \times (N-1) \div 2 \]

*N = no. of managed devices*
DEFINITION OF HIGH-PERFORMANCE NETWORKING

The Data Center network must be:

- Scalable
- Fast
- Reliable
- Secure
- Simple

The Network is the foundation of the Data Center
TIER'S


2. Two-tier data center

3. Legacy three-tier data center

W Up to 75% of traffic E
SIMPLIFYING THE NETWORK

Virtual Chassis in Access (2008)

Connect the access to the core
Eliminate the Aggregation Tier
($1.2B spent in DC aggregation tier)

Benefits:
1. Fewer devices, fewer links
   (up to 35% lower cost)
2. Operational Simplicity
3. Lower Latency
SIMPLIFYING THE DATACENTER NETWORK

1. Lower latency
2. Increased bandwidth
3. Higher reliability
4. Less power and space
5. Simplified management
6. Consolidated security

WAN Edge
Extend Virtual Private LANs with MPLS
Core Layer
High density, wire-rate 10GbE
Security
Access Layer
Single fabric using Virtual Chassis technology
GbE servers
10GbE servers
IMPROVING PERFORMANCE AND EFFICIENCY

Aggregation/Core Switches

EX 4200
~2.6 – 36µs*

Server 1 Rack 1

Hypervisor

O/S

App 1

Unused

VM 1

O/S

App 2

VM 2

O/S

App 3

VM 3

Server 2 Rack 2

Hypervisor

O/S

App 4

VM 4

O/S

App 5

VM 5

O/S

App 3

VM 3

up to 160µs*
1 TIER ARCHITECTURE

3. Legacy three-tier data center

2. Two-tier data center

QFabric is not a network –

QFabric is a new type of switch

A Revolutionary New Architecture

Design Goals

Flat, resilient fabric
Everything is one hop away

Scale without complexity
The ability to add capacity without adding operational complexity
TRANSFORM THE NETWORK

One Network
Flat, any-to-any connectivity

A Network Fabric has the....
Performance and simplicity of a single switch

And the...
Scalability and resilience of a network

Single device N=1
Switch Fabric
Data Plane
- Flat
- Any-to-any
Control Plane
- Single device
- Shared state

Empowered by Innovation
So, we separate the line cards from the fabric.
And replace the copper traces with fiber links.
For redundancy add multiple devices.
SCALING THE DATA PLANE

1. All ports are directly connected to every other port
2. A single “full lookup” at the ingress QF/Node device
3. Blazingly fast: Always under 5μs 3.71μs (short cables)

QFabric is faster than any Ethernet chassis switch ever built
SCALING THE MANAGEMENT PLANE

- Single point of management
- Extensive use of automation
- Familiar operational model

Managed as a single switch - N=1
QFABRIC HARDWARE

**QF/Interconnect**
- Connects all the edge devices
- Cannot function as a standalone device

**QF/Node**
- Media independent I/O ToR device
- Can be run in independent or fabric mode

**QF/Director**
- 2 RU high fixed configuration
- X86 based system architecture

Industry First & Hardware Innovation

- 40G Interface
- 1Tbps/slot
- 40Tb Fabric
- <5µSec latency
1 TIER FABRIC

- Virtual & Physical Firewall
- Inter-DC connectivity
  - MPLS and VPLS
- Single, scalable fabric

One large, seamless resource pool
QFABRIC vs COMPETITION

QFabric

- 1/3 fewer devices
- 77% less power savings: $360K/Yr
- 90% less floor space
- 85% fewer links
- 12-16x faster
- Mgd. Devices 1 vs. 193
- L2 AND L3

TRILL like – Architecture

L3

L2 only
EN RESUMEN TODO PARA ARRIBA

Money
- Lower CAPEX
- Lower OPEX
- Lower TCO

&

Management
- Physical and operational simplicity
- Increased agility
- Automated orchestration