



Intel® Virtual Gateway

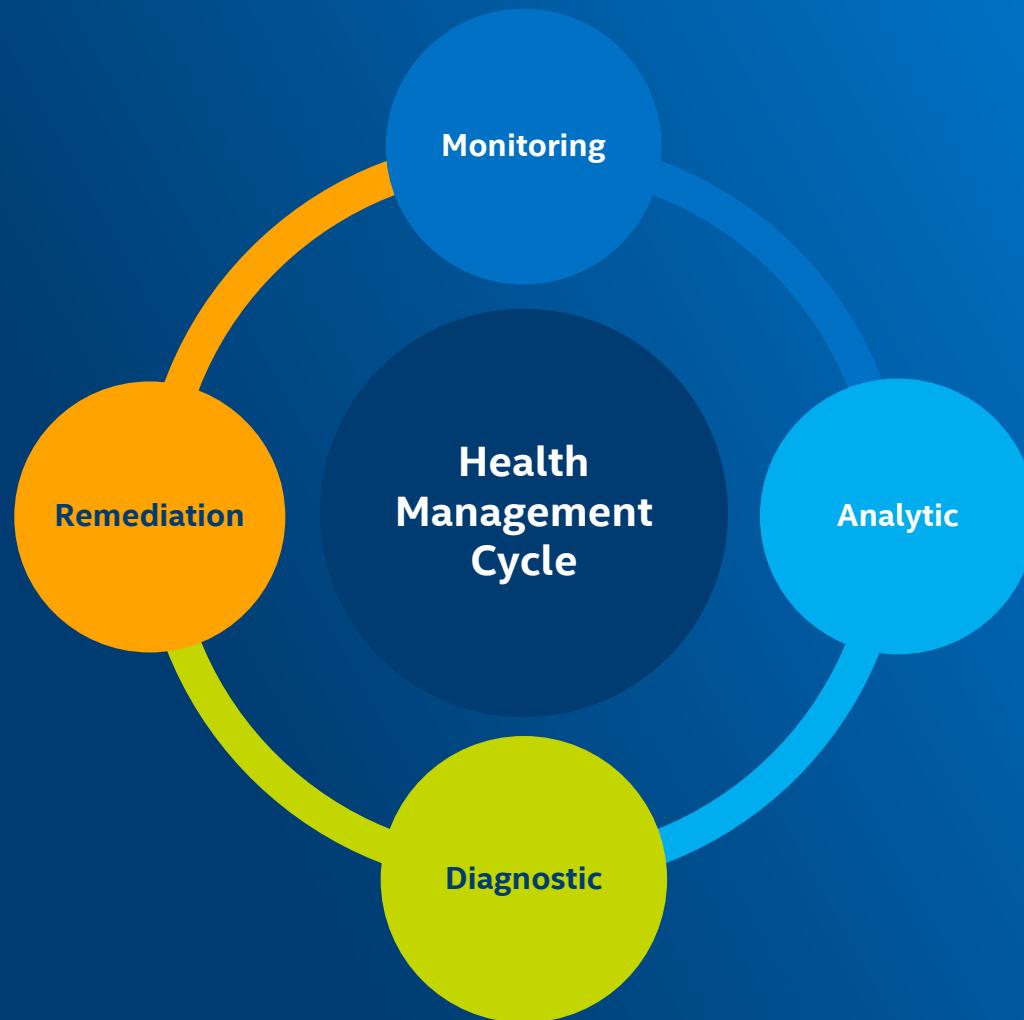
Improve IT operation efficiency with health management

13



Overview

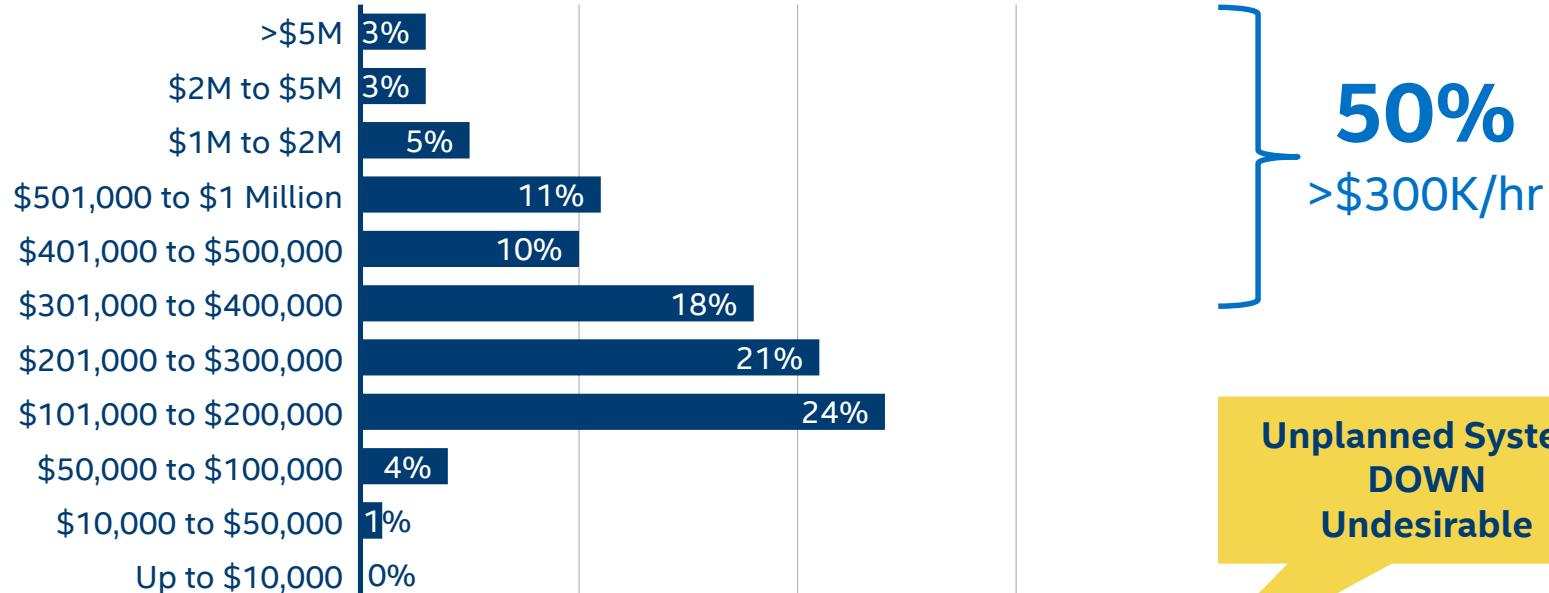
What is Health Management?



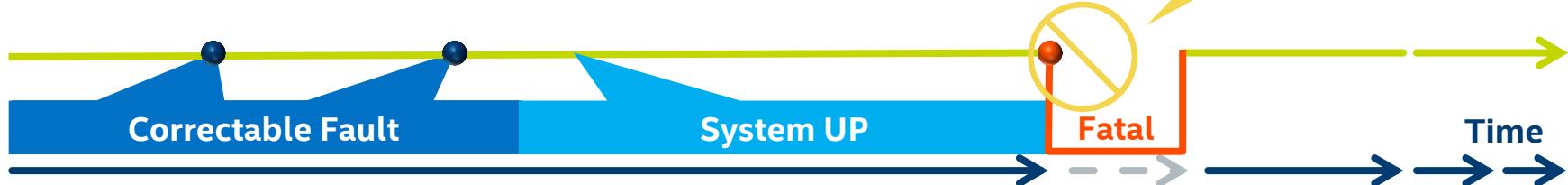
Data Center Challenge: How to Prevent/Minimize Unplanned Downtime?

Data Requires Advanced RAS

Cost of Hourly Down Time for Large Enterprises

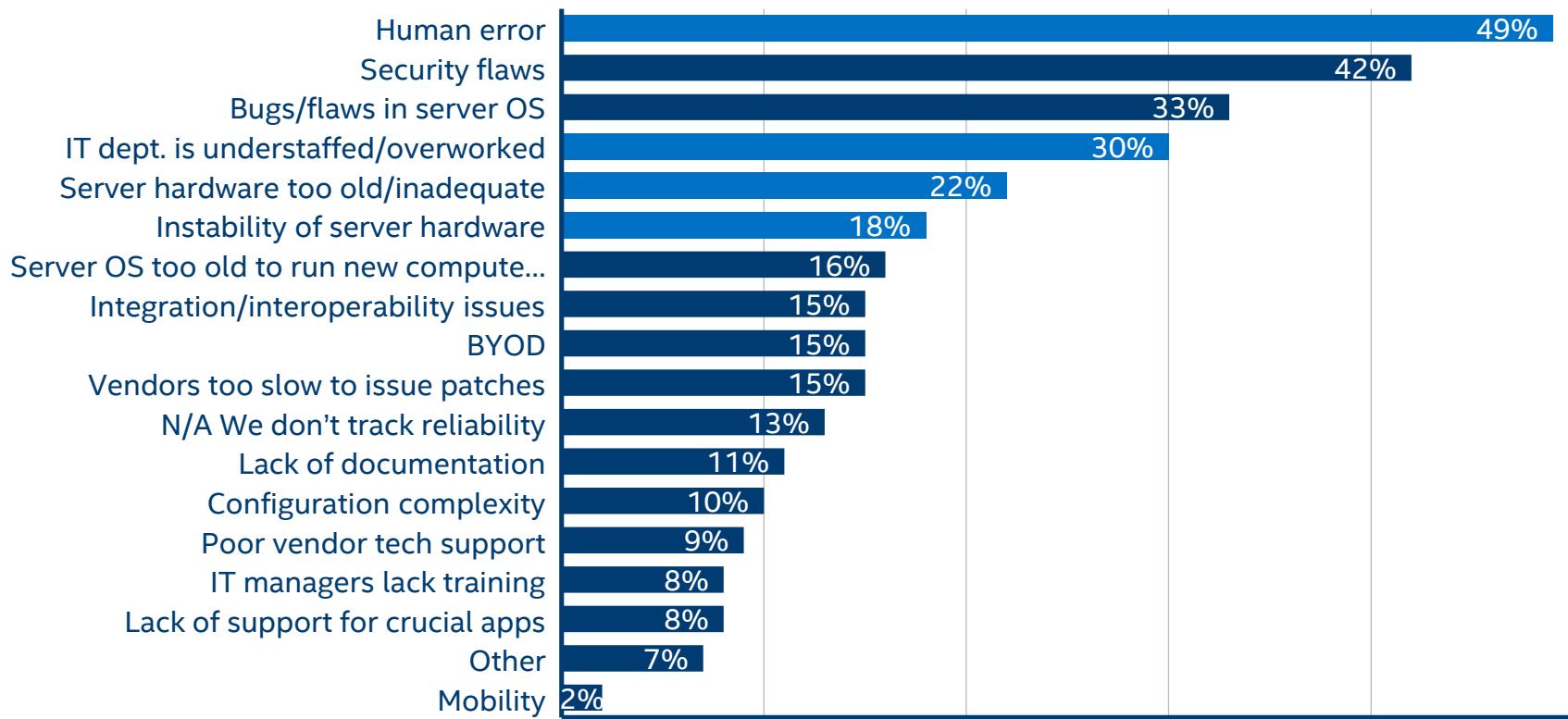


Source: Information Technology Intelligence Consulting Corp. (ITIC) Global Server Reliability Survey, July 2013



How to Improve Data Center Health Management?

In 2015 what issues have the most negative impact on reliability & downtime for server HW and OS platforms? (Select all that Apply)

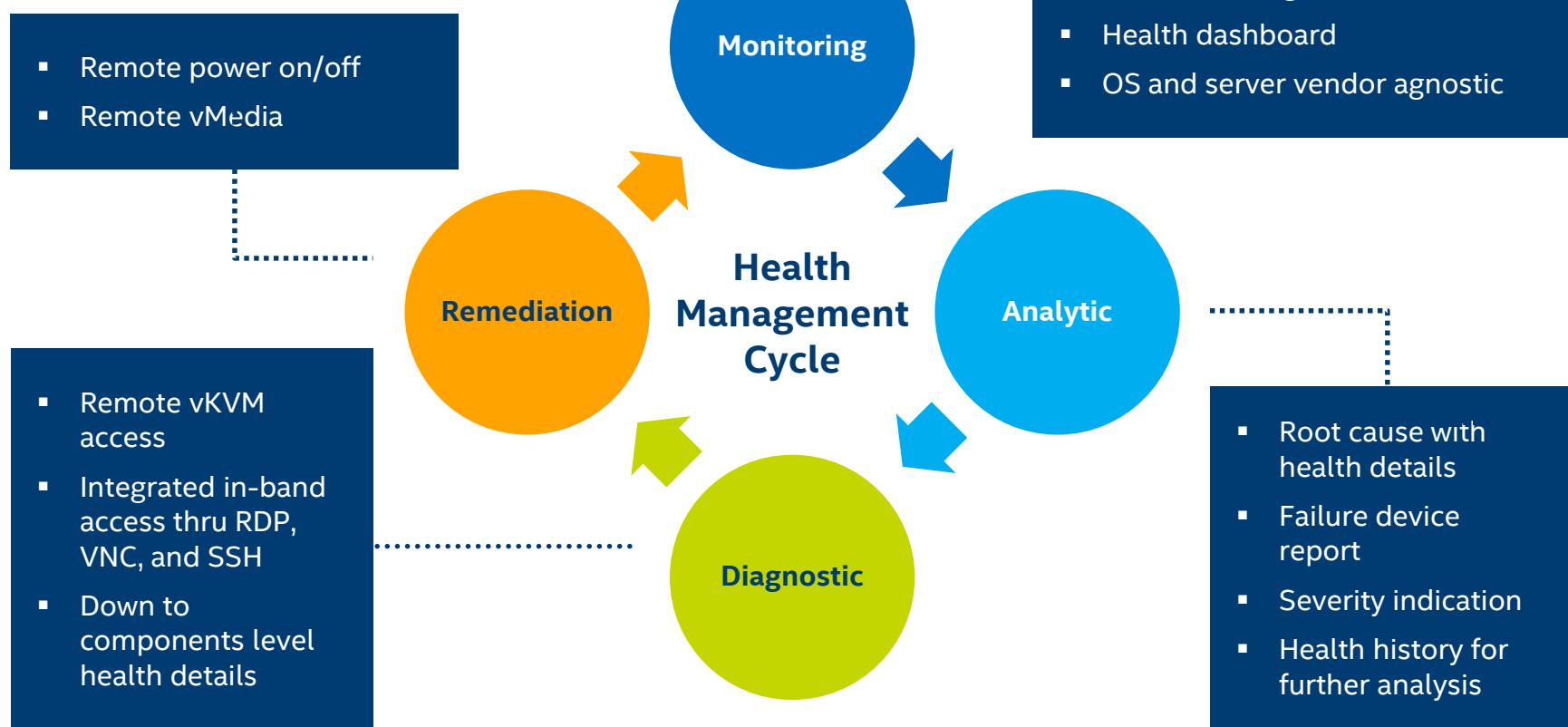


Source: ITIC 2015

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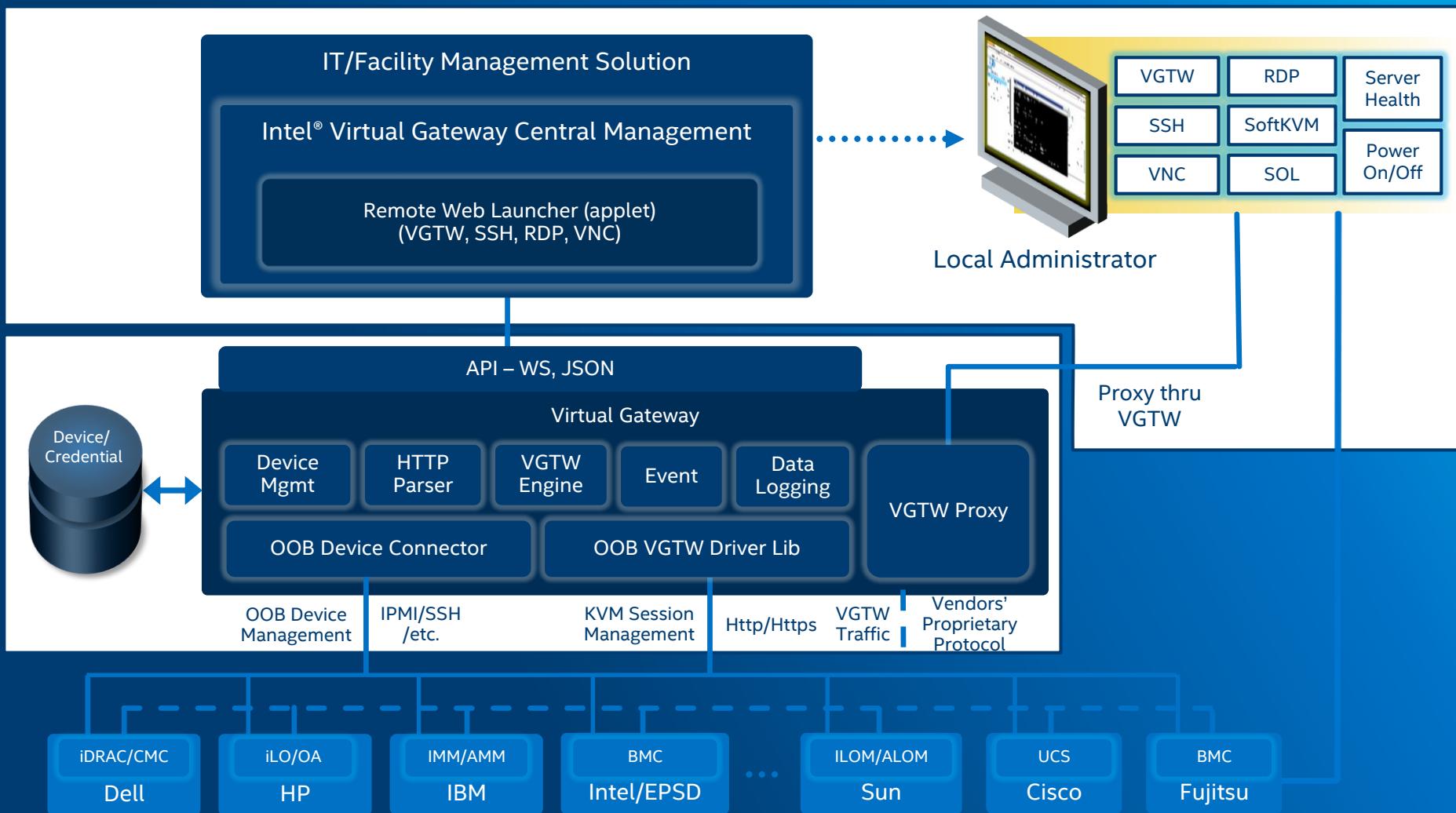
Health Management Cycle for DC

Central Management Console and SDK API



Intel® Virtual Gateway Architecture

Legend: 3rd Party Intel Comps



What are Your Benefits with Intel® Virtual Gateway?



Health Management Benefits in Data Center

- Cost Saving
- IT Efficiency/Reliability Improvements
- Prevent/Minimize Server Downtime
- Heterogeneous Env. Management
- One-to-Many Solution
- No HW Required
- Remote Power Cycling
- Support In-Band & Out-of-Band Management
- Integrated with DCIM Solutions or Available As Stand Alone Package

Target Implementation: Where & Who?

Hybrid Retrofit Data Centers

- Lower initial cost
- Easier to install than hardware KVMs
- No power, cooling or space required

New Data Centers

- Lower initial cost
- Lower deployment costs
- Lower operating costs

IT & Facility Managers

- Need access/control of the IT layer
- One-to-many remote access
- Management heterogeneous DC environment
- Notification of failures
- Automation of server health monitoring

Intel® Virtual Gateway Deployment Options



北京中合实创电力科技有限公司
BEIJING OPSYSPOWER TECHNOLOGY CO.,LTD.



Intel® Virtual Gateway Case Studies

Use	Remote Management	Power On/Off	Server Health Management	Ease of Use	Security/Auditing (Future)
Customers	Intel IT Successful server access via vGTW POC. Able to replace expensive HW KVM.	Yihua Fund Able to automate remote power on/off controls through out entire internal DC.	Large Gaming Company IT staff time saving by automating time consuming server health LED checks. Achieved 40% MTTR reduction.	SGRI Deployed vGTW to 1,500+ servers in just 10 minutes.	 A blue rectangular sign with the words "JOIN US" in white, outlined in blue, hanging from a blue string.
	Large Japanese CSP Able to create offering for remote physical server access as a service using vGTW SDK.	CNPC Successful POC showing savings in remote DC administrator by automating power on/off.	Large Energy Enterprise Reduced time to track down server instability from hours to minutes by leveraging vGTW component failure insights.		



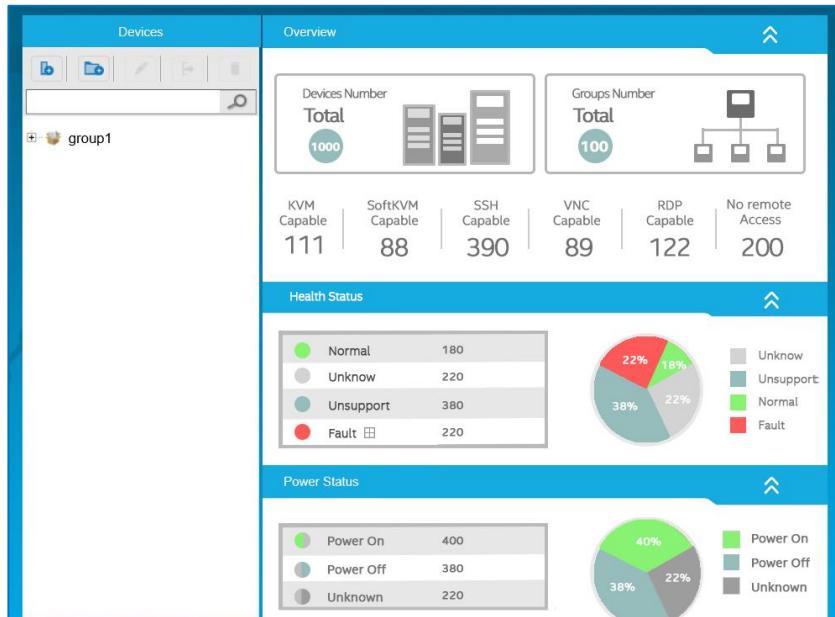
Health Management in Data Center

Data Center Health Challenges

- How can I know when my server's components fail?
- Do we really need Jose to walk around and manually check the LEDs?
- How soon can I expect my fans to fail?
- How can I get a failure report for my data center?
- How do I figure out when I need to make service calls to my remote DCs?
- I'm paying contractors to troubleshoot my remote servers, how do I know what he's really doing when he's on them?
- I spend a lot of \$\$\$ on hardware KVMs for my servers...
- I have thousands of heterogeneous servers in my data center and I need a tool to control and access them to maintain full availability.



Health Management Overview



◀ Overview of Environment

Name	Type	System Health	Management Address	OS Address	KVM Access	Inband Access	Power Control
Dell R730	Server	⚠	10.239.43.23		BMC KVM	N/A	No
HP DL360 G9	Server	⚠	10.239.151.68		BMC KVM	N/A	No
HP DL380	Server	⚠	ilcng049tgn1		BMC KVM	N/A	No
HP DL380 G7	Server	⚠	ilouse137rn9dc		BMC KVM	N/A	No

▲ Per Device Health

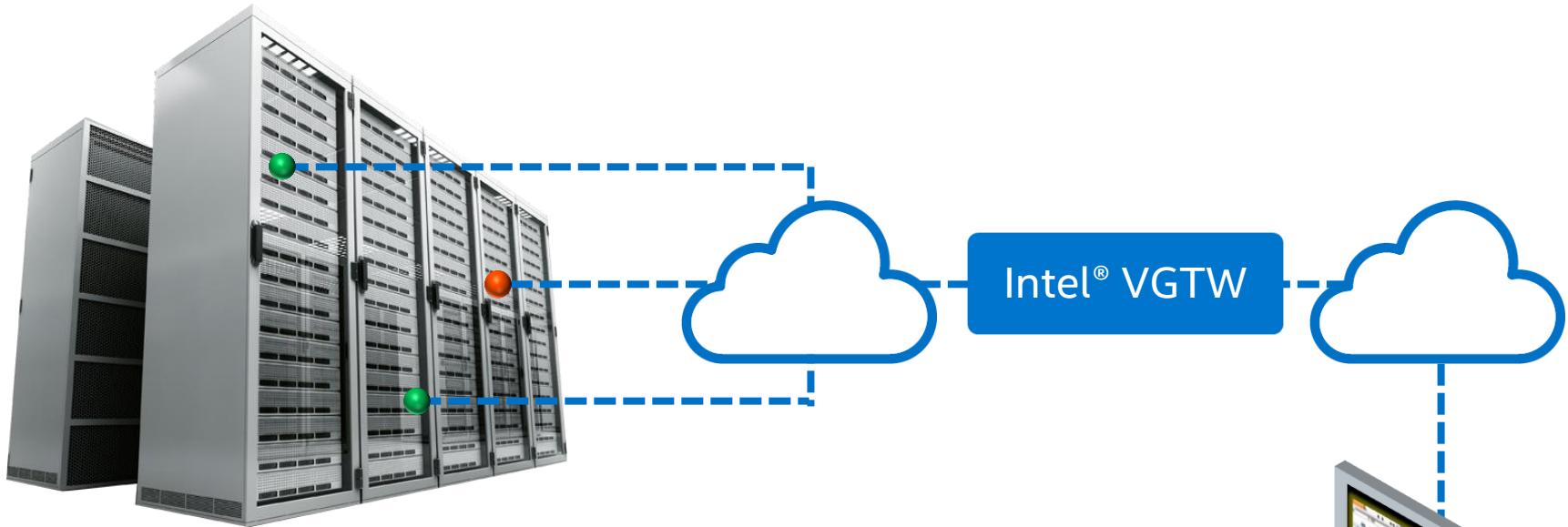
Devices	Type	Health Status	CPU	Memory	Fan	Power supply	Storage	Temperature	Voltage	Battery health state
Service1		Normal	✓	✓	✓	✓	✓	✓	✓	✓
Service2		Normal	✓	✓	✓	✓	✓	✓	✓	✓
Service3		Error	✗	✗	✗	✗	✗	✗	✗	✗
Service4		Normal	✓	✓	✓	✓	✓	✓	✓	✓
Service5		Error	✗	✗	✗	✗	✗	✗	✗	✗

◀ Device and Component Report

Health Status	Error (Critical)
CPU	✓
Memory	⚠ [DIMM 11] Uncorrectable ECC
Fan	✗
Power	✗
Storage	⚠ [Drive 0] In Failed Array; [Drive 1] Drive Fault
Temperature	✓
Voltage	✓
Battery	✗

▲ Component Overview

Remote Server Management



- Server diagnostics and troubleshooting
- Checking BIOS settings and BIOS configuration
- Analyze server logs
- Configuration changes or verification
- Remote power cycling



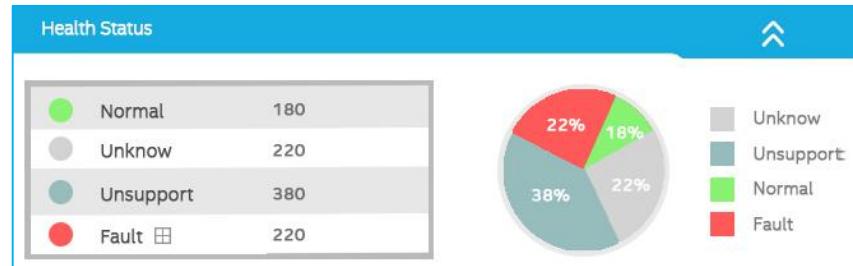
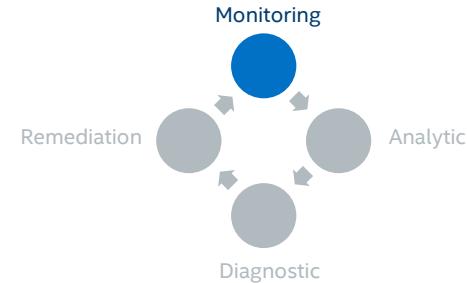
Use Cases

What Can You Do with Intel® Virtual Gateway?



Health Monitoring

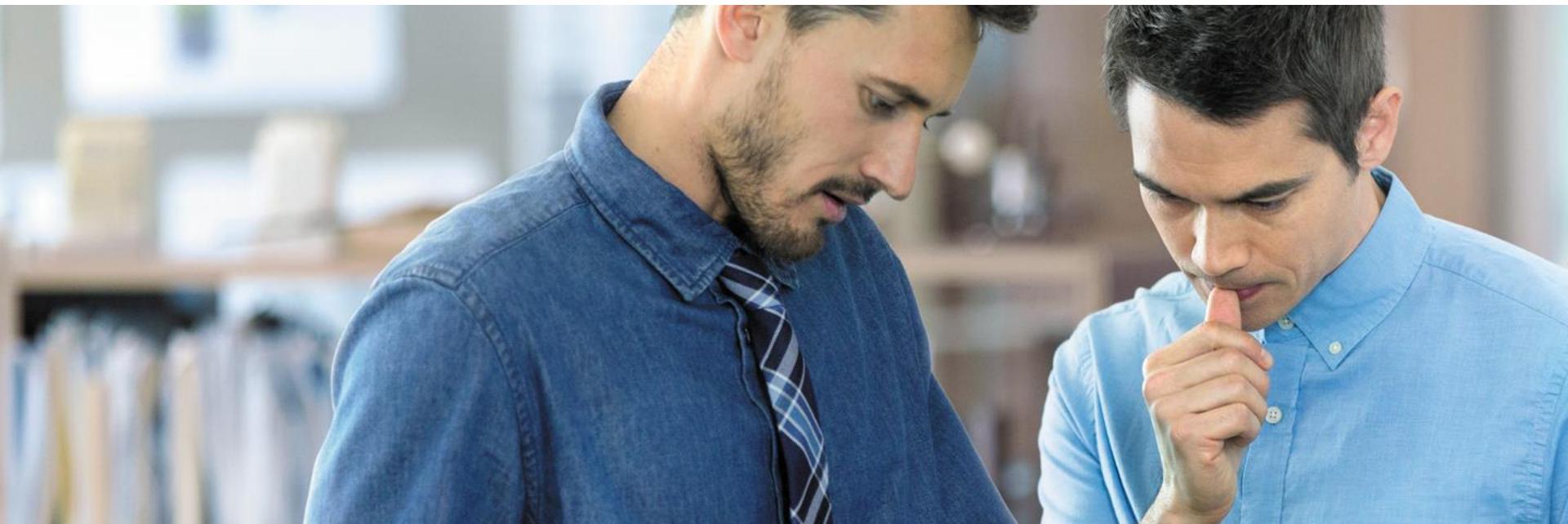
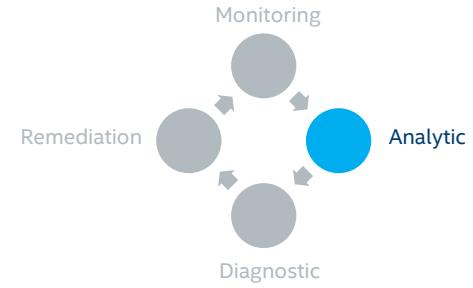
- Automated health status collection
- High level server health all the way down to component level (CPU, memory, storage, fan, temperature, battery, power supply, voltage)
- Ability to receive notifications (email, SNMP, browser) when components fail on your hardware
- Can predict more accurately when components will need to be replaced by looking at hardware failure trends
- See overall health of environment and breakdown of failures by component or urgency



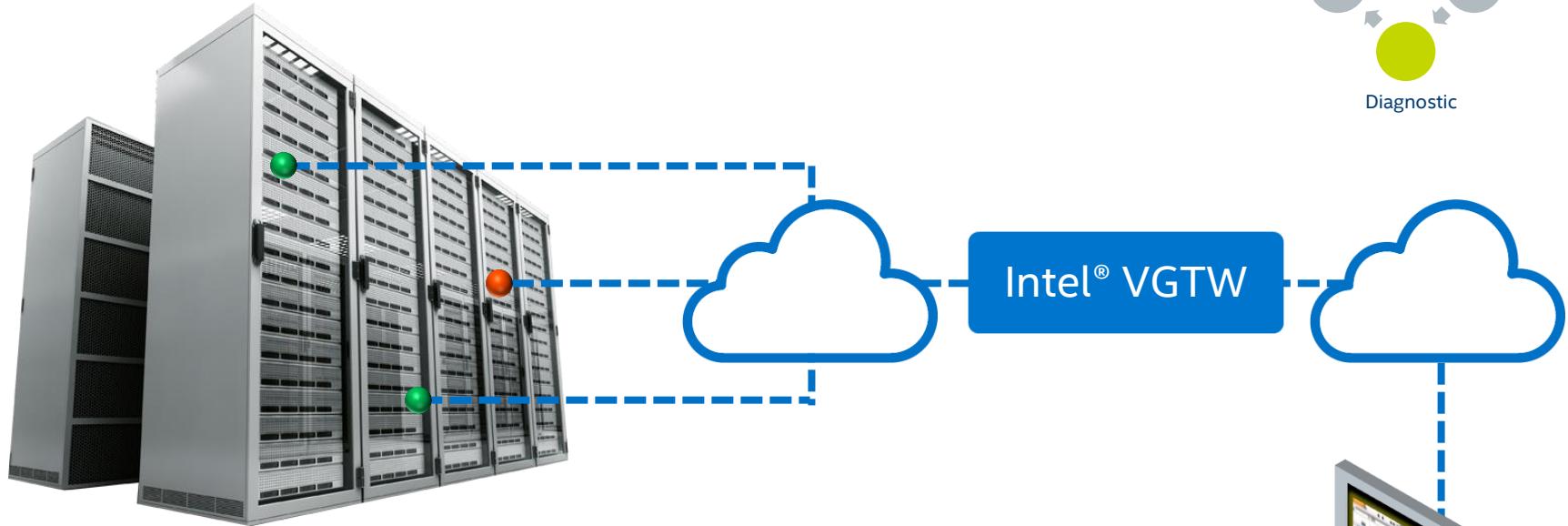
Health Status		Error (Critical)
CPU	<input checked="" type="checkbox"/>	
Memory	<input type="checkbox"/>	[DIMM 11] Uncorrectable ECC
Fan	<input type="checkbox"/>	
Power	<input type="checkbox"/>	
Storage	<input type="checkbox"/>	[Drive 0] In Failed Array; [Drive 1] Drive Fault
Temperature	<input checked="" type="checkbox"/>	
Voltage	<input checked="" type="checkbox"/>	
Battery	<input type="checkbox"/>	

Analytic

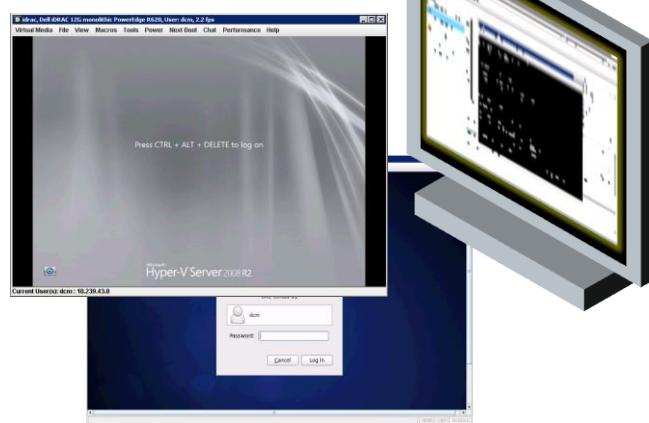
- Discover the cause of failures down to the component level
- Failure device report with severity and failure details
- Can better predict when components will need to be replaced by looking at hardware failure trends
- Failure rate and MTTR analysis (per server model, components, etc.) – future
- Server failure predication – future



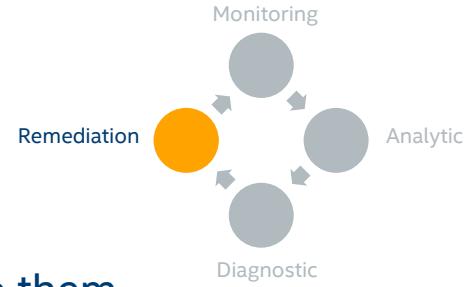
Diagnostic



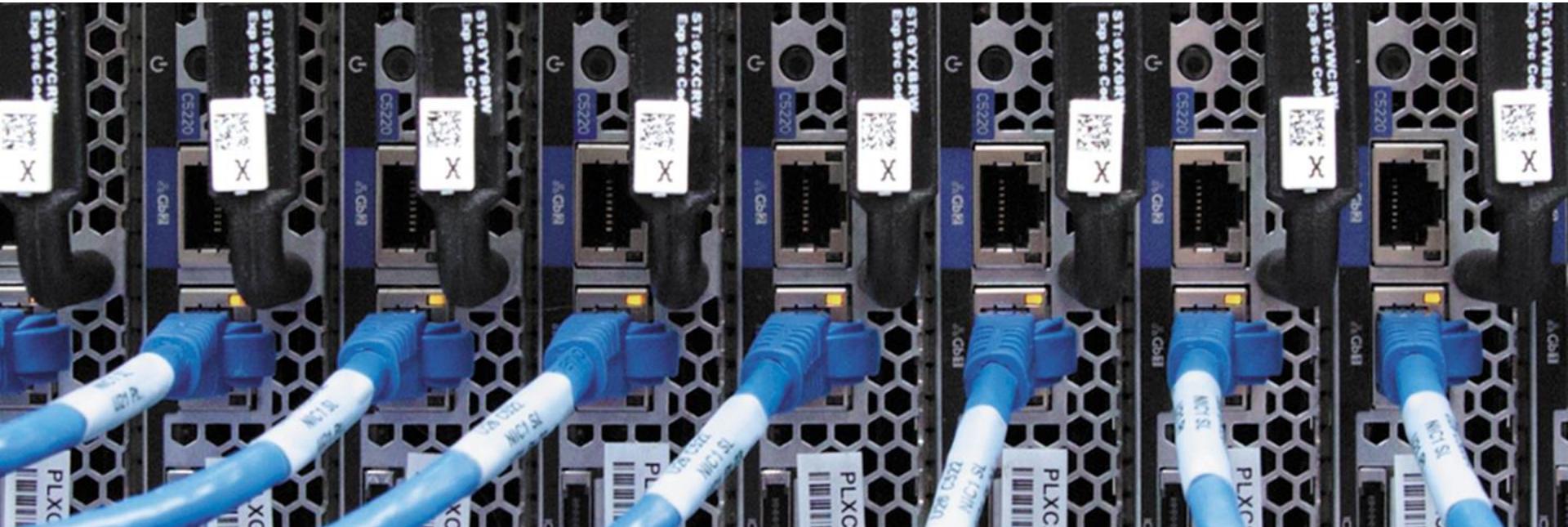
- Server diagnostics and troubleshooting
- Checking BIOS settings and BIOS configuration
- Analyze server logs
- Configuration changes or verification
- Use both OOB (KVM) and IB (SSH, RDP, VNC)



Remediation

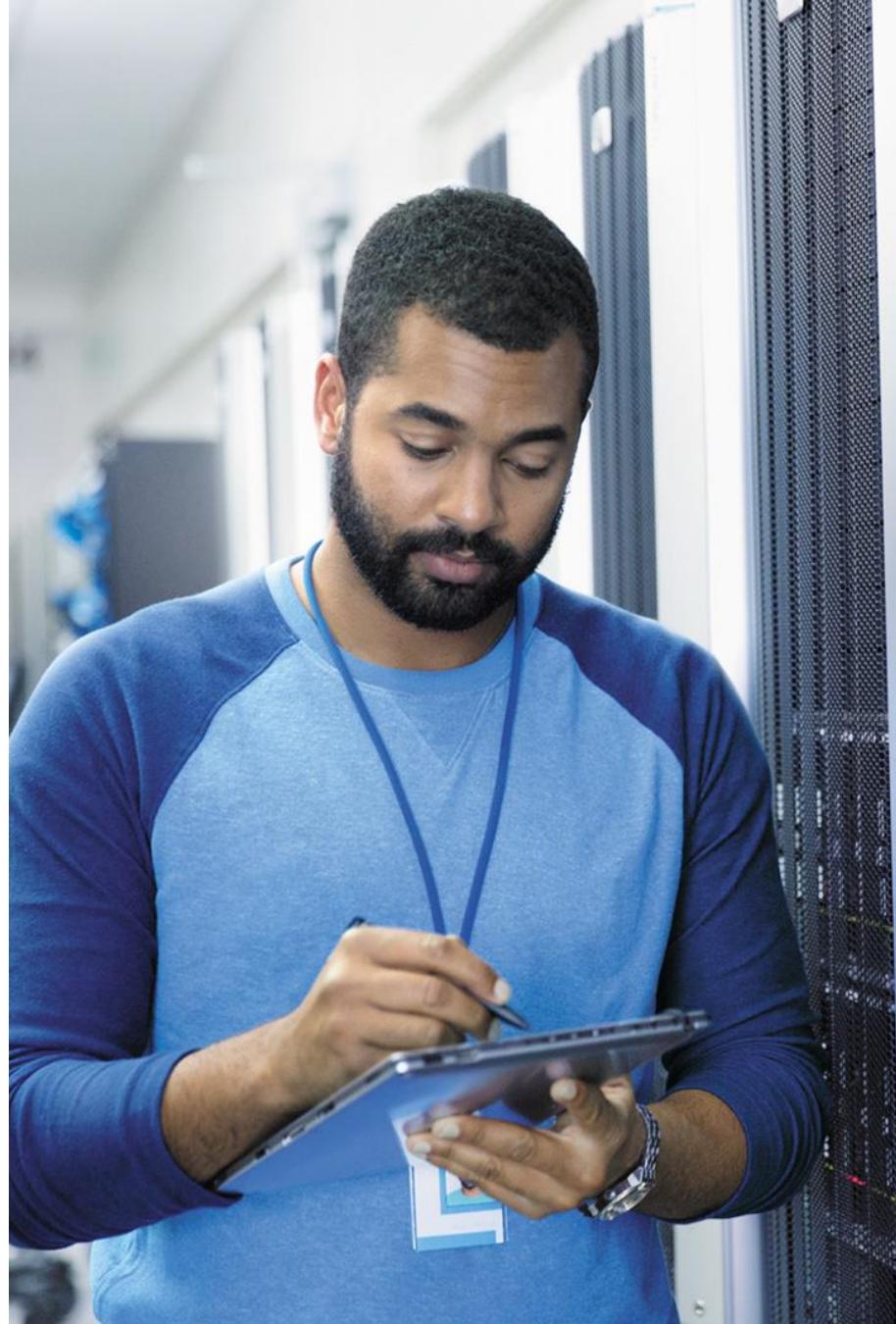


- Remotely power servers on and off
- Ability to create groups of servers and then deploy power tasks to them
- Can schedule and automate an individual or group power task
- vMedia for remote OS provisioning and installation
- Link server failures to workload and/or workflow management system for IT



More Benefits

- No hardware deployment required
- Automated discovery of devices in environment
- Heterogeneous support for all makes and models
- Users can also see the server power status via the Console
- Find out what's failing on your devices as it happens with no monitoring setup required
- Security/auditing (future)
 - Ability to record KVM sessions and user interaction for later review
 - Video recording of screens and comprehensive log of mouse and keyboard activity
 - Can audit user or session info for security compliance or government regulator laws





ROI Cases

Hardware KVM Replacement (Case I)

- No hardware deployment required
- VGTW per node cost is 50% of the cost of hardware dongle
- 1/3-1/4 overall cost of traditional hardware KVM
- Heterogeneous support for all makes and models means no additional equipment required for support
- Automate server health monitoring and avoid time-consuming human server health round check – save of human resource
- Savings involved in speeding up recovering/fix process by notification of events when they happen and pin point

Hardware KVM	Cost
KVM (64 nodes)	\$12,699.00
Dongles (64)	\$9,280.00
Support (4 years)	\$3,175.00
Total cost	\$25,154.00

VGTW	Cost
VGTW (64 nodes)	\$2,880.00
Support (4 years)	\$2,304.00
Total cost	\$5,184.00

Prevent/Minimize DC Downtime (Case II)

45% server MTTR reduction

250 hours unplanned server downtime saving on reduction of critical business discontinuity for 1,000 servers per annum

- Improve DC reliability and save the cost of critical business discontinuity
 - Automated server failure detection
 - Easy to track down failure cause by holistic health monitoring down to component level
 - Alert on HW failure before trigger to app/service level impact

Assumptions	a) 1,000 servers b) Unplanned downtime per server/per annum in minutes: 20 minutes*
Conditions**	Before: server MTTR = 5.5 hours After: server MTTR = 3.5 hours MTTR: mean time to recovery
ROI	Server MTTR reduction: $(5.5 - 3.0) / 5.5 = 45\%$ Annual server downtime saving: $20/60 \times 1000 \times 45\% = 250 \text{ hours}/\text{per annum}$

* [Information Technology Intelligence Consulting Corp. \(ITIC\) Global Server Hardware, Server OS Reliability Report, July 2015](#)

** [A Better Management to Datacenter Health. May 2016](#)

Operation Efficiency Improvement (Case III)

Save IT labor cost \$35K - \$100K USD per hour for 1,000 servers

Automated server health monitoring reduces human errors

	Scenario 1: Typical IPDC	Scenario 2: High Maturity DC
Assumptions	a) 1,000 servers b) 3 technician per 1,000 servers c) IT labor cost: \$25 USD per hour	a) 1,000 servers b) 1 technician per 1,000 servers c) IT labor cost: \$50 USD per hour
Conditions*	Before: Total server maintenance consumed 8,000 man-hours per year After: Total server maintenance cost was reduced to 4,000 man-hours per year* Note: total IT server maintenance includes health monitoring, failure detection, troubleshooting, fixing, etc.	Before: 1,500 hours for health management per annum After: 800 hours for server health management per annum**
ROI	Labor cost saving: $(8,000 - 4,000) \times \$25 = \$100K \text{ USD per annum}$	Labor cost saving: $(1,500 - 800) \times \$50 = \$35K \text{ USD per annum}$

* [Information Technology Intelligence Consulting Corp. \(ITIC\) Global Server Hardware, Server OS Reliability Report, July 2015](#)

** [A Better Management to Datacenter Health, May 2016](#)

** Estimation base on Intel IT large DC

In Development (Next Two Releases)

Intel® Virtual Gateway Future Features

KVM Session Recording

- Record interactions for auditing or security purposes

Component MTTR Analysis

- Improve IT efficacy / reliability through server component analysis

Historical Failure Trending by Device

- Gather insight into DC failure trends

Network Storage Health Monitoring

- Full IT device coverage for health management in DC

Health Failure Prediction and Diagnostic

- Know when components will fail before they do

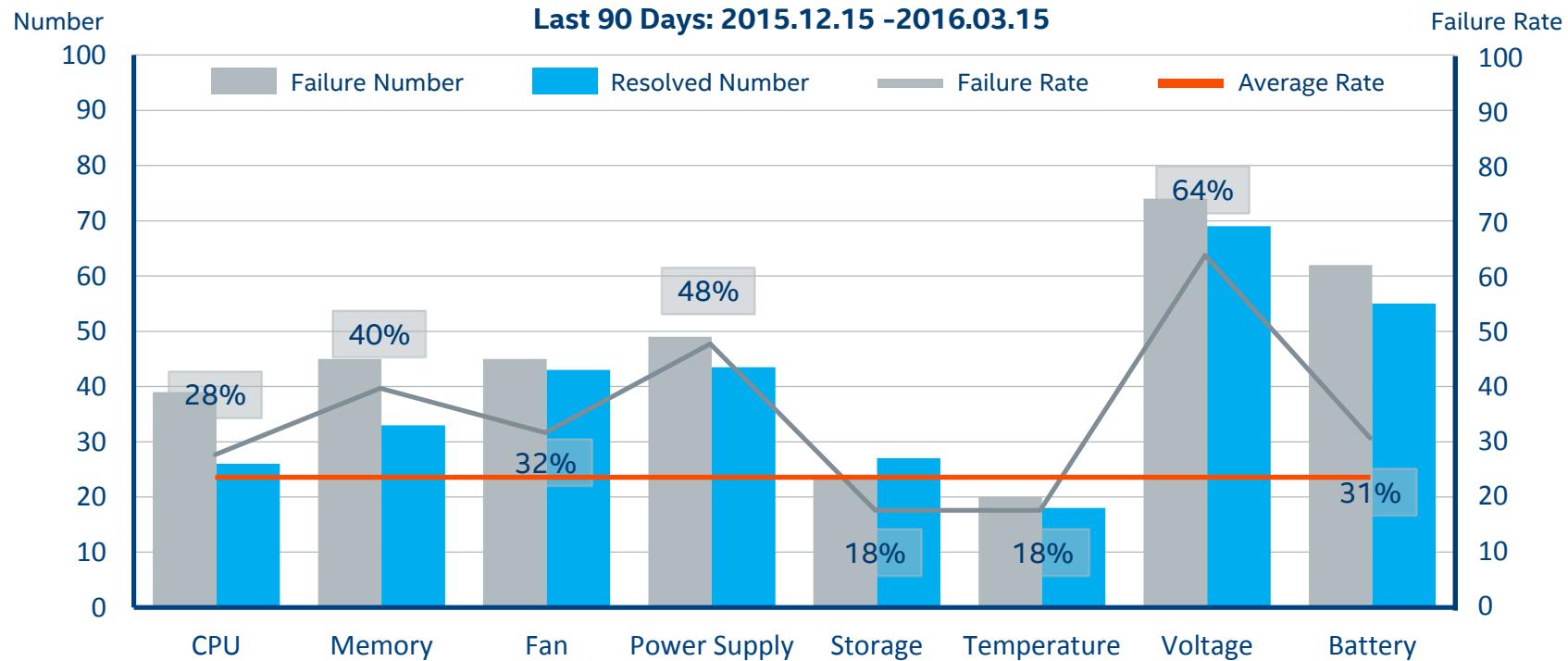


ISV value add

In the SDK, But Not In Console Yet

Comprehensive Failure Report Analysis

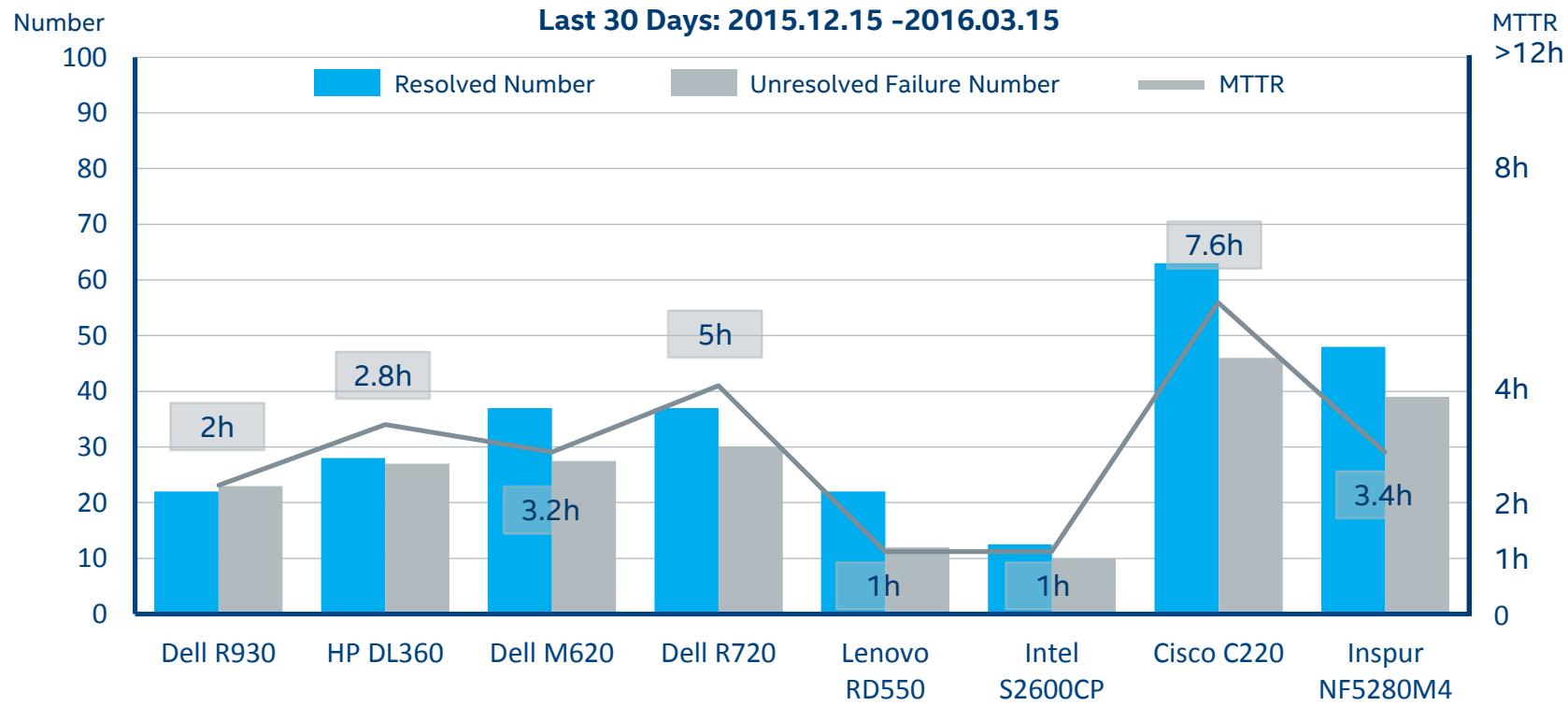
- Link server failures to workload/workflow for IT
- MTTR analysis and report (per server model, components, etc.)
- Server failure statistic report and analysis



In the SDK, But Not In Console Yet

Comprehensive Failure Report Analysis

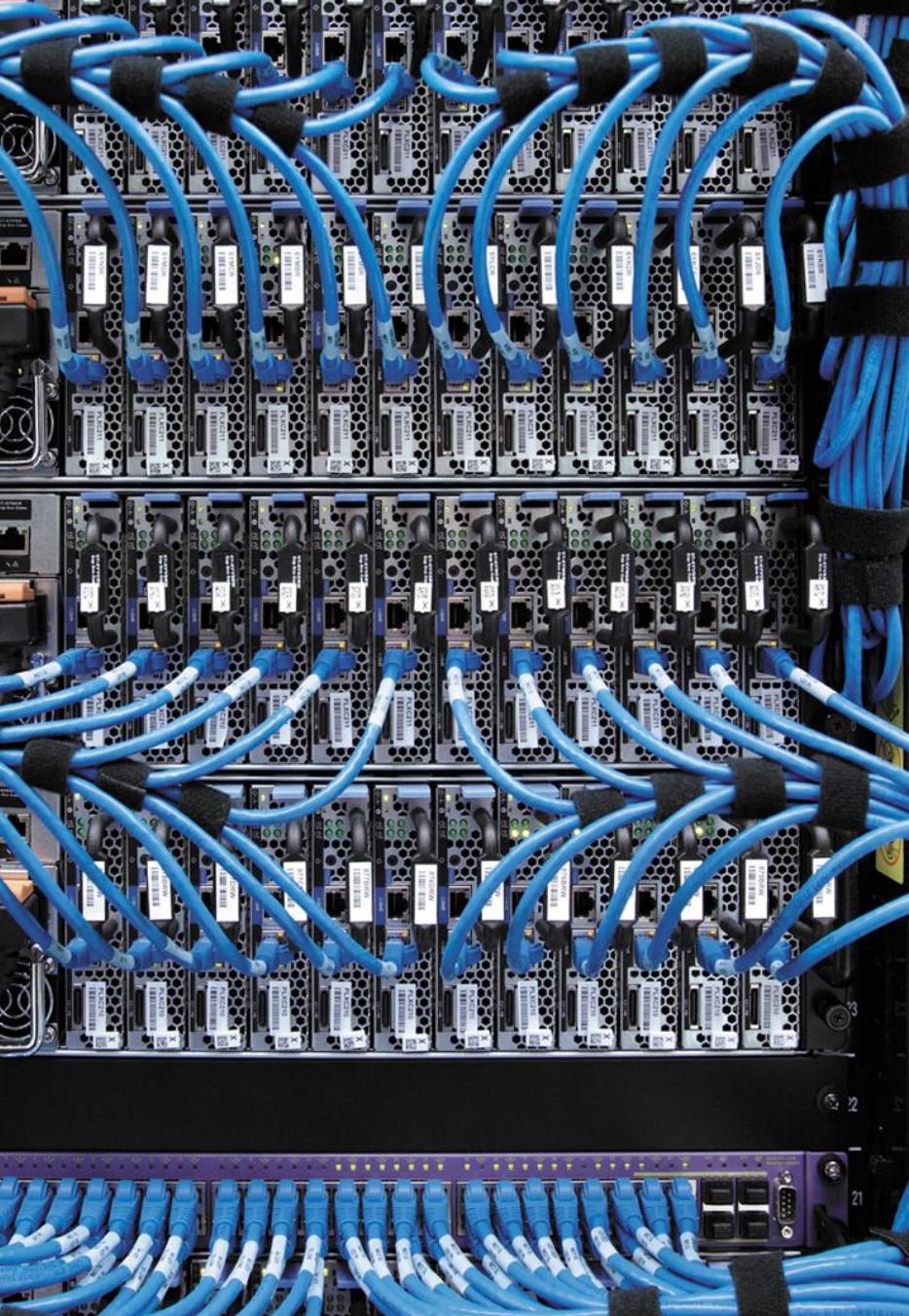
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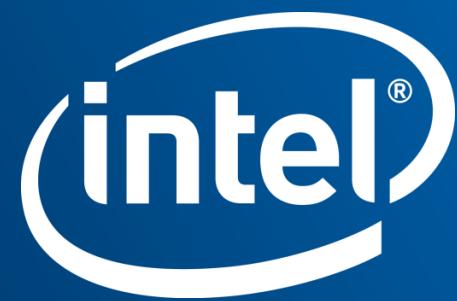


Summary

A new approach at health management!

- Intel® Virtual Gateway is used for diagnosing and troubleshooting data center hardware across platforms. It is a natural complement to data center power management.
- IT managers can now securely configure or fix compatible components (e.g., servers, network switches and storage devices) remotely, in a “one-to-many” solution.





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