

Getting through the Pain to See the Gain

Donna Lawrence

Head of Information and Technologies

Dynamic Attractions/Dynamic Structures(DA)

Craig Breckenridge

Lead Designer

Dynamic Structures (subsidiary of DA)





About the speakers

Donna Lawrence

Head of Information and Technologies

at Dynamic Attractions and its subsidiaries for 22 years and IT industry for over 30 years. She has provided strategic oversight of corporate-wide information technologies, vision, coordination of infrastructure and service delivery. Responsible for supporting enterprise applications, data, research, infrastructure, communications and information security.



About the speakers

Craig Breckenridge

Lead Designer at Dynamic Structures with over 40 years manufacturing everything from bridges and material handling to arenas, amusement park rides and telescopes. He has also held the positions of Engineering Systems Manager and Drawing Office Manager. Craig is currently supervising the design team on the Thirty Meter Telescope Enclosure and helping to coordinate the move to a Product Based Manufacturer to a Project Based one. He is an active participant in all things Autodesk and remains current in the latest software products.

Agenda

- Introduction Video on Dynamic Attractions
- Learn how to eliminate productivity roadblocks encountered with large models
- Learn about optimal hardware configuration
- Learn about application customizations within Inventor, Vault, and AutoCAD
- Learn how to identify system optimizations to prevent system crashes

Introduction Video on DA

(courtesy of Autodesk)

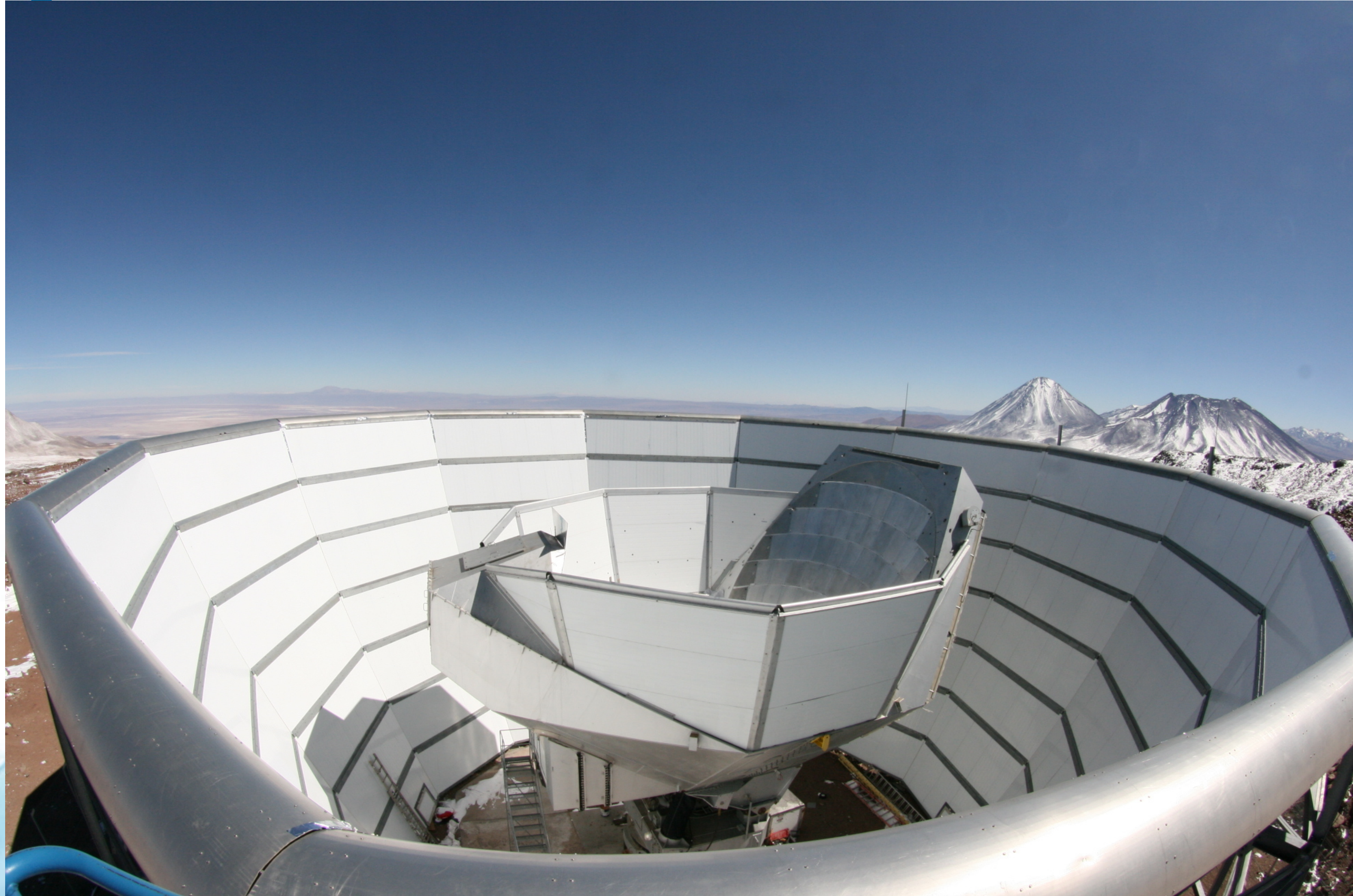
https://myshare.autodesk.com/:v:/g/personal/michelle_camargo_autodesk_com/EcY3qrGCA8xJupE_KwBg4U0BIYjyTOAt23qE7LL4MQT3XQ?e=y0jQE0

Introduction to DA

Understanding our business



DS Projects



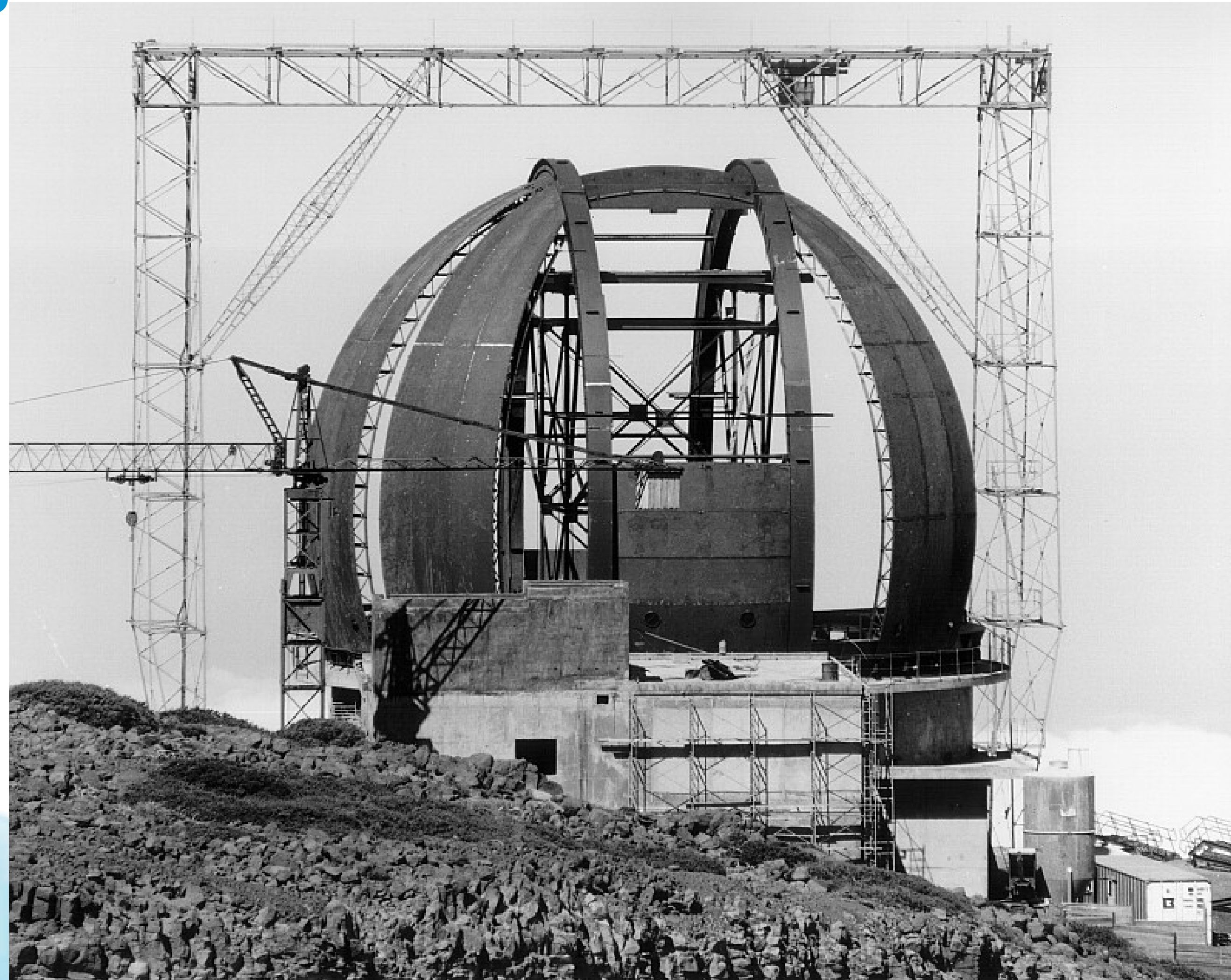
DS Projects



DS Projects



DS Projects



DS Projects



Deciphering where your Productivity Deficiencies are

Great Stars from Hubble. Photo by NASA

Going Down the Rabbit Hole

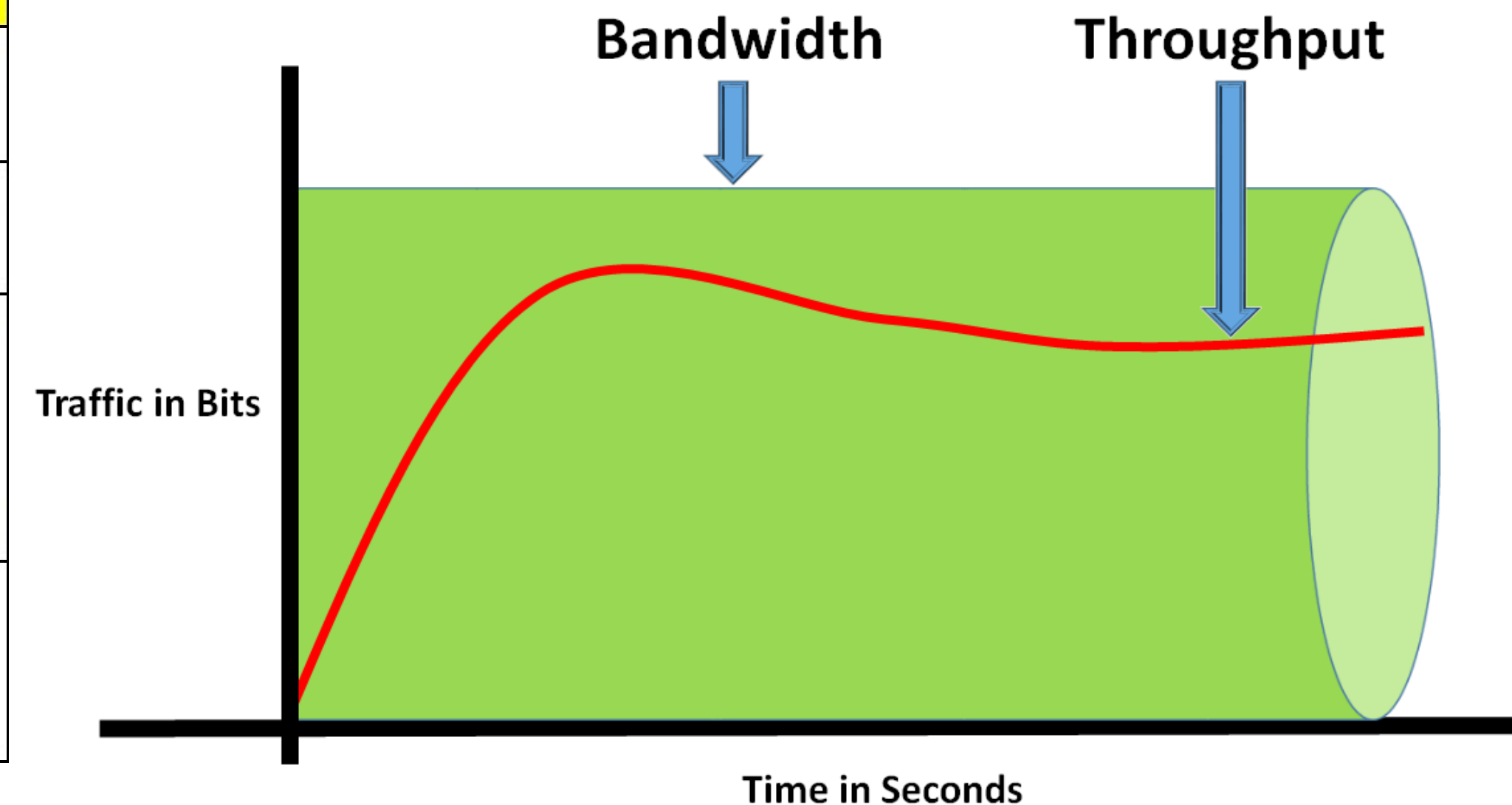


Image by WeAreTheLedger

Bandwidth vs Throughput

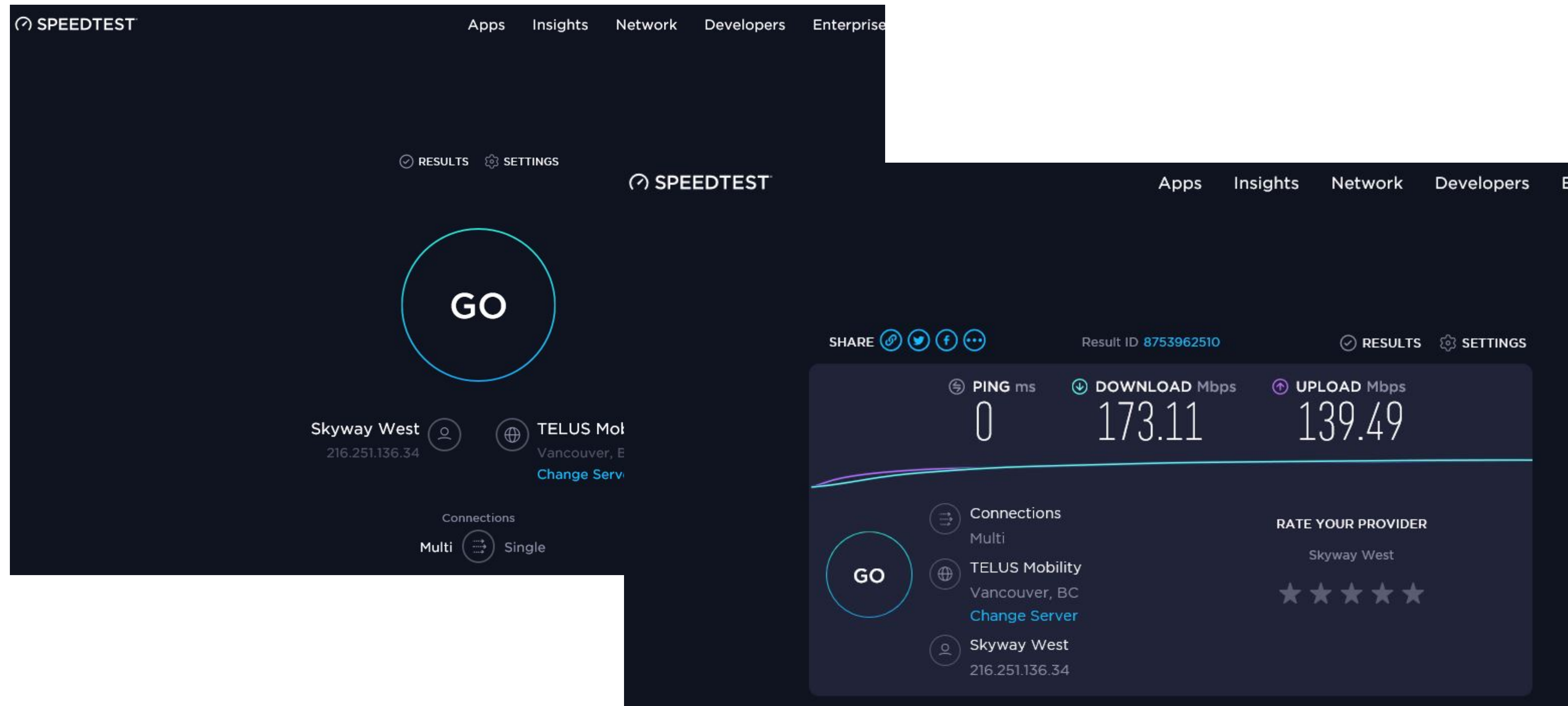
- Know your network infrastructure

Bandwidth	Throughput
Bandwidth is the maximum amount of data that can travel through a link or network.	Throughput is the actual amount of data that can be transferred through a network.
Bandwidth is always measured a physical layer property.	Throughput can be measured at any layer in OSI model.
A data rate measured in bits per second.	Average rate of successful message delivery over a communication channel. These data may be delivered over a physical or logical link, or pass through a certain network node.
Bandwidth does not depend on latency on link Theoretical performance	Throughput depends on latency on the link. Real World performance



Bandwidth Monitoring Tools

- Utilize tools to confirm your network is operating at optimum throughput
 - Speedtest.net



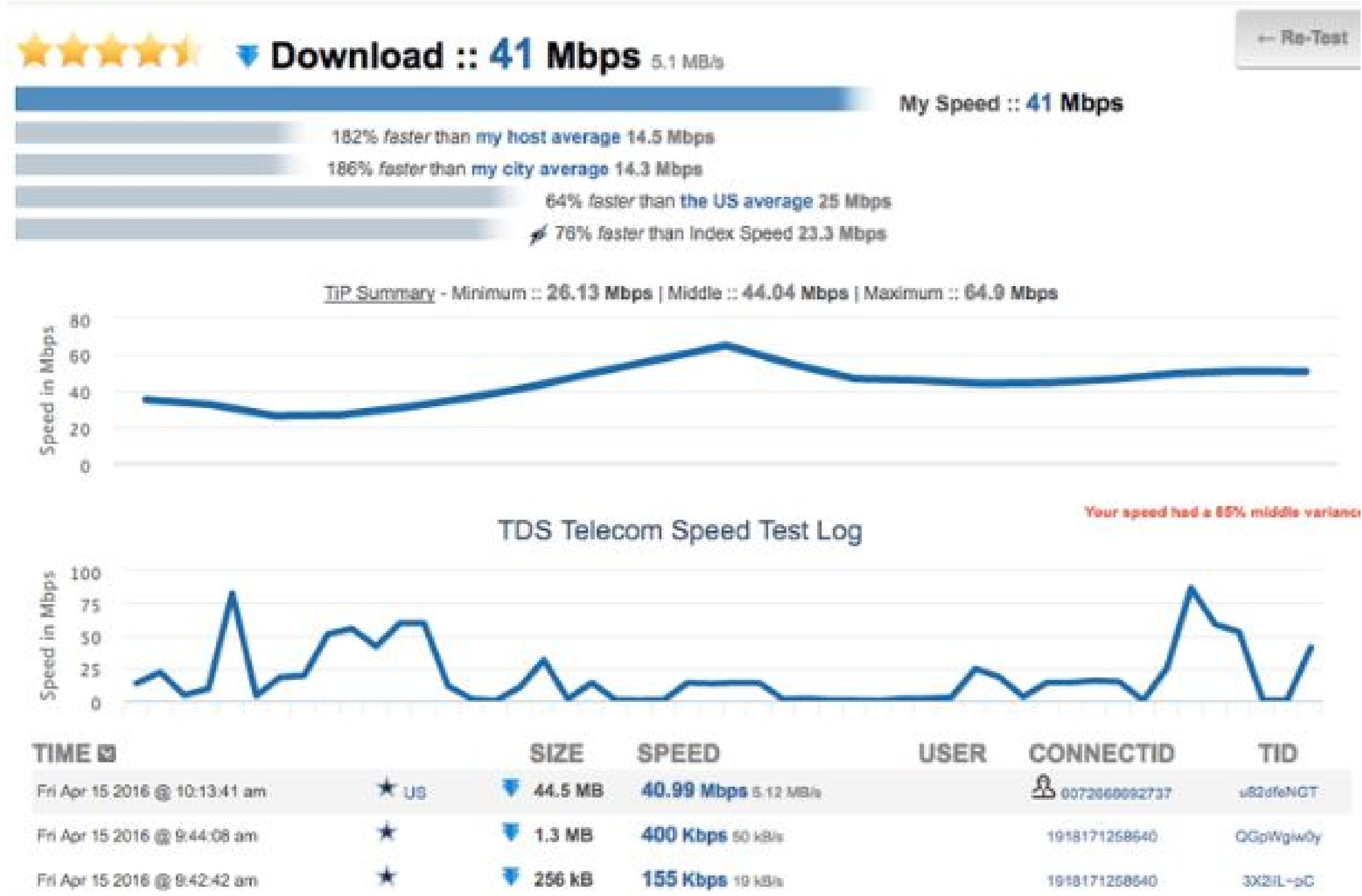
Bandwidth Monitoring Tools

- SpeedOfMe.com

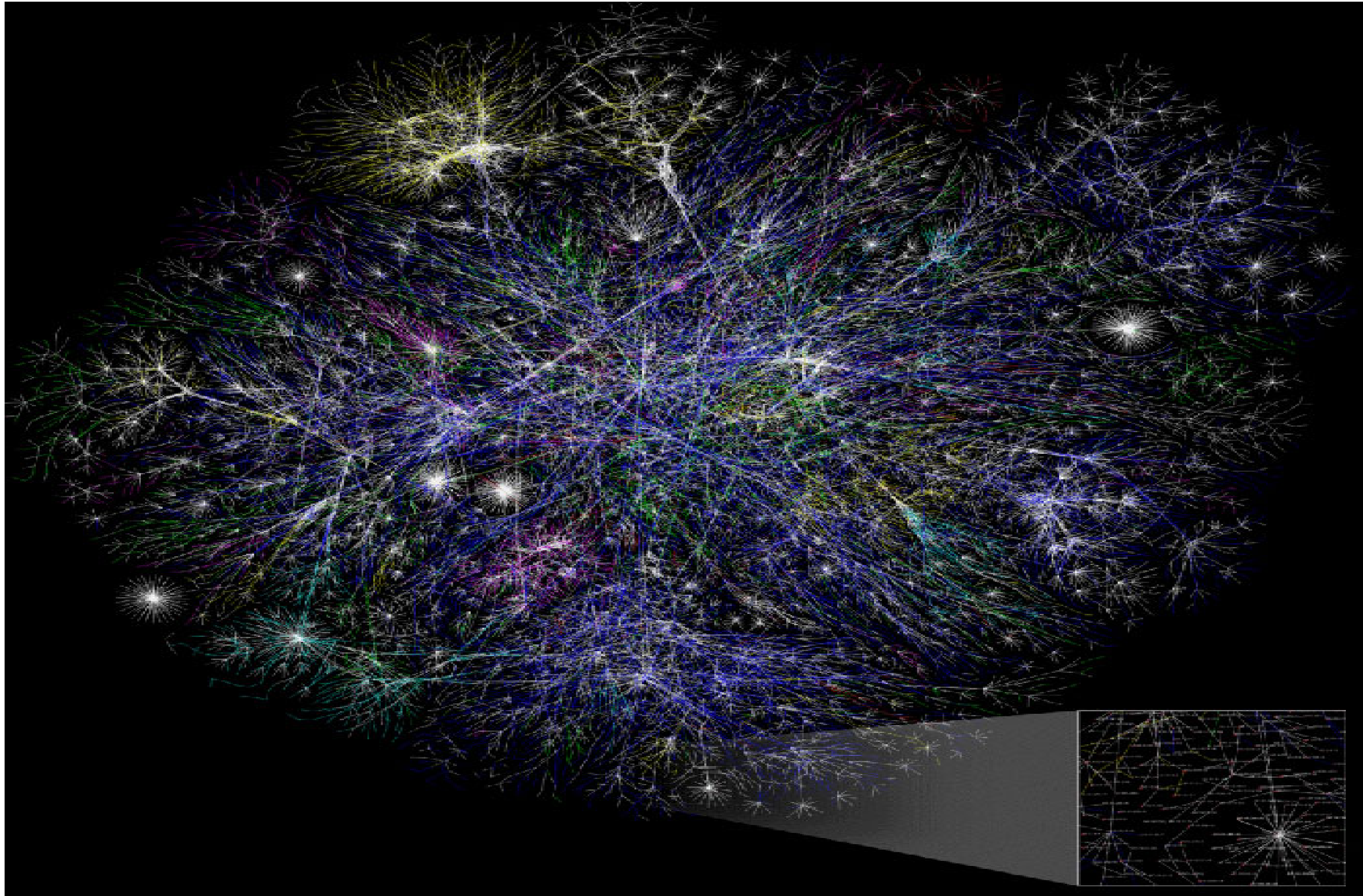
https://youtu.be/i_cM7o2TpYA

Bandwidth Monitoring Tools

- TestMy.net



Network Optimization



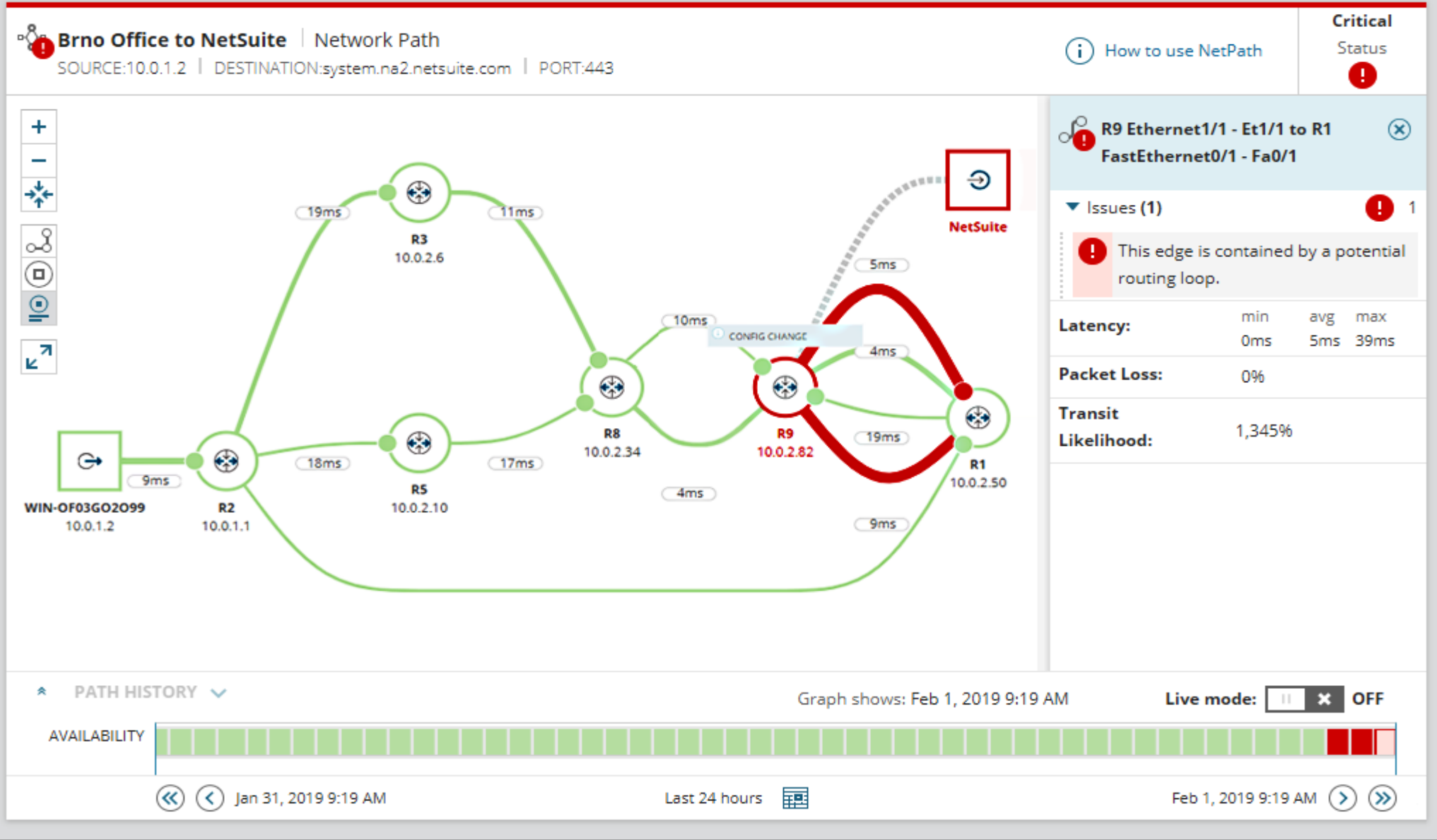
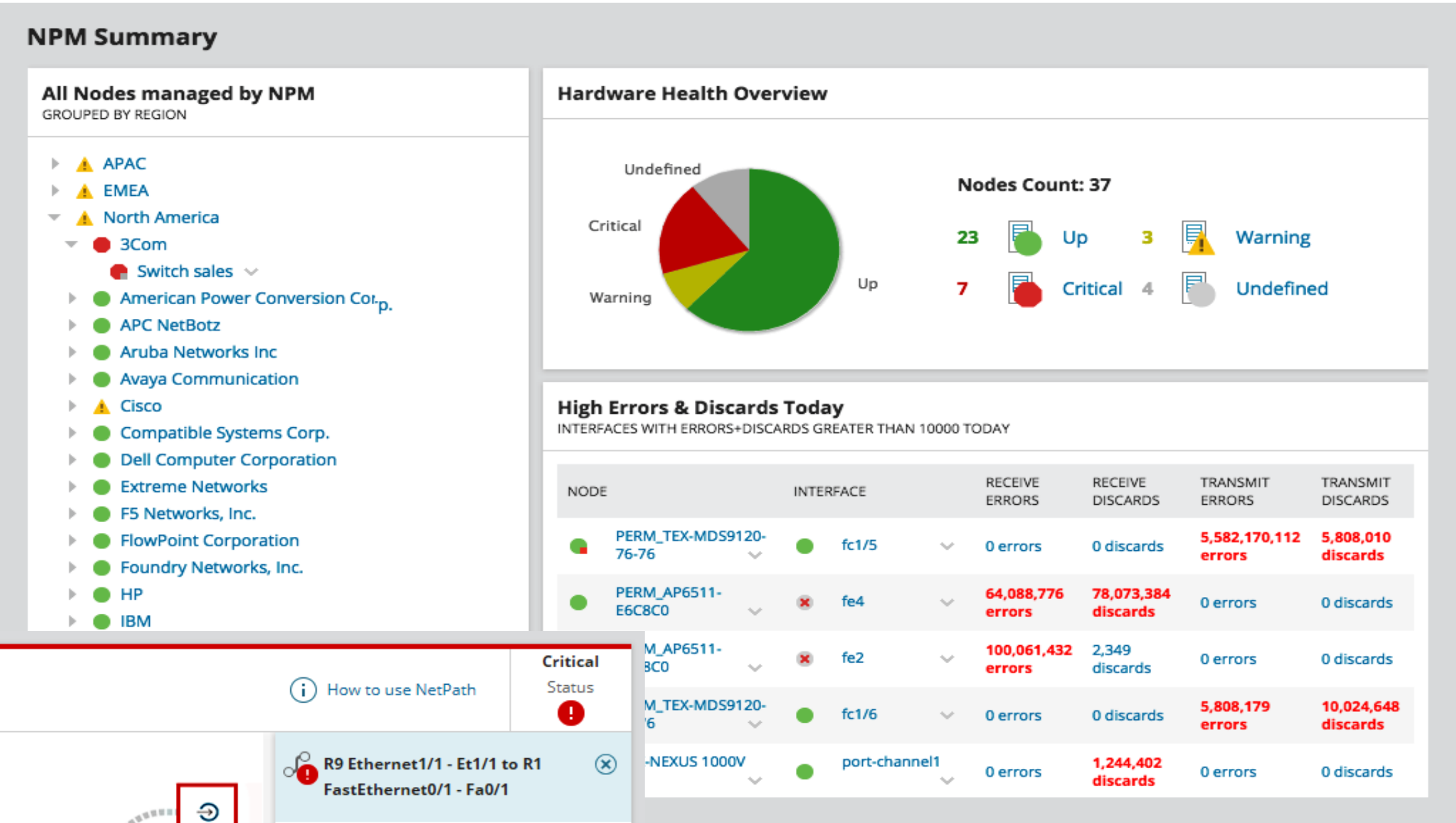
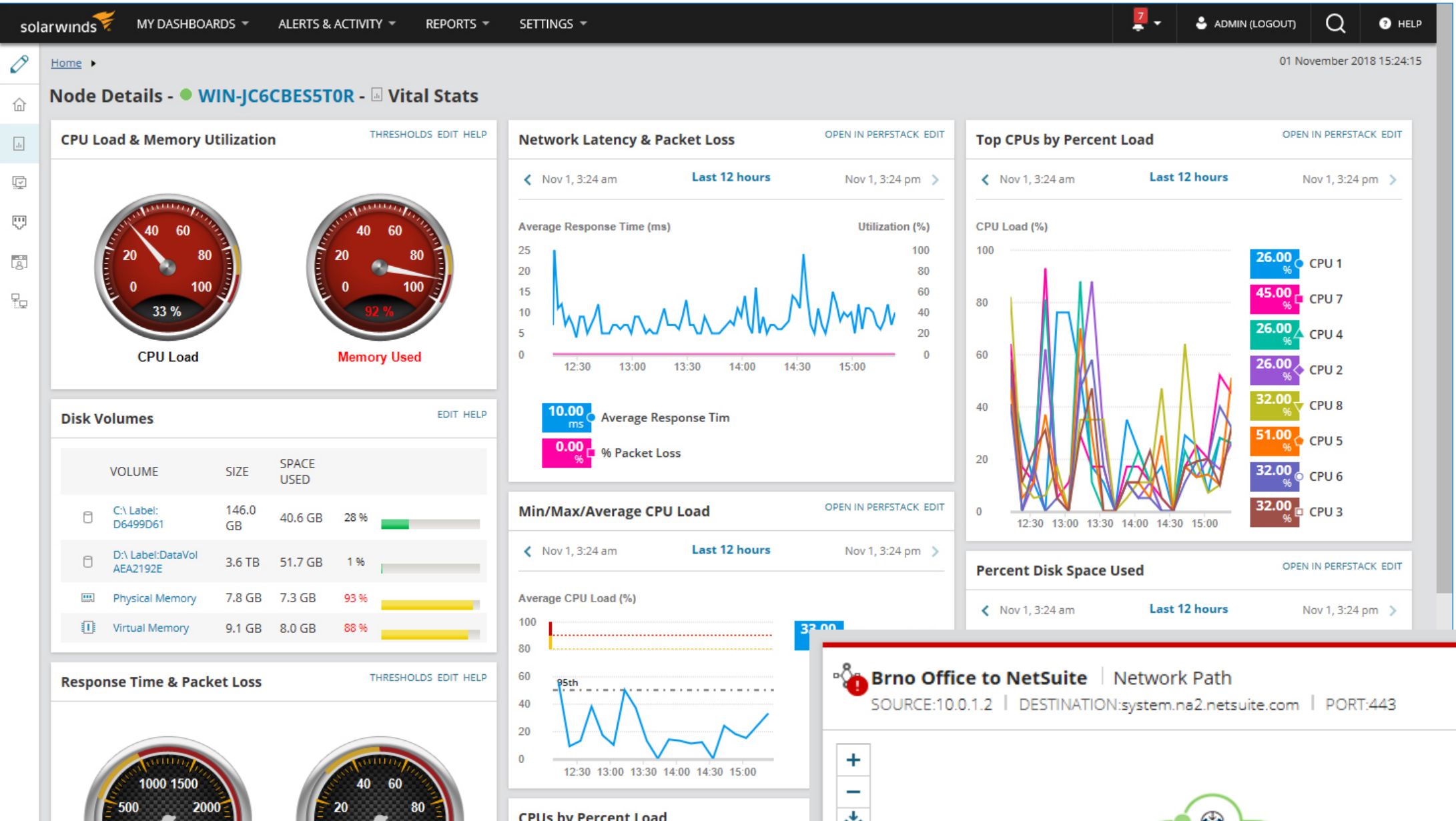
- PC & Network Downloads

Network Optimization

- Measure network performance
 - Passive
 - Active
- What affects network performance?
 - Latency
 - Packet Loss
 - Retransmission
 - Throughput
 - Queuing Delay

Network Optimization Software & Tools

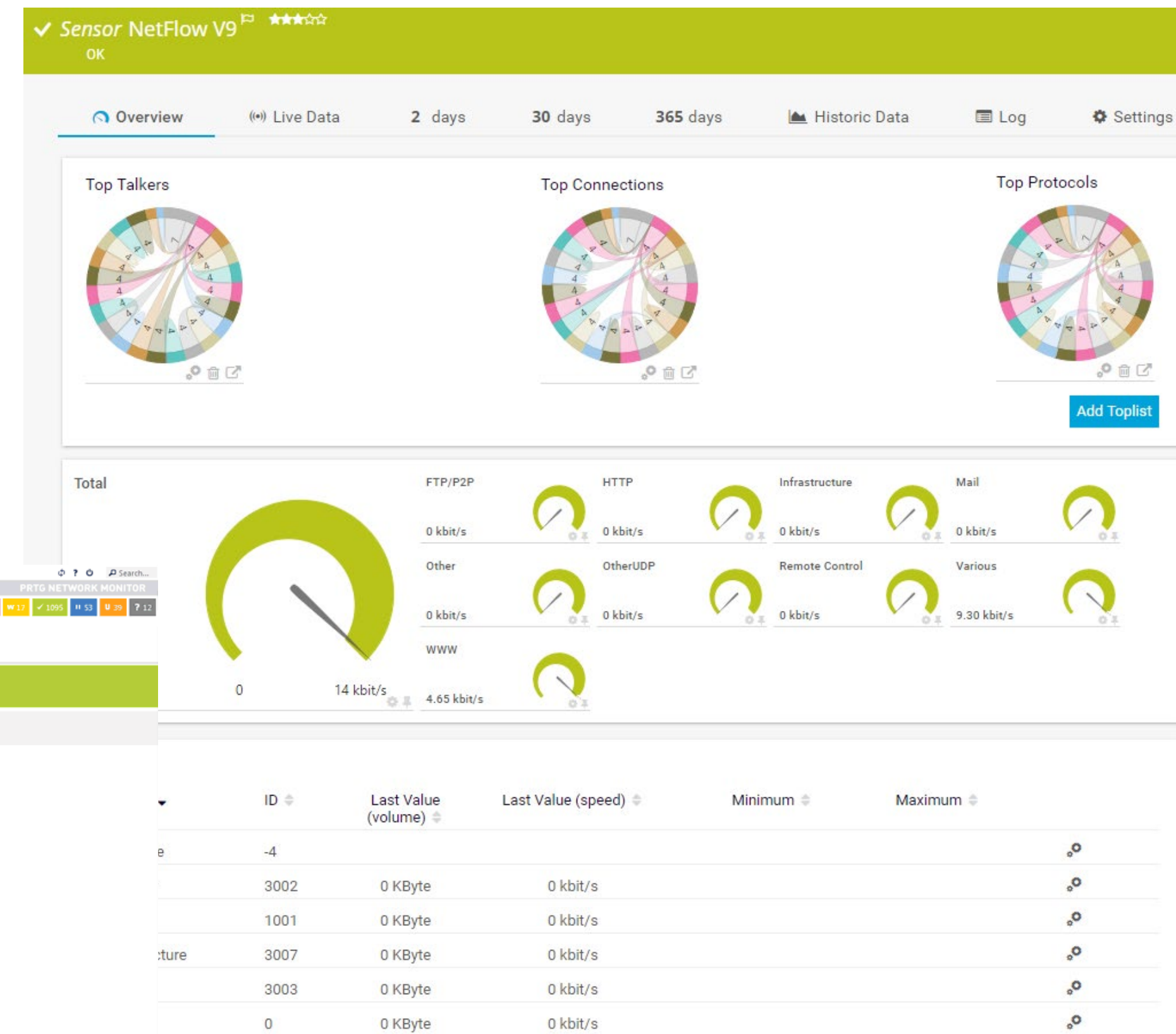
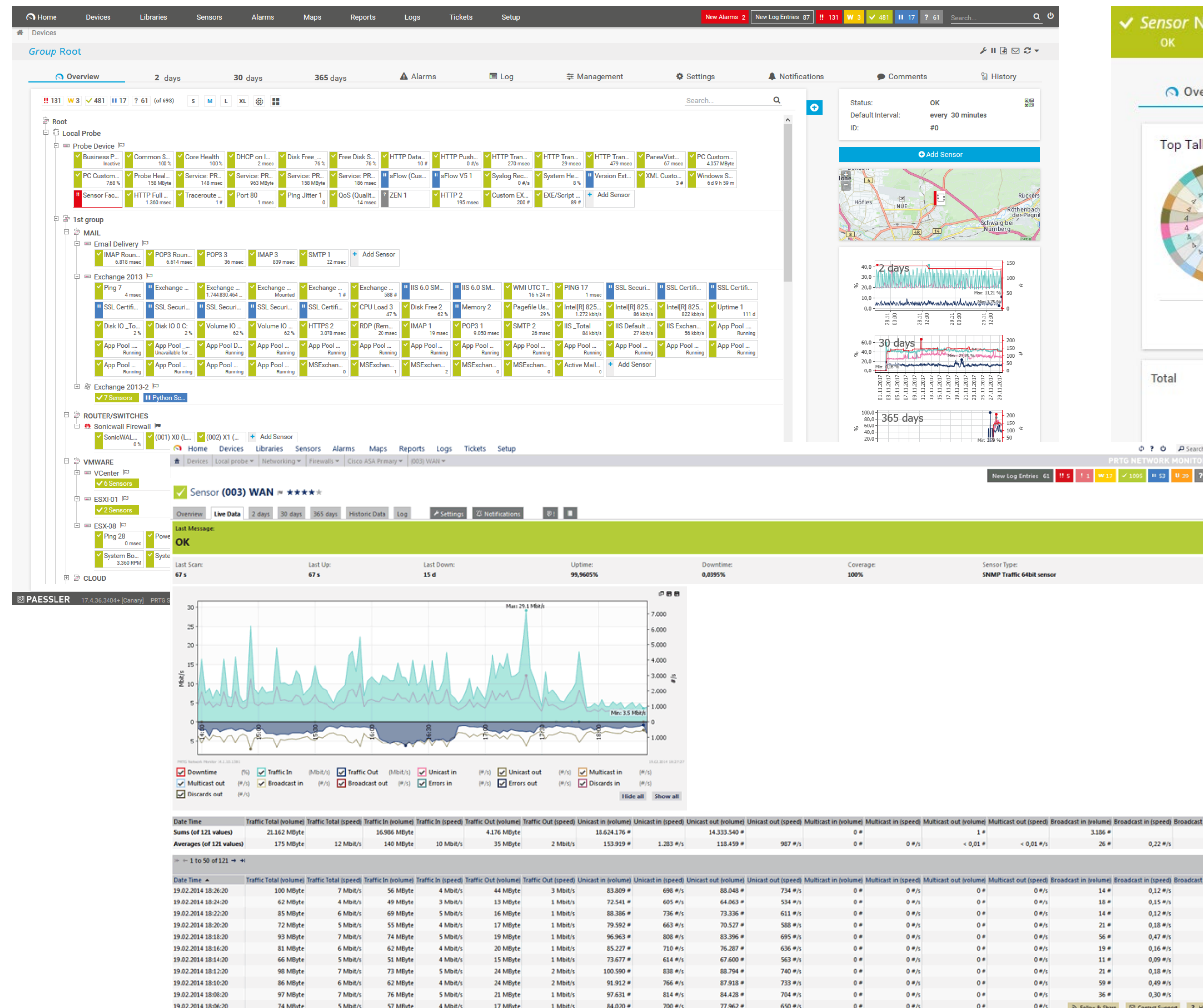
- Solarwinds Network Performance Monitor



Images by Solarwinds

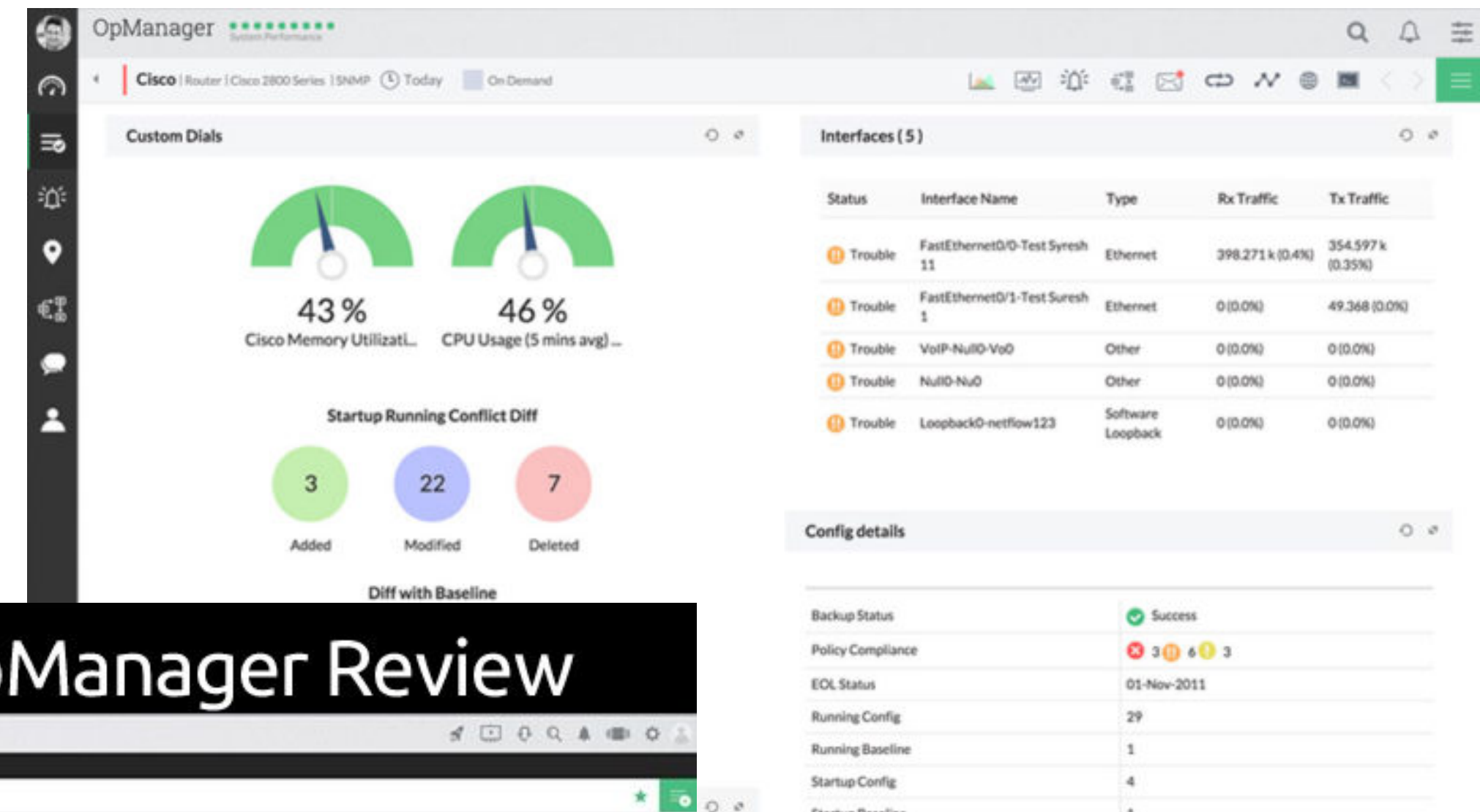
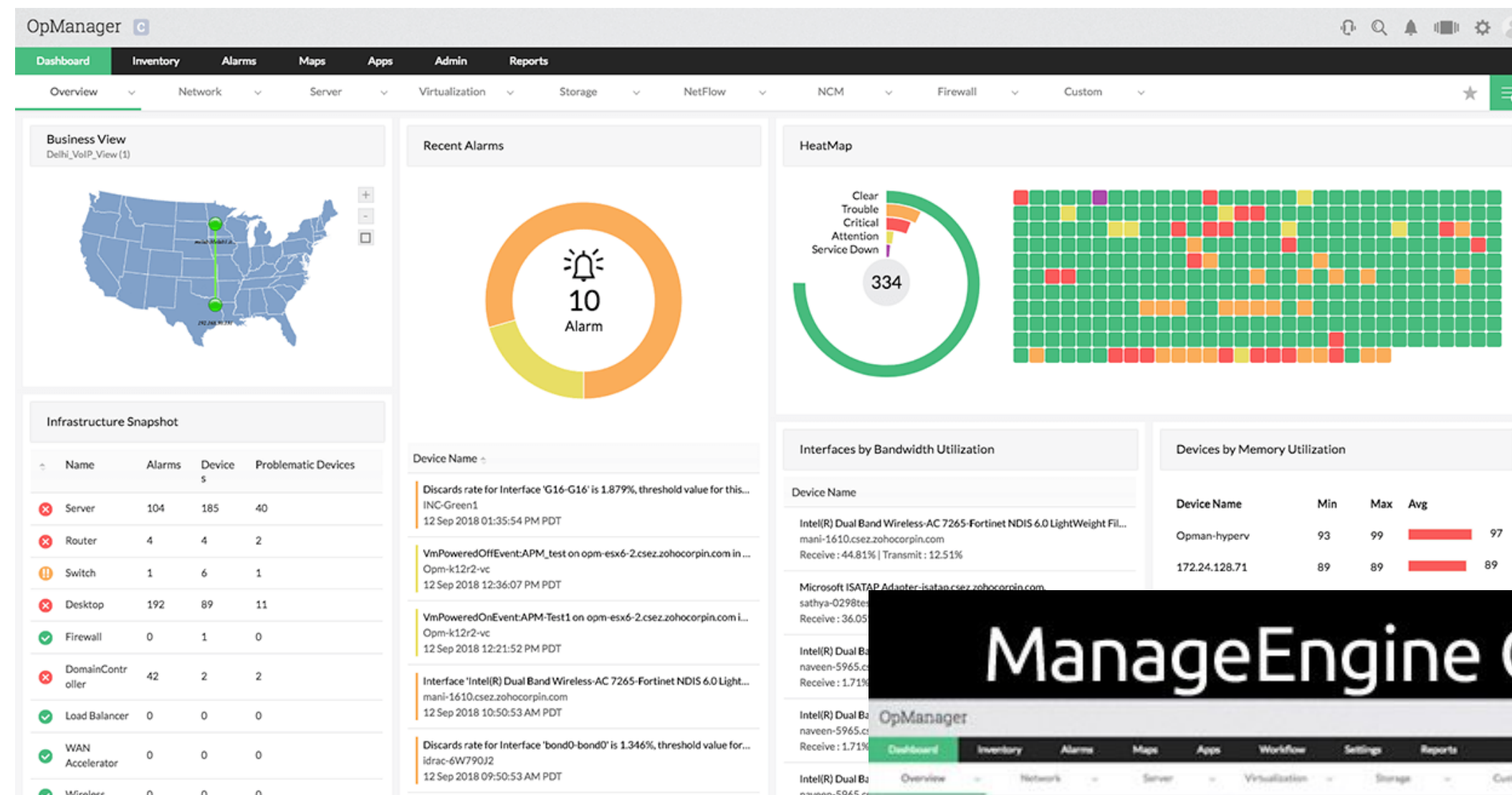
Network Monitoring Tools

- PRTG Network Monitor

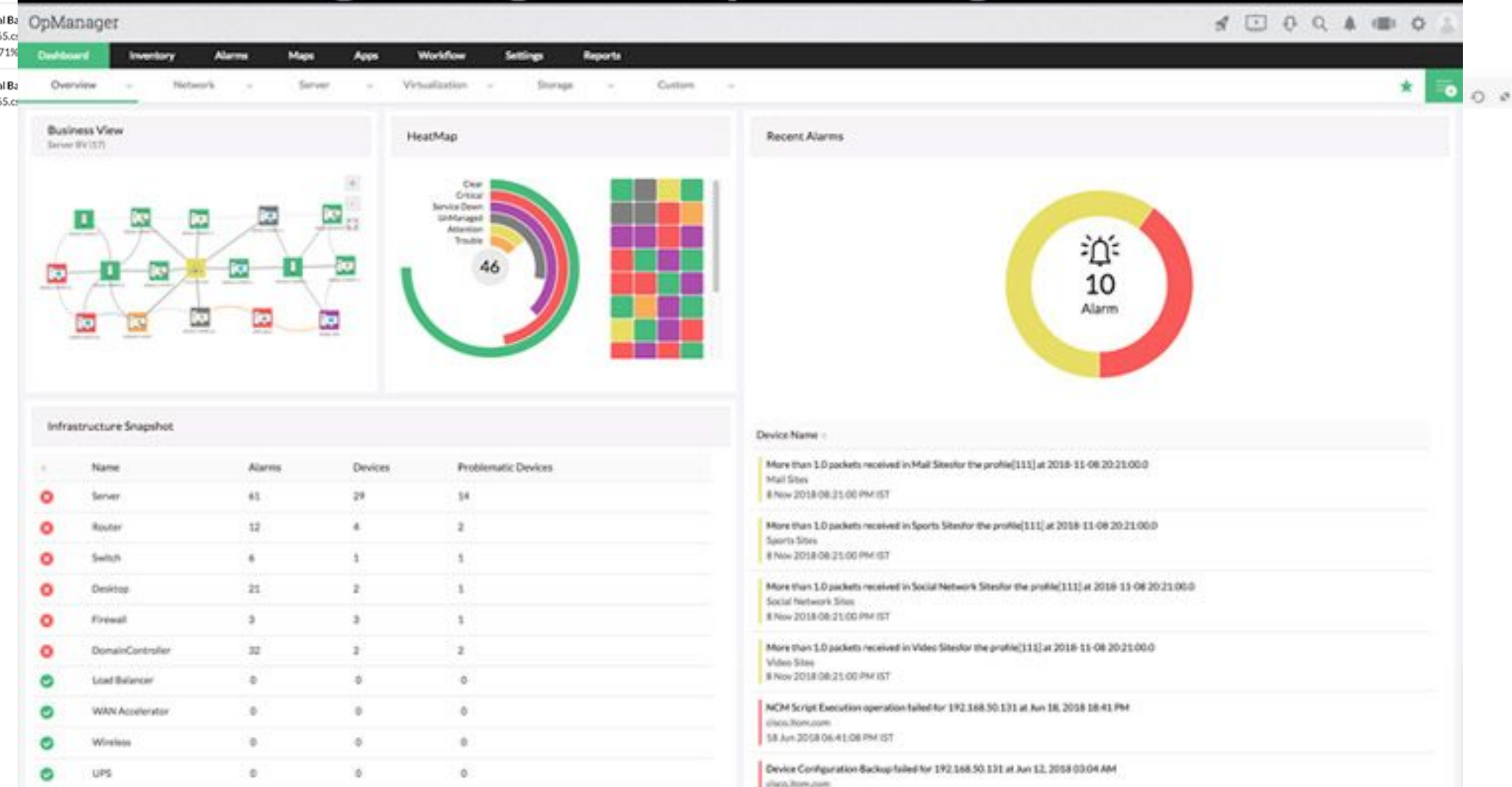


Network Monitoring Tools

- OpManager from ManageEngine

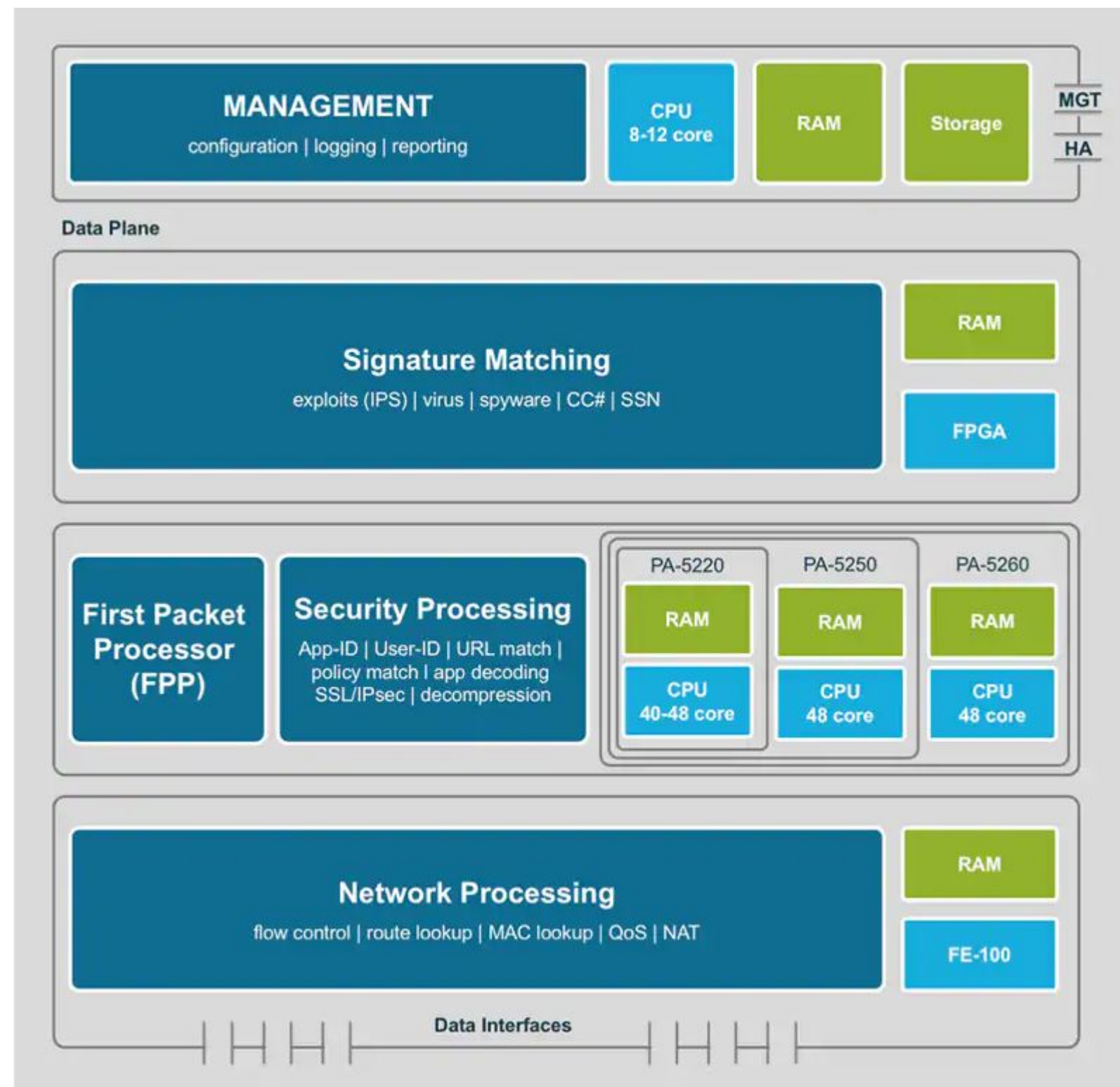


ManageEngine OpManager Review



Network Hardware Optimization

- Greenfield
 - Replace with new hardware
- Brownfield
 - Upgrade current systems



Images by PaloAlto and Hewlett Packard

Engineering Computer Optimization

- Hardware Specifics
 - Dell vs HP
- HP Z440
 - CPU Xeon E5-1650
 - RAM 64GB
 - GPU NVidia Quadro K4200 or GTX 1080
 - HD 1TB HDD or 500GB SSD



Images by Dell and Hewlett Packard

Engineering Computer Optimization

- Hardware Specifics
 - Memory
 - Processor
 - Hard drive



Images by Intel

Engineering Computer Optimization

- Hardware Specifics
 - Graphics Card



Engineering Computer Optimization

- Benchmarking
 - Graphics Card

Benchmark Tool from Autodesk Exchange

https://apps.autodesk.com/INVNTOR/en/Detail/Index?id=3667345248776204460&appLang=en&os=Win32_64&autostart=true

Invantor Bench - Version: 1.7.0.0 - Computer Name: W55166

Bench Home

Modelling Test ☒ Graphics Test ☒ Drawing Test ☒ Quick Test 10 Cycles Extensive Test Export Append eMail Web Check for Updates Donate

Select Tests Benchmark Export Results Contact Us Software Updates Contribute

CPU Information
Name: Intel(R) Xeon(R) CPU E5-1650 v3 @ 3.50GHz
Description: Intel64 Family 6 Model 63 Stepping 2
Speed - Rated: 3.5 GHz
Physical CPU's: 1
Cores / CPU: 6
Logical Processors / CPU: 12

Memory Information
Total Capacity: 64 Gb
DIMM1: Name: Physical Memory Manufacturer: Hynix Capacity: 8 Gb Speed: 2133 Model: Part No: HMA41GR7MFR4N-TF
DIMM2: Name: Physical Memory Manufacturer: Hynix Capacity: 8 Gb Speed: 2133 Model: Part No: HMA41GR7MFR4N-TF
DIMM3: Name: Physical Memory Manufacturer: Hynix Capacity: 8 Gb Speed: 2133 Model: Part No: HMA41GR7MFR4N-TF
DIMM4: Name: Physical Memory Manufacturer: Hynix Capacity: 8 Gb Speed: 2133 Model: Part No: HMA41GR7MFR4N-TF

Invantor Information
Invantor Version: 2018.3
Service Pack: 0
Bit Level: 64 Bit
Inv Graphics Window Res: 1936 x 1066

OS Information
OS Name: Microsoft Windows 10 Pro
OS Version: 6.2.9200.0

Hard Drive Information
HDD1: Manufacturer: (Standard disk drives) Model: SAMSUNG MZVLW512HMJP-000H Serial No: 0025_38B6_71F0_4852 Size: 477 Gb Description: Disk drive
HDD2: Manufacturer: Model: Serial No: Size: Description:

Graphics Card Information
Name: NVIDIA GeForce GTX 770
Description: NVIDIA GeForce GTX 770
Driver Date: 20171027000000.000000-000
Driver Version: 23.21.13.8813
Video Processor: GeForce GTX 770

Other (Seconds)
Invantor Warm Start: 7.25

Modelling Test (Seconds)
Modelling Time: 10.11
Model Rebuild Time: 3.92

Graphics Intensive Test (Seconds - Refresh Rate)
Shaded Edges Mode: 2.91 sec 123.71 Hz
Shaded Mode: 2.83 sec 127.21 Hz
Wireframe Mode: 6.97 sec 51.65 Hz

HDD Intensive Test (Seconds)
Model Save Time: 6.16
Set Model Save Folder...

Drawing Test (Seconds)
Sequential View Creation: 16.09
Multi-View Creation: 11.27

Category Totals (Seconds)
HDD Test: 6.16
Modelling Test: 14.03
Graphics Test: 12.71
Drawing Test: 27.36

Invantor PC Index (IPI)
IPI: 1-8.30

Invantor Hardware Setting = Performance (Software Graphics Enabled = FALSE)

Invantor Bench - Version: 1.7.0.0 - Computer Name: BC-CAD1

Bench Home

Modelling Test ☒ Graphics Test ☒ Drawing Test ☒ Quick Test 10 Cycles Extensive Test Export Append eMail Web Check for Updates Donate

Select Tests Benchmark Export Results Contact Us Software Updates Contribute

CPU Information
Name: Intel(R) Xeon(R) CPU E5-2650 v3 @ 2.30GHz
Description: Intel64 Family 6 Model 63 Stepping 2
Speed - Rated: 2.3 GHz
Physical CPU's: 2
Cores / CPU: 10
Logical Processors / CPU: 20

Memory Information
Total Capacity: 144 Gb
DIMM1: Name: Physical Memory Manufacturer: Samsung Capacity: 8 Gb Speed: 2133 Model: Part No: M393A1G40DB0-CPB
DIMM2: Name: Physical Memory Manufacturer: Samsung Capacity: 8 Gb Speed: 2133 Model: Part No: M393A1G40DB0-CPB
DIMM3: Name: Physical Memory Manufacturer: Hynix Capacity: 16 Gb Speed: 2133 Model: Part No: HMA42GR7MFR4N-TF
DIMM4: Name: Physical Memory Manufacturer: Hynix Capacity: 16 Gb Speed: 2133 Model: Part No: HMA42GR7MFR4N-TF

Invantor Information
Invantor Version: 2018.2
Service Pack: 0
Bit Level: 64 Bit
Inv Graphics Window Res: 1936 x 1056

OS Information
OS Name: Microsoft Windows 7 Professional
OS Version: 6.1.7601.65536

Hard Drive Information
HDD1: Manufacturer: (Standard disk drives) Model: Intel Raid 5 Volume SCSI Disk Dev Serial No: Volume0 Size: 5310 Gb Description: Disk drive
HDD2: Manufacturer: Model: Serial No: Size: Description:

Graphics Card Information
Name: NVIDIA Quadro K4200
Description: NVIDIA Quadro K4200
Driver Date: 20170916000000.000000-000
Driver Version: 22.21.13.8569
Video Processor: Quadro K4200

Other (Seconds)
Invantor Warm Start: 29.53

Modelling Test (Seconds)
Modelling Time: 11.07
Model Rebuild Time: 5.26

Graphics Intensive Test (Seconds - Refresh Rate)
Shaded Edges Mode: 0.65 sec 553.8 Hz
Shaded Mode: 0.64 sec 562.5 Hz
Wireframe Mode: 0.65 sec 553.8 Hz

HDD Intensive Test (Seconds)
Model Save Time: 16.31
Set Model Save Folder...

Drawing Test (Seconds)
Sequential View Creation: 19.48
Multi-View Creation: 12.28

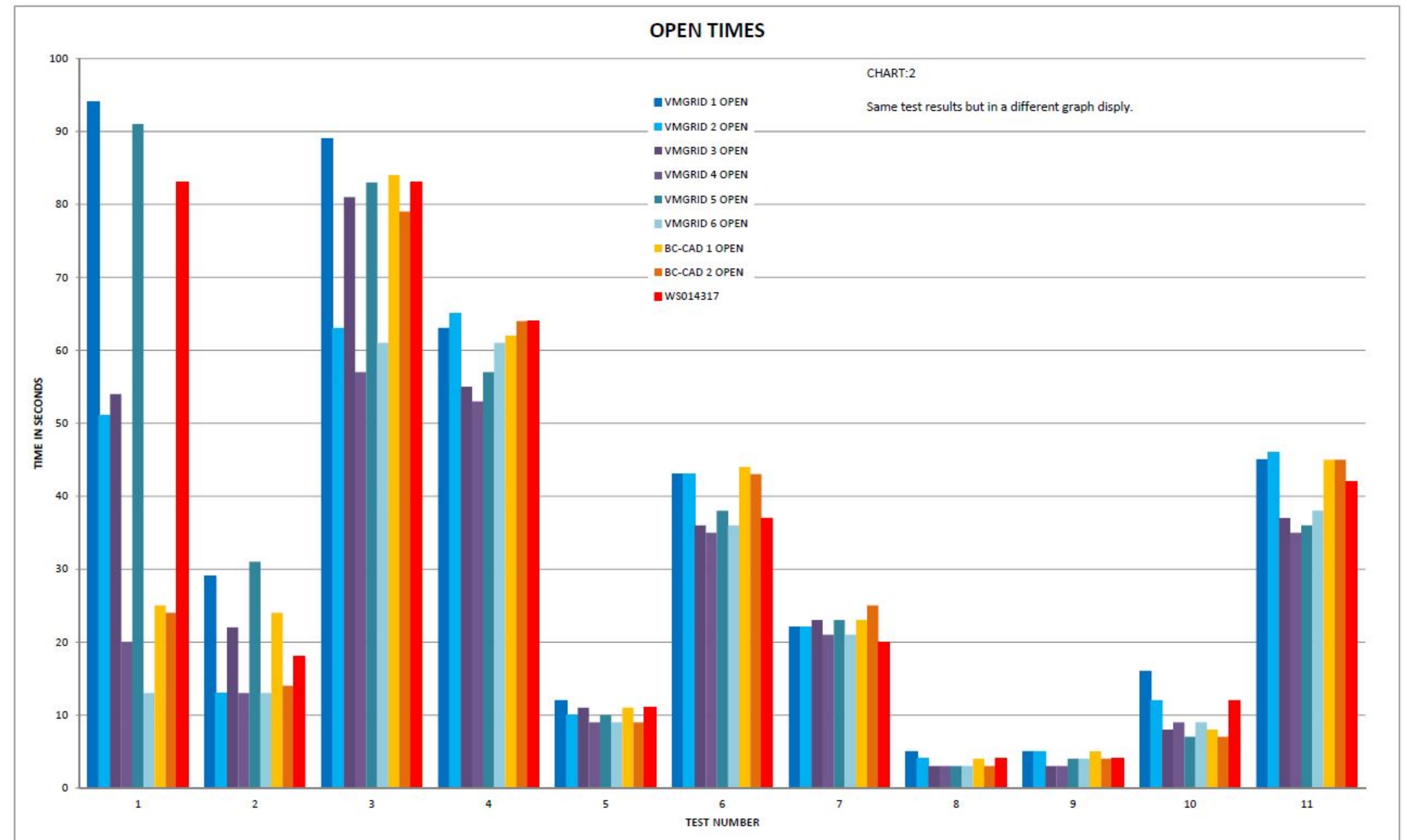
Category Totals (Seconds)
HDD Test: 16.31
Modelling Test: 16.33
Graphics Test: 1.94
Drawing Test: 31.76

Invantor PC Index (IPI)
IPI: 1-7.54

Invantor Hardware Setting = Performance (Software Graphics Enabled = FALSE)

Engineering Rendering/Analysis Computer

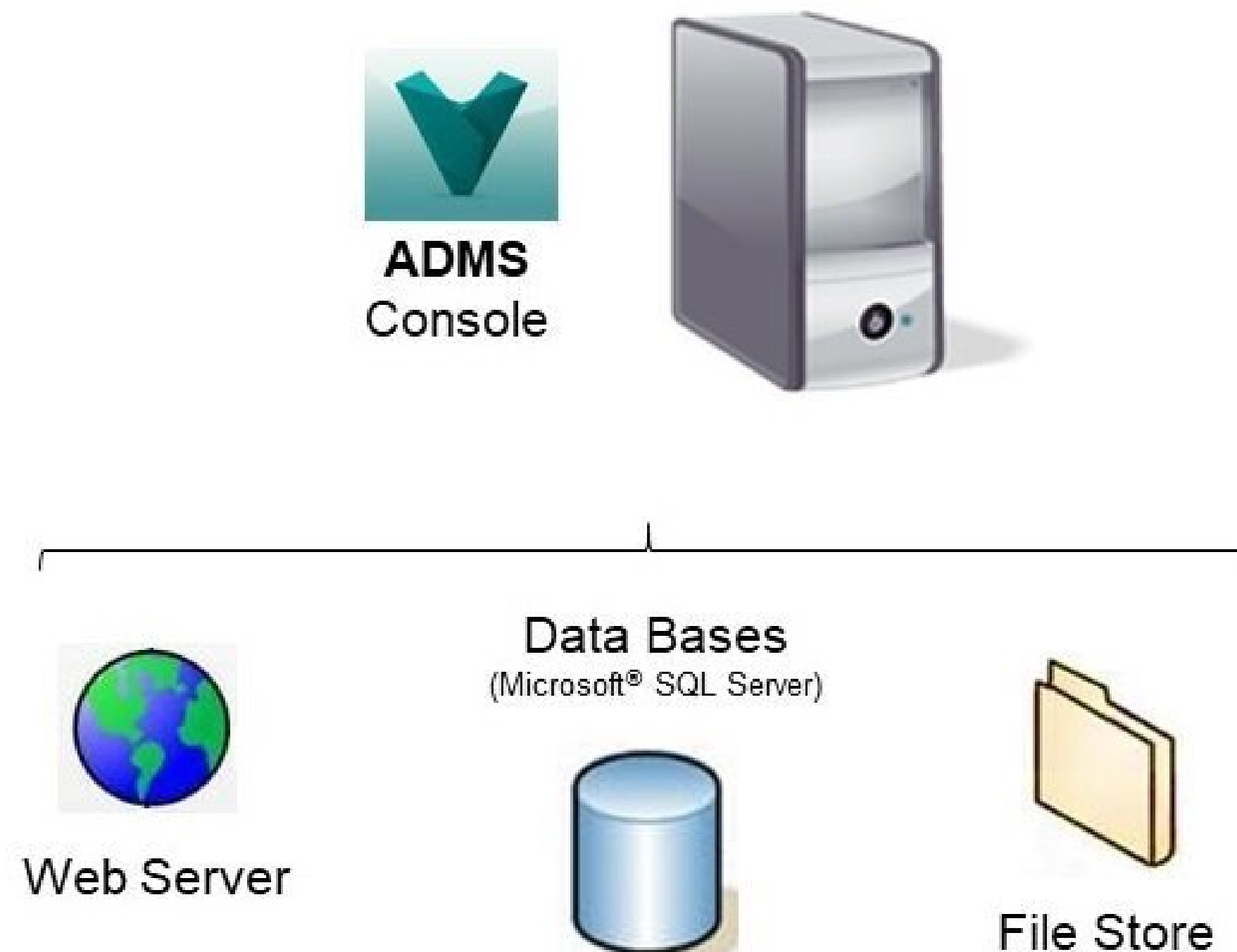
- CAD Remote Machines
 - HP Z840
 - CPU Xeon E5-2650
 - RAM 128GB
 - GPU NVidia Quadra K4200
 - HD RAID5 3TB



Vault Server

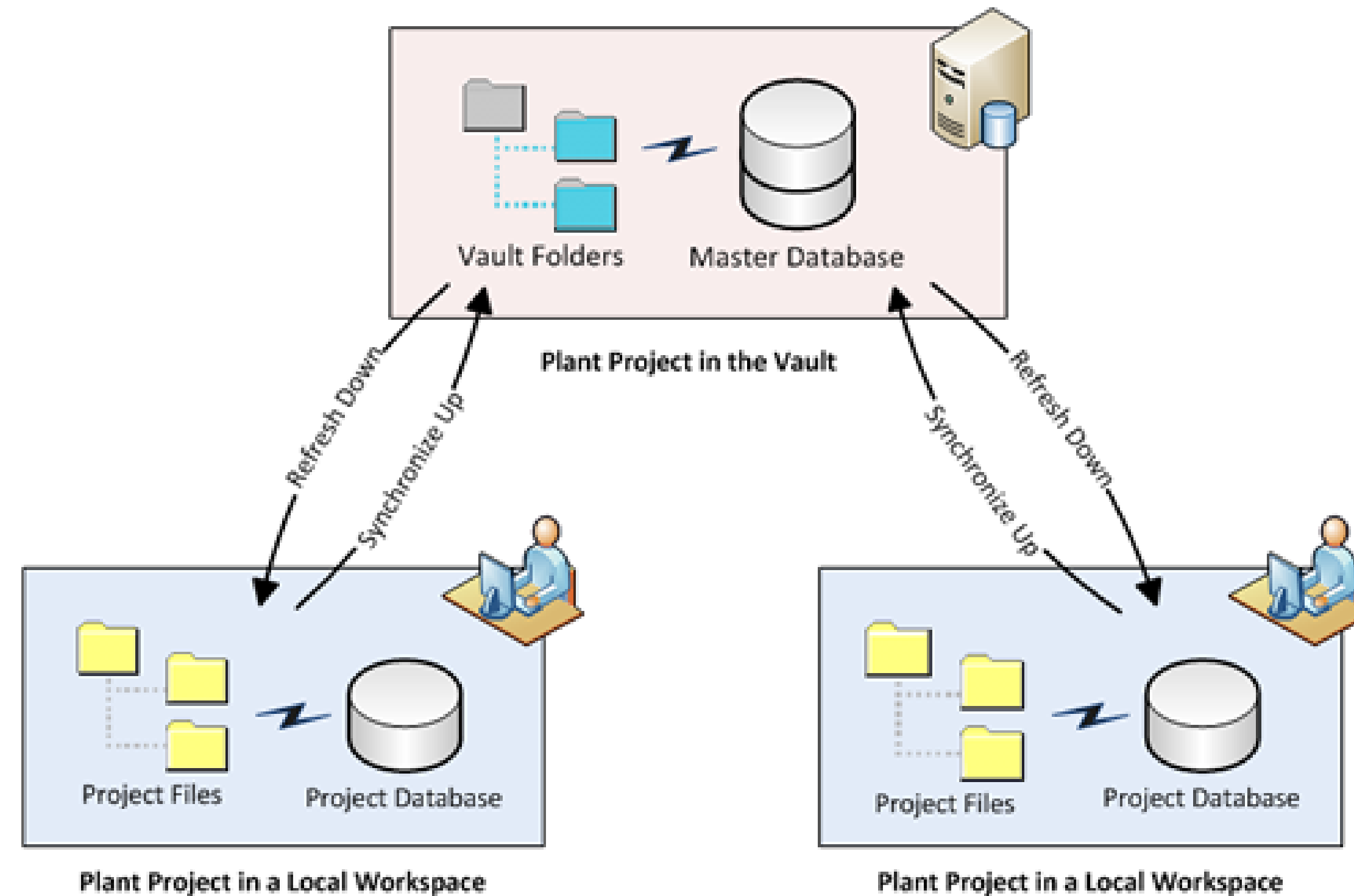
- Vault Live Production Server
 - Virtual Machine (VMWare)
 - OS: Server 2016 Datacenter
 - CPU 16X2.10 GHz
 - RAM 150GB
 - HD RAID5 3TB

Autodesk Data Management Server



Vault Replication Server

- Vault Replication Server
 - HP Z840
 - OS: Server 2016 Datacenter
 - CPU Xeon E5-2650
 - RAM 128 GB
 - NVidia Quadra K4200



Vault Legacy Server

- Vault Legacy Server
 - Virtual Machine (VMWare)
 - OS: Server 2016 Datacenter
 - CPU: 16X2.10 GHz
 - RAM 48 GB



Vault Backups for Large Datasets



Image by Dell

Vault Backups for Large Datasets

- Daily backup
 - Veeam
 - Nimble to Exagrid
 - Nimble to Nimble – 14 points daily
- Hourly Backup
 - Nimble only



Customizations Tips and Tricks

- Data Exporter
 - KFG (KSS File Generator)

The screenshot displays the 'Projects' application interface. At the top, there is a 'Projects' header with a search bar labeled 'Search Projects'. Below the header, a table lists projects with columns 'Name' and 'State'. The first entry is '18-329'. The main content area is divided into two panels. The left panel, titled 'Project Data', contains form fields for 'Number' (18-329), 'Customer' (Evergrande), 'Description' (SFX Coaster), and 'Location' (Changsa), with 'Add', 'Edit', and 'Cancel' buttons at the bottom. The right panel, titled 'Items', features a table with columns 'Drawing', 'Code', 'Area', and 'Quantity'. The table contains one row: '18328-A5000.iam', '500', 'VEHICLE', and '1'. Below the table are 'Add', 'Edit', 'Delete', and 'Export' buttons. At the bottom of the right panel, there are input fields for 'Code', 'Area', and 'Quantity', and 'Save' and 'Clear' buttons. The bottom left panel, titled 'Export Settings', has a 'Project File' field with a file selection button.

Name	State
18-329	

Number	Customer	Description	Location
18-329	Evergrande	SFX Coaster	Changsa

Drawing	Code	Area	Quantity
18328-A5000.iam	500	VEHICLE	1

Code	Area	Quantity

Customizations Tips and Tricks

- iProperty Manager
 - Inventor add-in with a GUI for editing the properties
 - Exchange: <https://apps.autodesk.com/en/Publisher/PublisherHomepage?ID=5GEJP3FL7SDQ>
 - Website: <https://www.brainbucketsoftware.com/>

DSL TITLE BLOCK

title block bom assembly table approvals

DO NOT SCALE DRAWING

Fab Tol: Units:

All Welding Per: Holes:

Cust. Ref.: Shop Finish:

Cust Dwg Num: AFS NO:

Drawn: mitchell.towle 10/28/19

Checked: 10/28/19

Approved: 10/28/19

Designer:

LEGAL STATEMENT

Customer:

Project:

Area:

Title:

File Name:

Project: Code/Seq: Drawing No: Sheet No: Rev:

APPLY SAVE CANCEL

Version: 2.1.7209.25072

DSL TITLE BLOCK

title block bom assembly table approvals

Part Number (Dwg on Title Block): Part Comments: Rolling Allowance:

Description: ABM:

*** The selected size and description do not match up!

Finished Length: USE LEN PARAM ☐ Field Item F

Len Param Not Found

BOM

SSG GSS

Shape: Units Filter:

Size: PUSH

Grade:

APPLY SAVE CANCEL

Version: 2.1.7209.25072

Customizations Tips and Tricks

- Skeletal Modeling
 - creating many associated parts using one sketch to drive them
 - efficient way of creating parts for assemblies

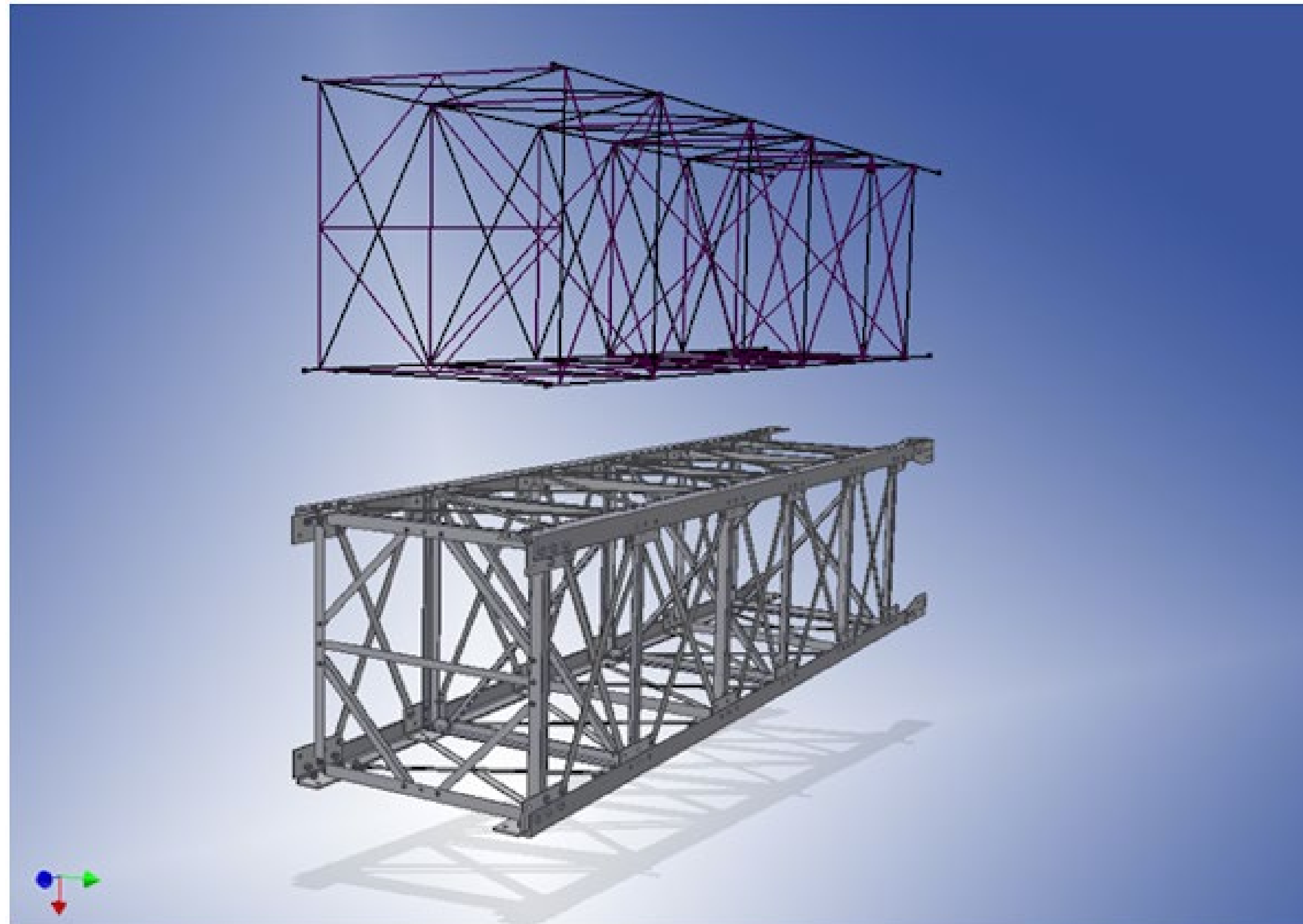
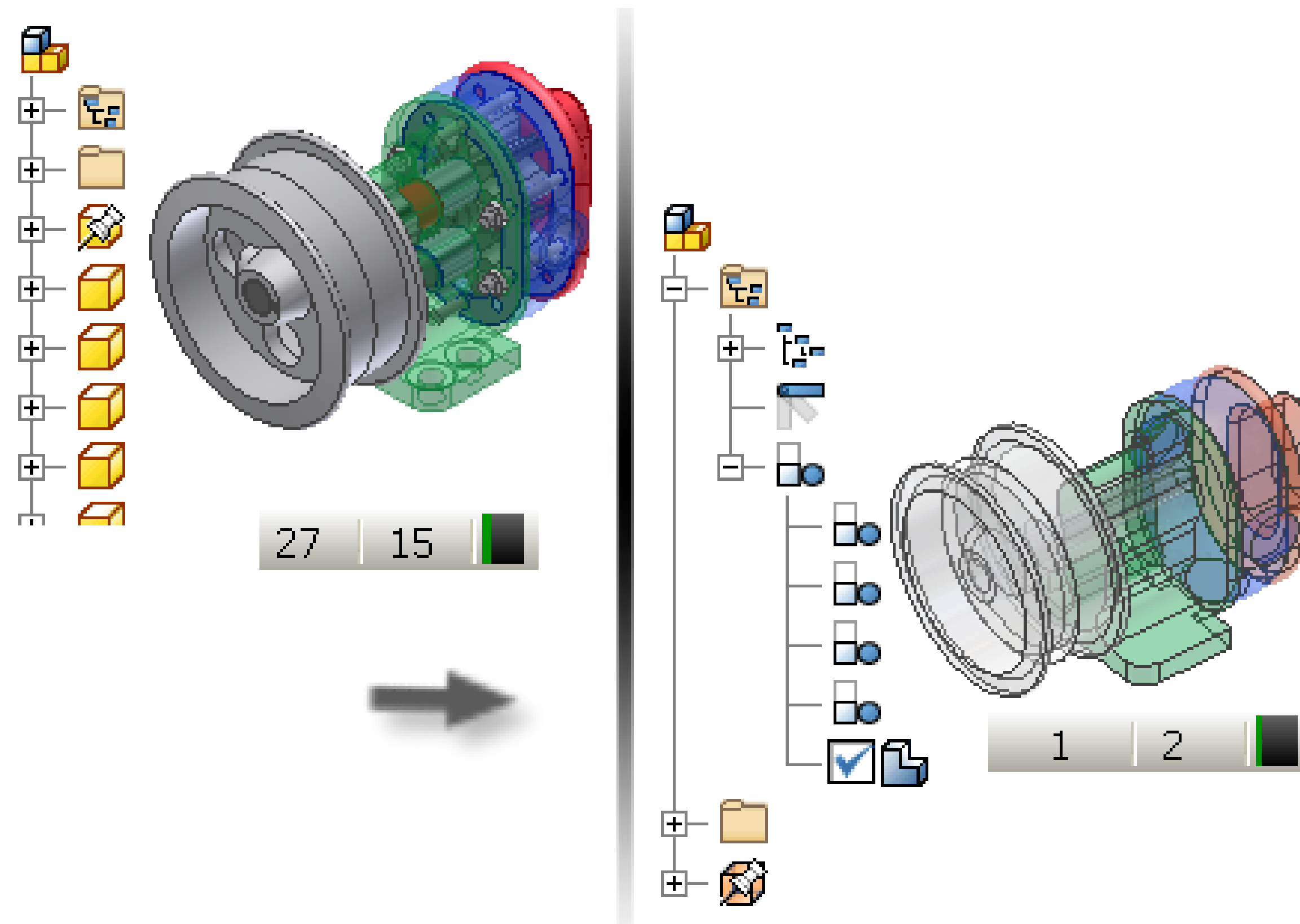


Image by Autodesk

Customizations Tips and Tricks

- Shrinkwraps
 - A separate copy of an assembly file that simplifies it down to one part file



Summary

- Assess your network infrastructure for inefficiencies
 - Bandwidth
 - Throughput
 - Network monitoring
 - Monitoring tools
 - Hardware benchmarking
 - Implementing efficient customizations



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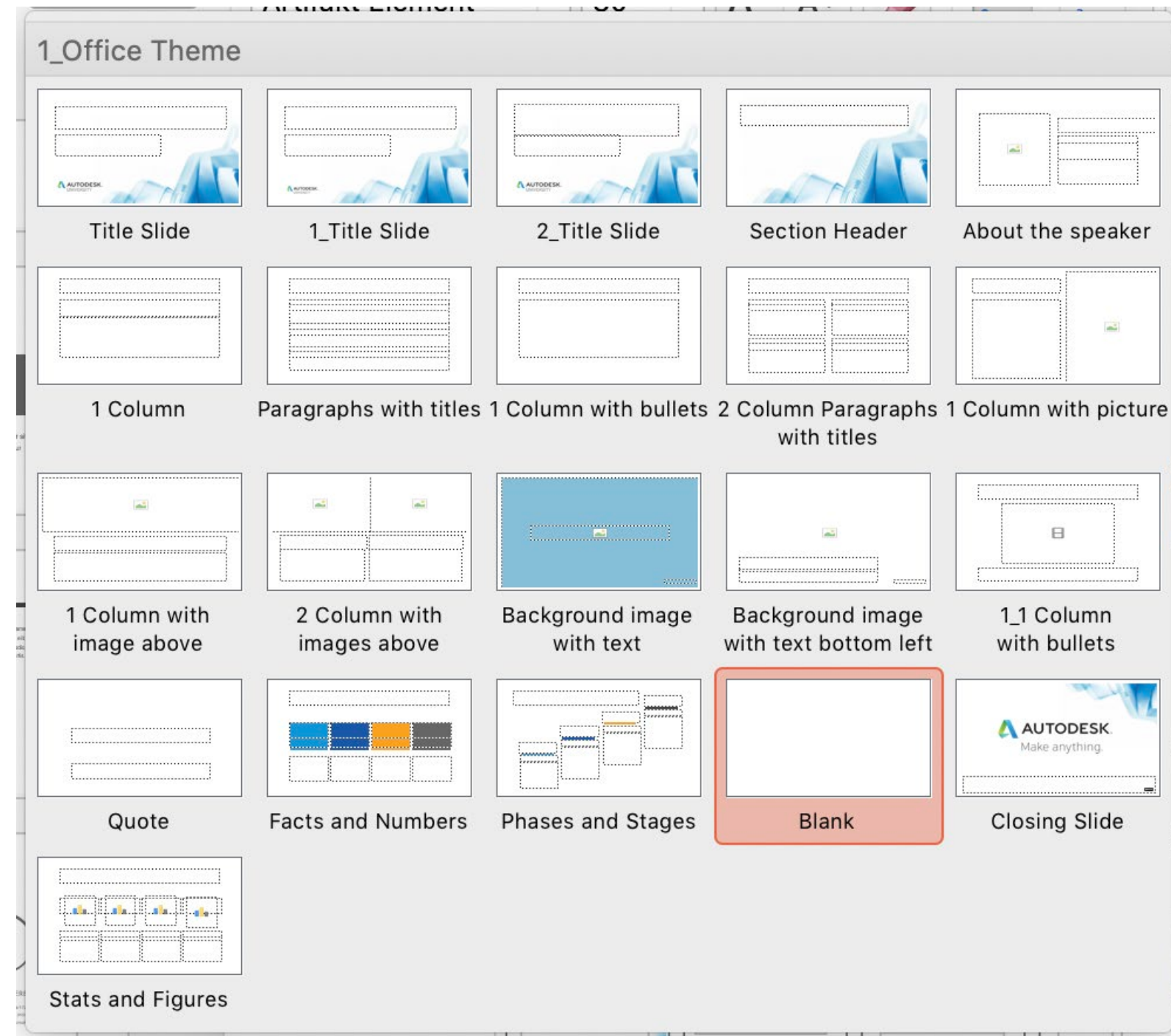
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Instructions and resources (Delete page)

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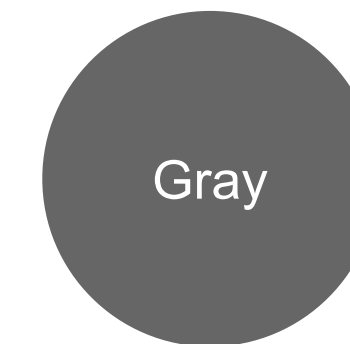


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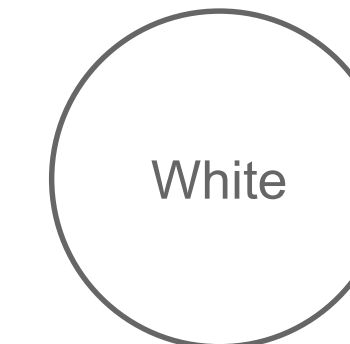
- AU 2019 Colors



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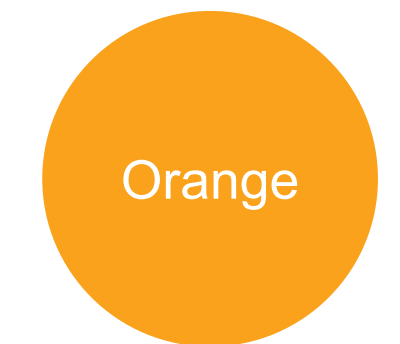
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R 24 G 88 B 168
HEX: 1858A8



R 250 G 162 B 27
HEX: FAA21B

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 - Branding and editorial guidelines – Autodesk [Brand Hub](#)