Travelport

Redefining travel commerce

Travelport e-Pricing

Low Latency Spectrum Scale

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Version 1.2 – 15 November 2015

Introducing Travelport

The platform that is redefining travel commerce for our customers

Travelport
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Travelport is a Travel Commerce Platform providing distribution, technology, payment and other solutions for the $8 trillion global travel and tourism industry.

We facilitate travel commerce by connecting the world's leading travel providers, such as airlines and hotel chains, with online and offline travel agencies and other travel buyers in our proprietary business-to-business Travel Commerce Platform.

Travelport's data center is a state-of-the-art facility, and our technology platform leads the industry in terms of functionality, performance, reliability and security with a 99.991% core system uptime

Travelport global operations

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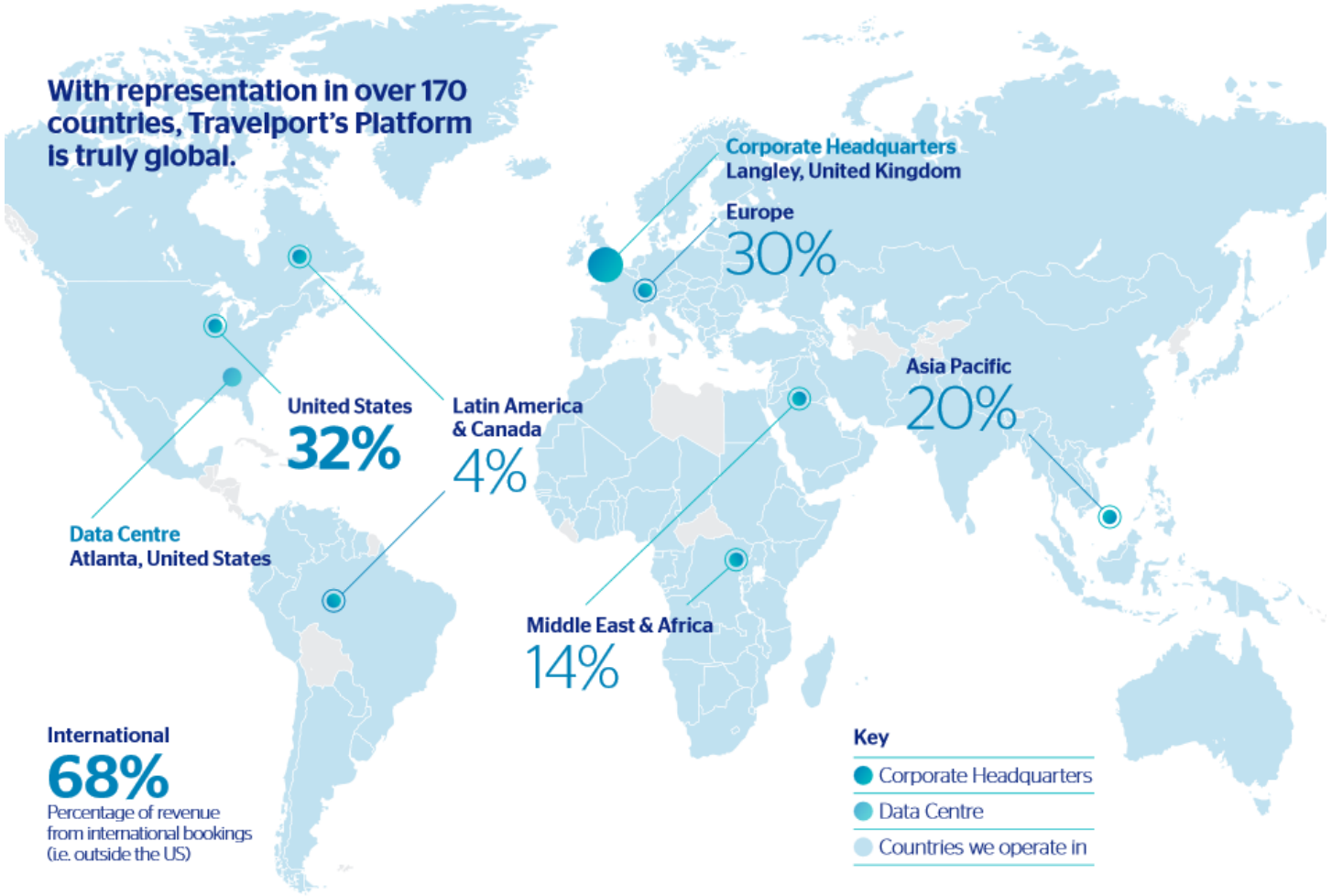
We operate in 170 countries, perform 3 billion transactions daily, and process $90 billion in annual travel spending



Unrivaled Content

We're redefining the breadth and depth of travel choice

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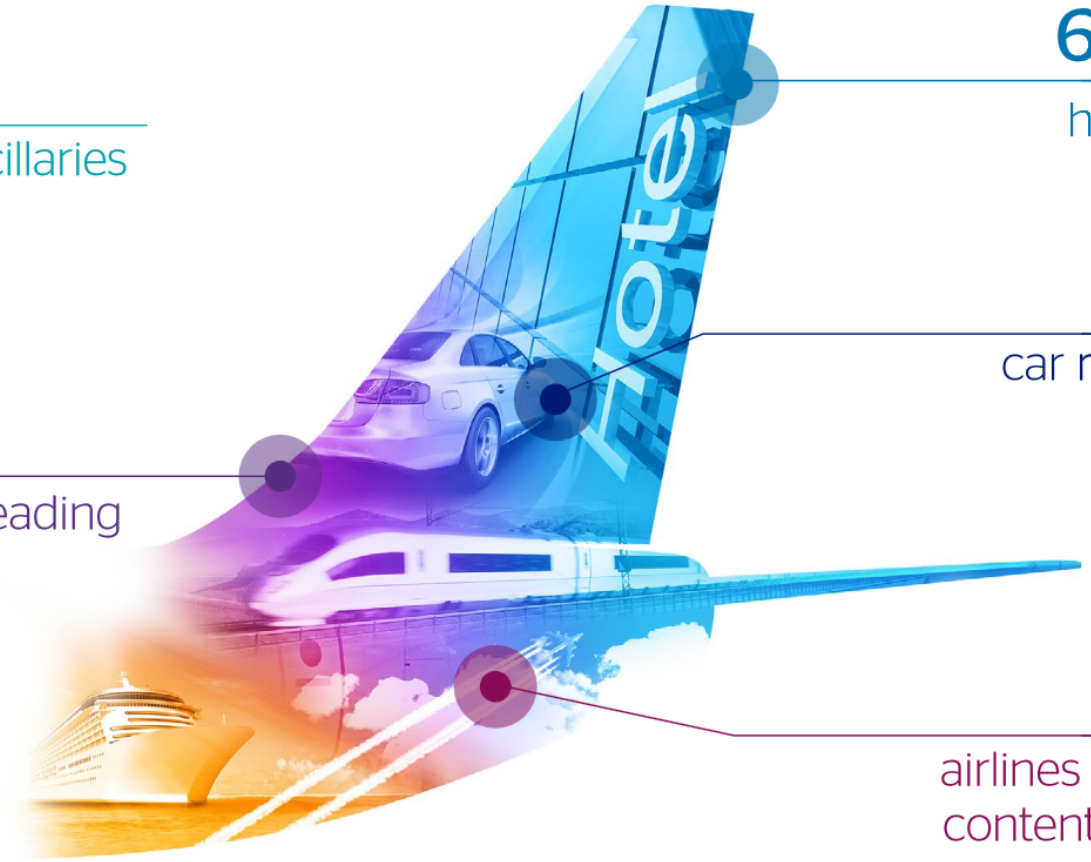
50+
types of airline ancillaries

650,000+
hotel properties

35,000+
car rental locations

400+
airlines including leading low-cost carriers



100+
airlines signed for rich content and branding

Empowered Selling

We're redefining the way travel is sold

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67,000
travel agency locations

$90 billion
of travel spending processed

122 million
air tickets issued

63 million
hotel nights booked

85 million
car rental days sold

Transforming Payments

We're redefining travel payments

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$67 million
revenue generated

$810 billion
addressable market

Supporting
30 currencies

137%
eNett net
revenue growth

Active in over
65 countries

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Air Search Engine

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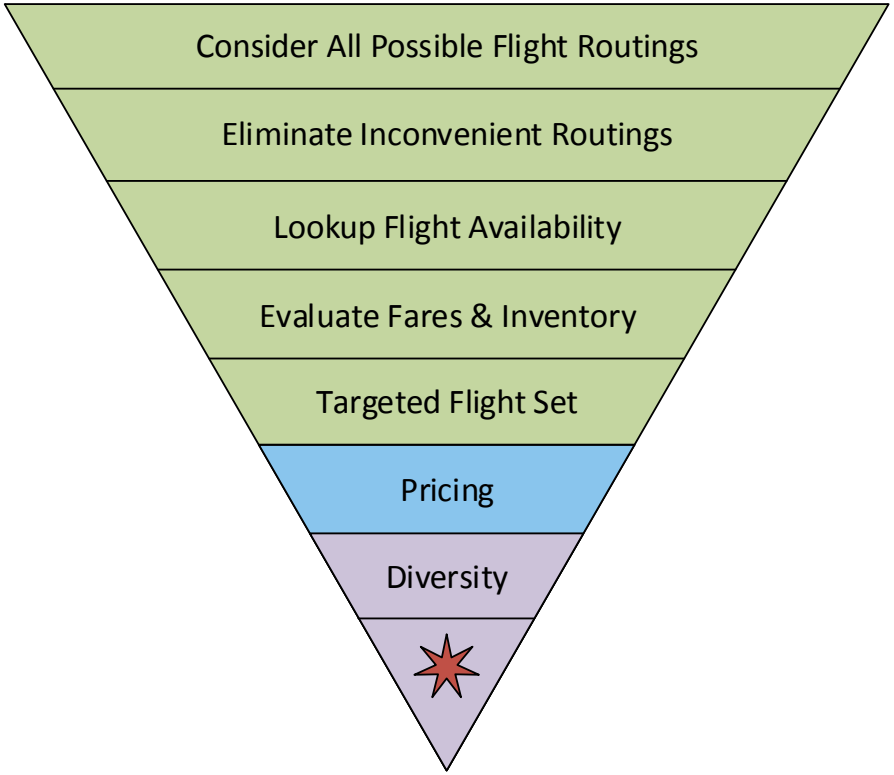
- Massively parallel OLTP application running on a very large HPC grid
  - Scatter/gather
  - Distributed Shared Memory
  - Low latency file system
- Flight targeting evaluates all possible flights and selects the subset most likely to sell
- Pricing deterministically evaluates all possible permutations of the targeted flight set
  - Shortest path graph search across 50M vertices
  - Each adjacent edge has hundreds of additive constraints
  - 5+ billion itineraries priced daily
- Extreme I/O requirements
  - Large file counts in excess of 1.5 Billion
  - Low latency / High Bandwidth



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MicroLatency Spectrum Scale Building Block

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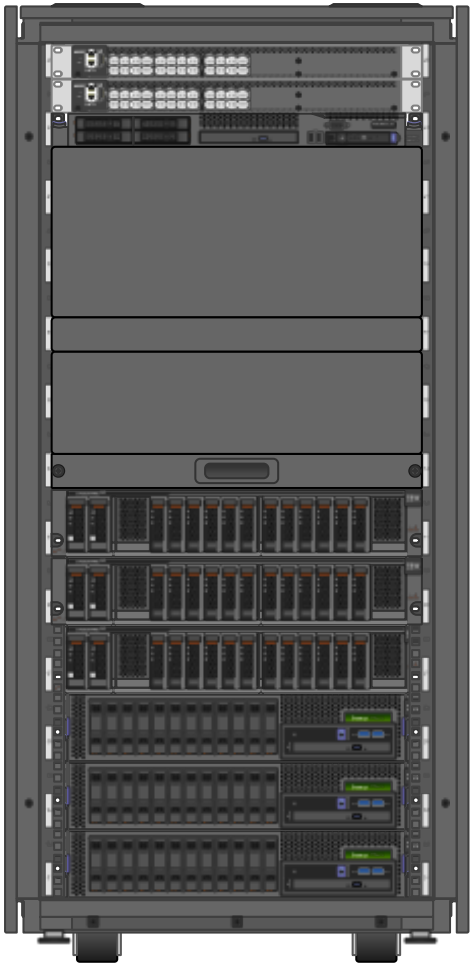
- Custom cluster design optimized for large file count environments
  - Fast POSIX metadata for improved directory scans
  - Single meta/data block hit for files < 700 bytes
  - 30 GB/sec large block bandwidth (*requires SR-IOV 40Gb*)
- Solution Components
  - (2) IBM SAN 48B-5 16Gb Fiber Channel Switches
  - (1) IBM CR8 Hardware Management Console
  - (3) IBM FlashSystem 900 storage arrays
  - (3) IBM Power S822L Power 8 servers w/ PowerVM
- Flexible Configuration via PowerVM/LPAR
  - Selectively scale Spectrum Scale Software instances
  - Configurable as 1-3 software clusters
- Enterprise Grade RAS
  - Call-home support on all hardware
  - FlashSystem 900 supports concurrent code load and maintenance
  - Only 2 out of 3 S822L CEC's required for full performance
  - No token migrations for planned maintenance (PowerVM LPM)



**Maximum Building Block Configuration Shown*

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Power S822L LPAR Configuration

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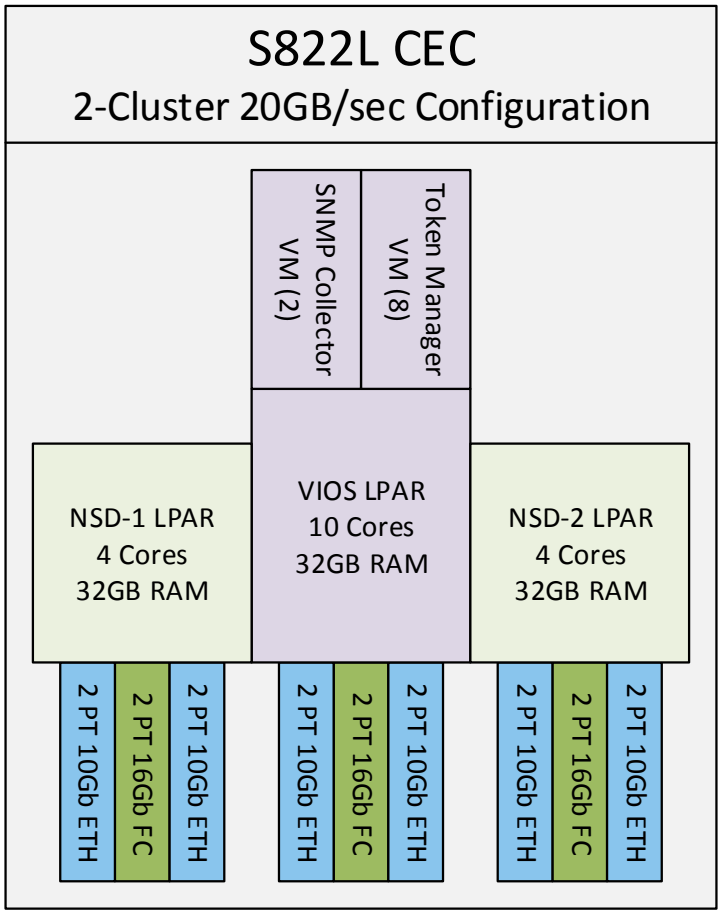
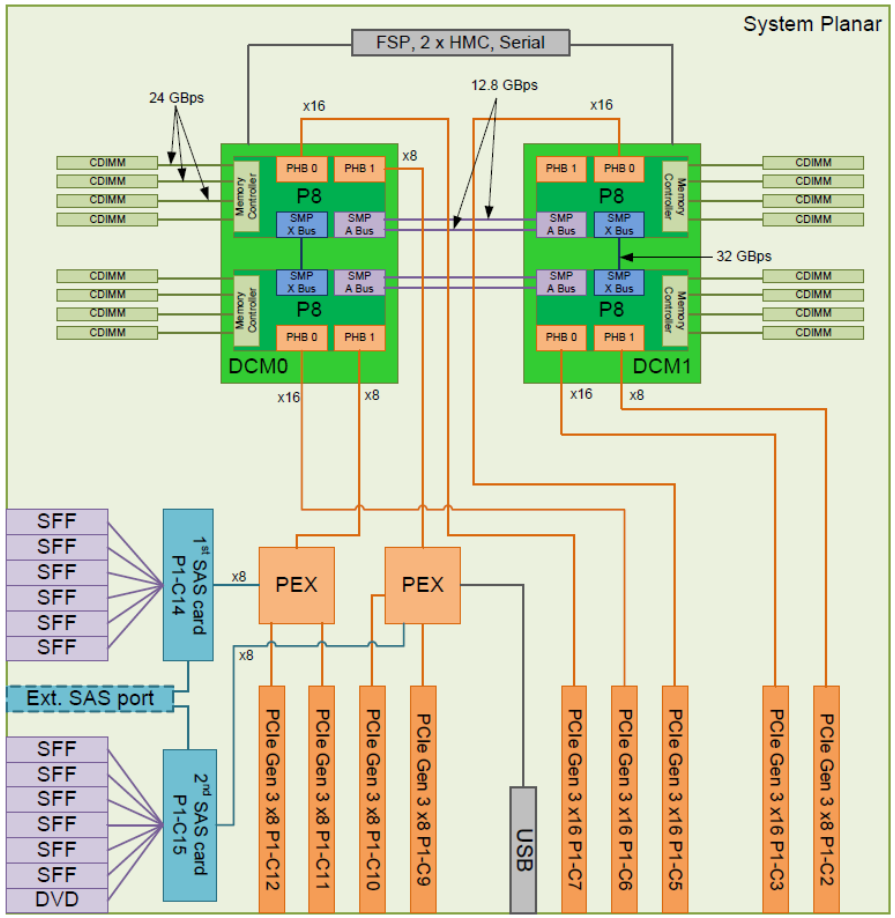


Travelport 20 GB/sec configuration shown, 30 GB/sec possible with 40Gb NIC's and SR-IOV available Q1-2016



S822L System Planar Block Diagram - 88 PCI Express 3.0 Lanes, 88 GB/sec. Up to 19 adapters with I/O drawer.

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Spectrum Scale Building Block (2 clusters)

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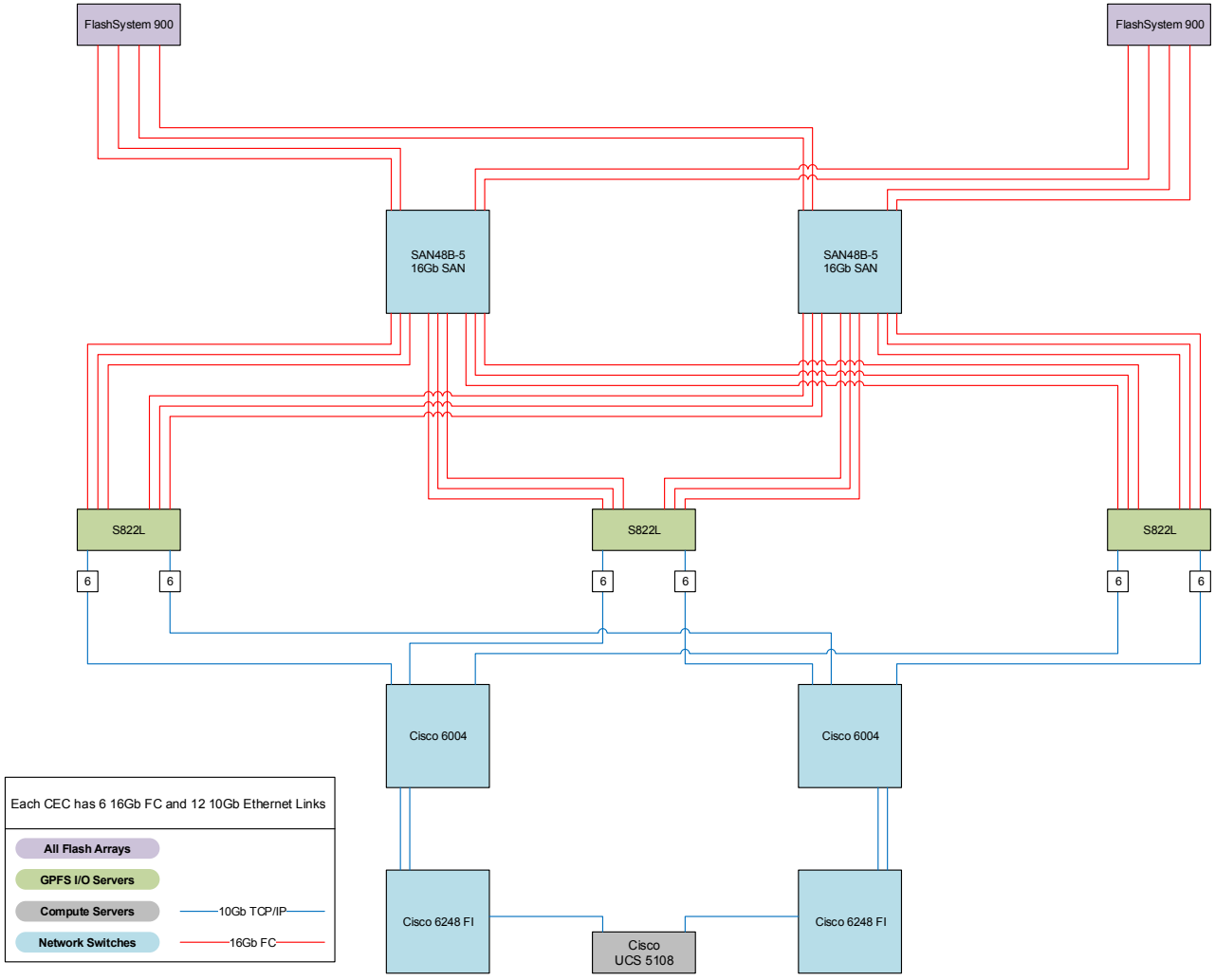

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Spectrum Scale Performance

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- Travelport currently processes 4.5% of air search transactions on Spectrum Scale
- Upgrades to new cluster design are in progress and scheduled to complete Q1-2016
- Stats provided are from our first production cluster composed of the following
  - (3) IBM PowerLinux 7R1 NSD Servers
  - (2) IBM FlashSystem 820 AFA
  - (8) 2vCPU 16GB VMware Token Managers
  - Cisco B200M3 Compute Blades
- Fiber Channel I/O service times average 220us in steady state
- File system latency ranges from 600-850us in steady state depending on compute server model
  - This is the same latency range as other popular all flash arrays!
- We reach peak bandwidth numbers of 8 GB/sec and 8 million 512 byte sectors/second
- Total file system performance of 3 million mmpmon operations/second
  - 1.295M opens/second
  - 1.382M closes/second
  - 683K readdir/second

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Spectrum Scale Steady-State

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Spectrum Scale Peak Demand Event

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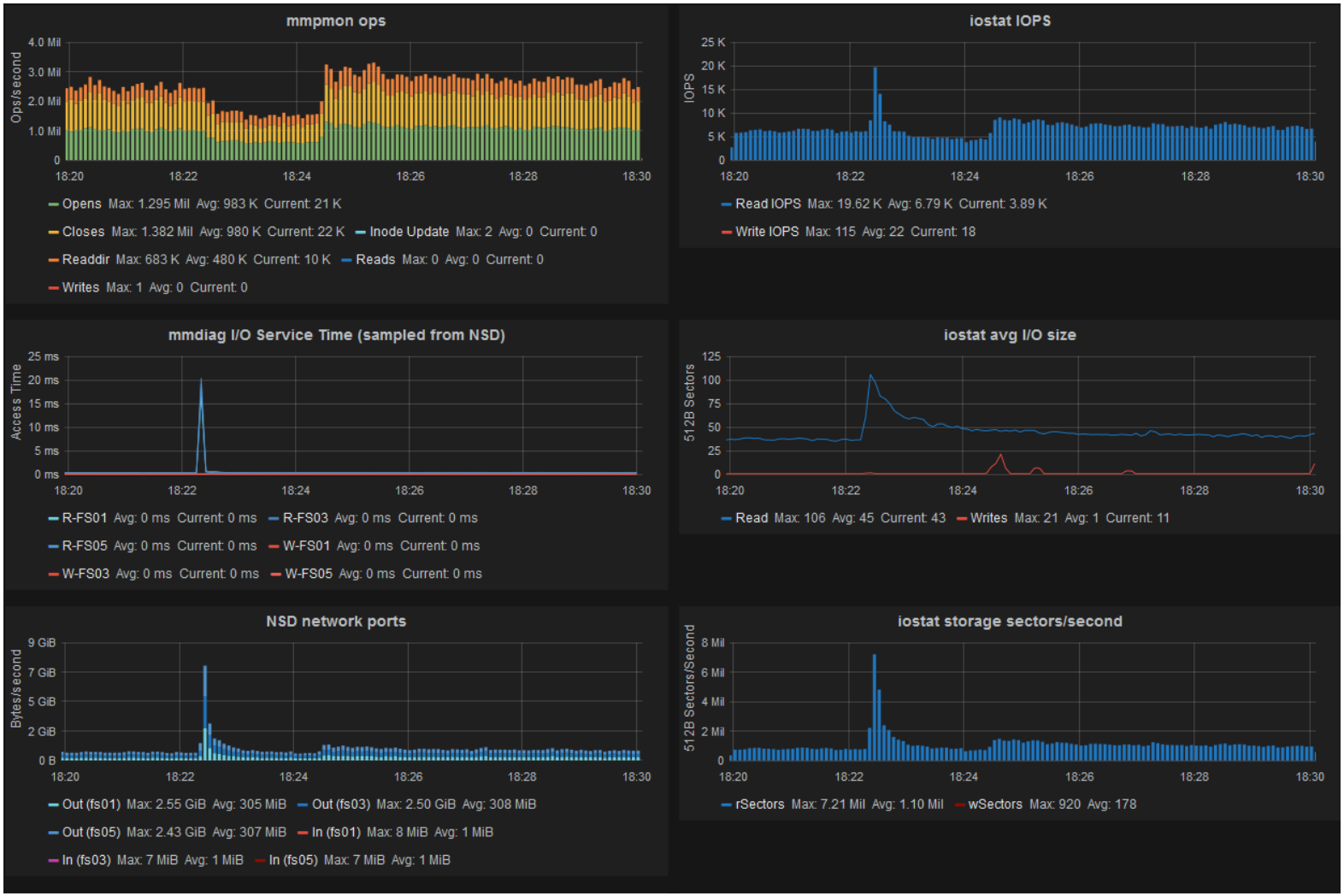

All screen examples, performance metrics, and other inserts associated with system output are provided for illustration purposes only. They are provided as illustrative examples of system functionality and are not meant to represent actual screen responses, rates, etc.