# AUTOMATING SECURITY IN THE CLOUD AND DATACENTER

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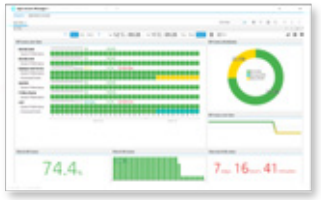
Jeff Hart
Chief Technologist
M2 Technology

# Automated Security = Automated Everything

Provisioning Users, Servers, Applications, Network Devices, Storage

Patching

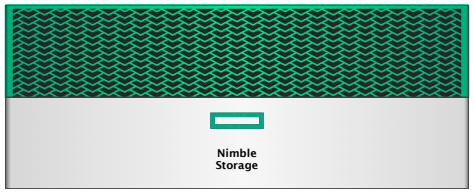
Configuration Management

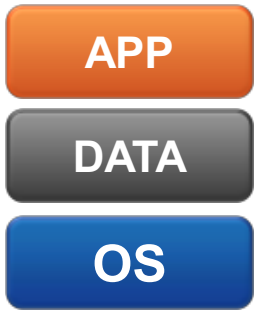


Testing – Functional, Load, and Security

Reporting

Service Management Processes





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# Automated IT and Security Operations

- IT Automation is Good
- Security Automation is Better
- DevSecOps is Best

- Automation requires testing
- Automation needs protection

Automating security improves security posture and reduces costs

*Gratisography*

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# Why Automated Security and DevSecOps?

## Better | Cheaper | Faster

**Projects using same automation as HmC:**

- Reduced release intervals from 6 months to 6 weeks with findings dropping from low three digits to a handful
- Data center operator reduced system fielding time from 4 days to 3 hours
- Increased test coverage by 400% even with a 50% staffing reduction

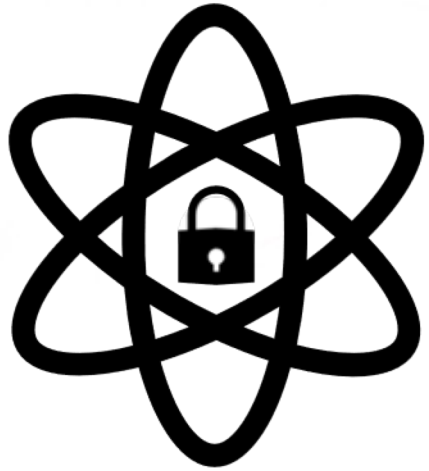
**Kessler Run**

- Credited with $391M in real life cost savings by deploying capability in 4 months instead of an estimated 5 years using traditional waterfall
- 90% of approximately 850 RMF controls inherited from platform, leaving about 40 controls at the application layer to be addressed
- First DoD organization to achieve Continuous Delivery to SIPR

# Start With a Secure Enclave

**100% Virtual Environment**

- Begin with host only network
- Load virtual NGFWs
- Build out virtual network infrastructure

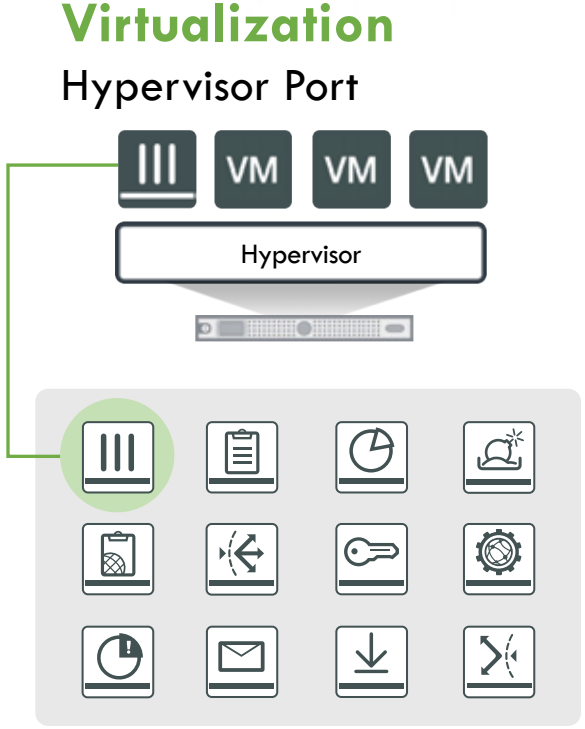


**Hybrid Environment**

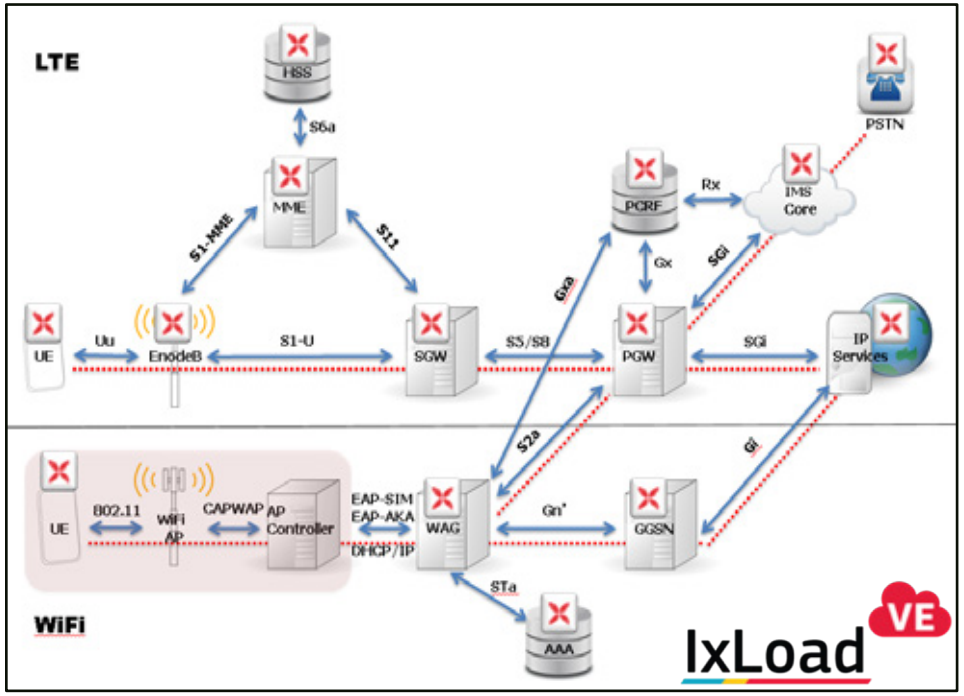
- Create virtual firewall / virtual domain on physical NFGWs
- Create physical to virtual NIC mapping
- Connect virtual switches / routers to virtual NICs

# Network Function Virtualization

Security stacks can now be completely constructed with virtual appliances – NGFW, IDS/IPS, Packet Capture, AAA servers, etc.

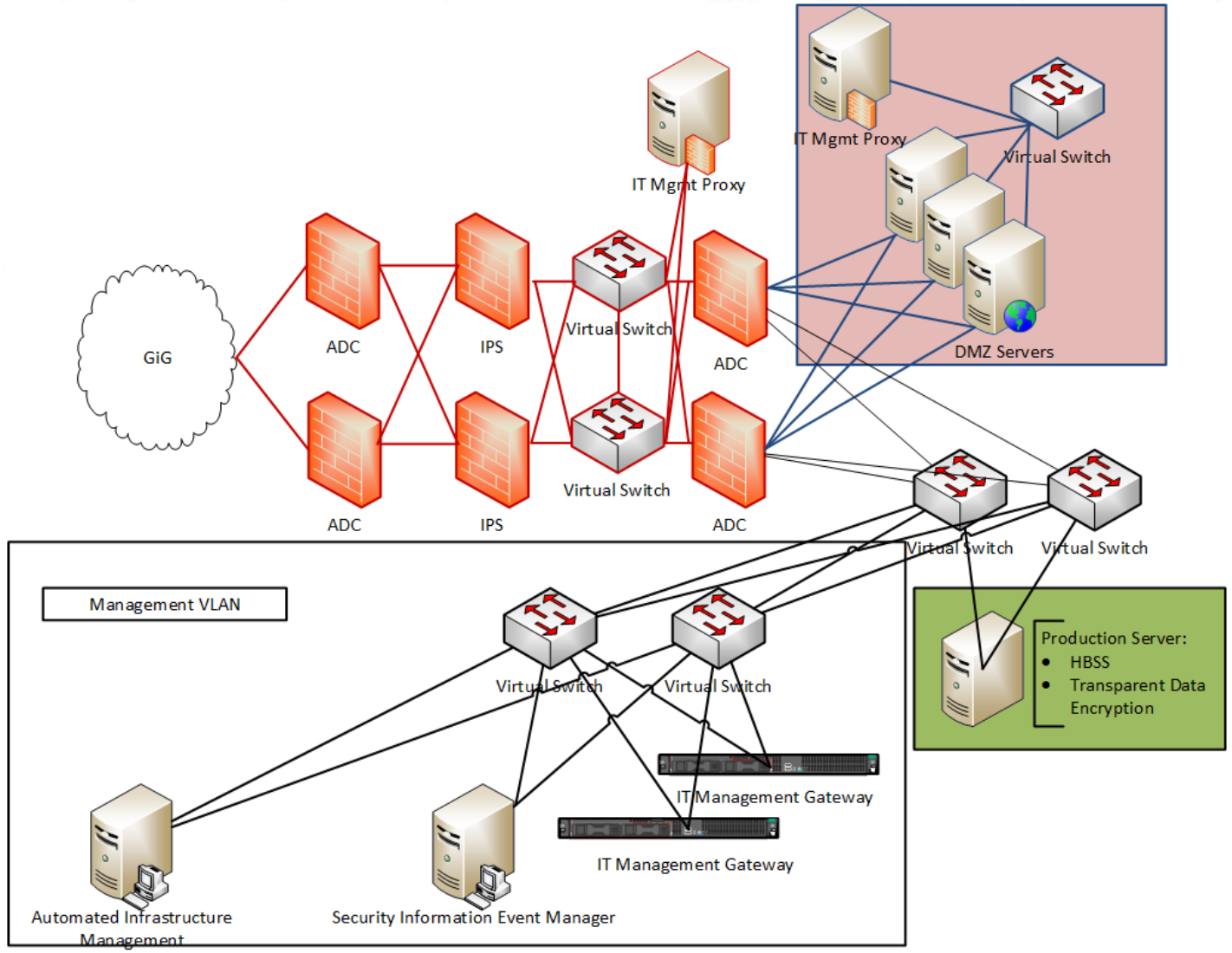



Virtual test devices are available for functional, load, and security testing



# Build out virtual network infrastructure

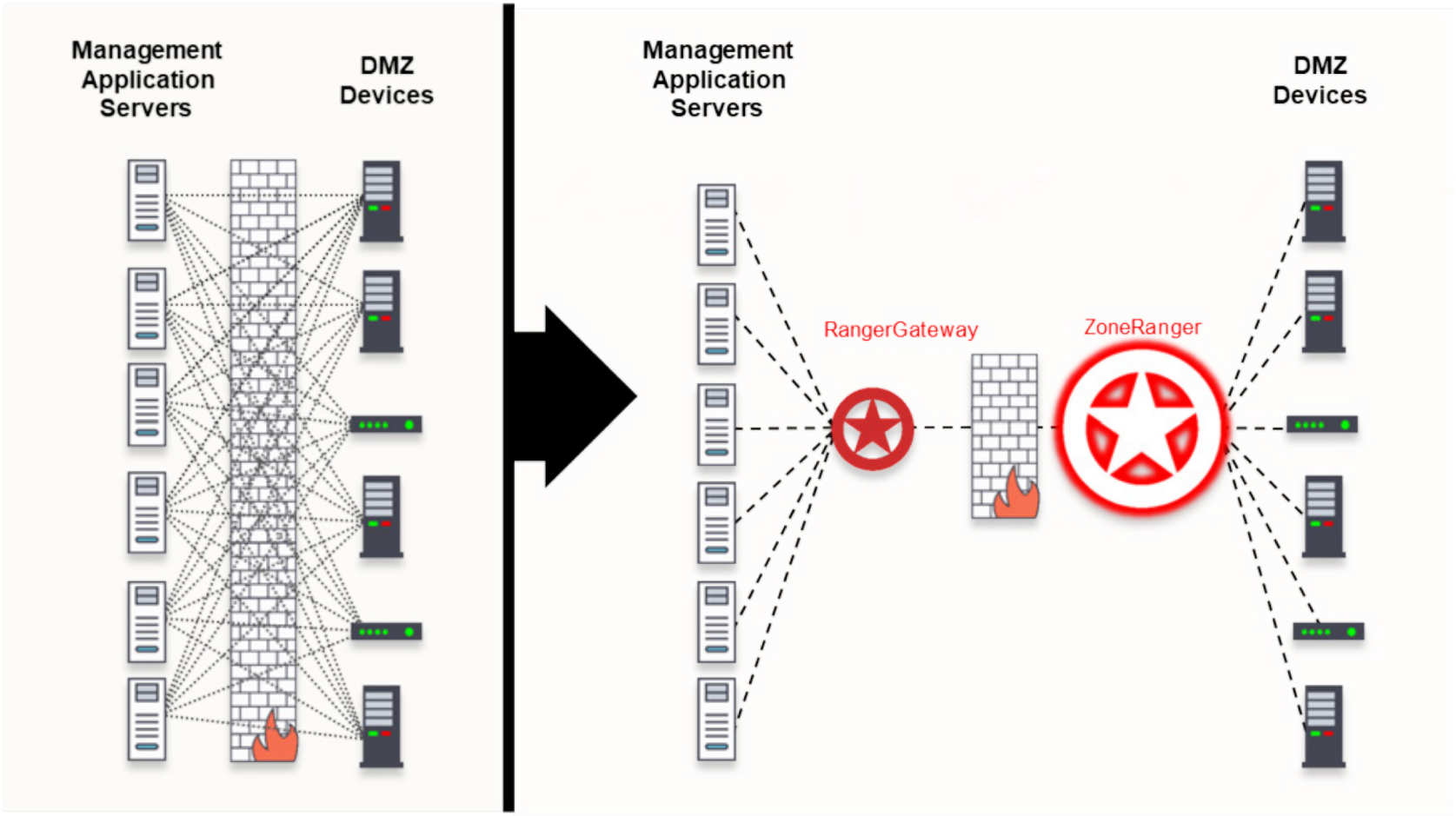
Complete Security and Management Stacks Before Deploying Applications



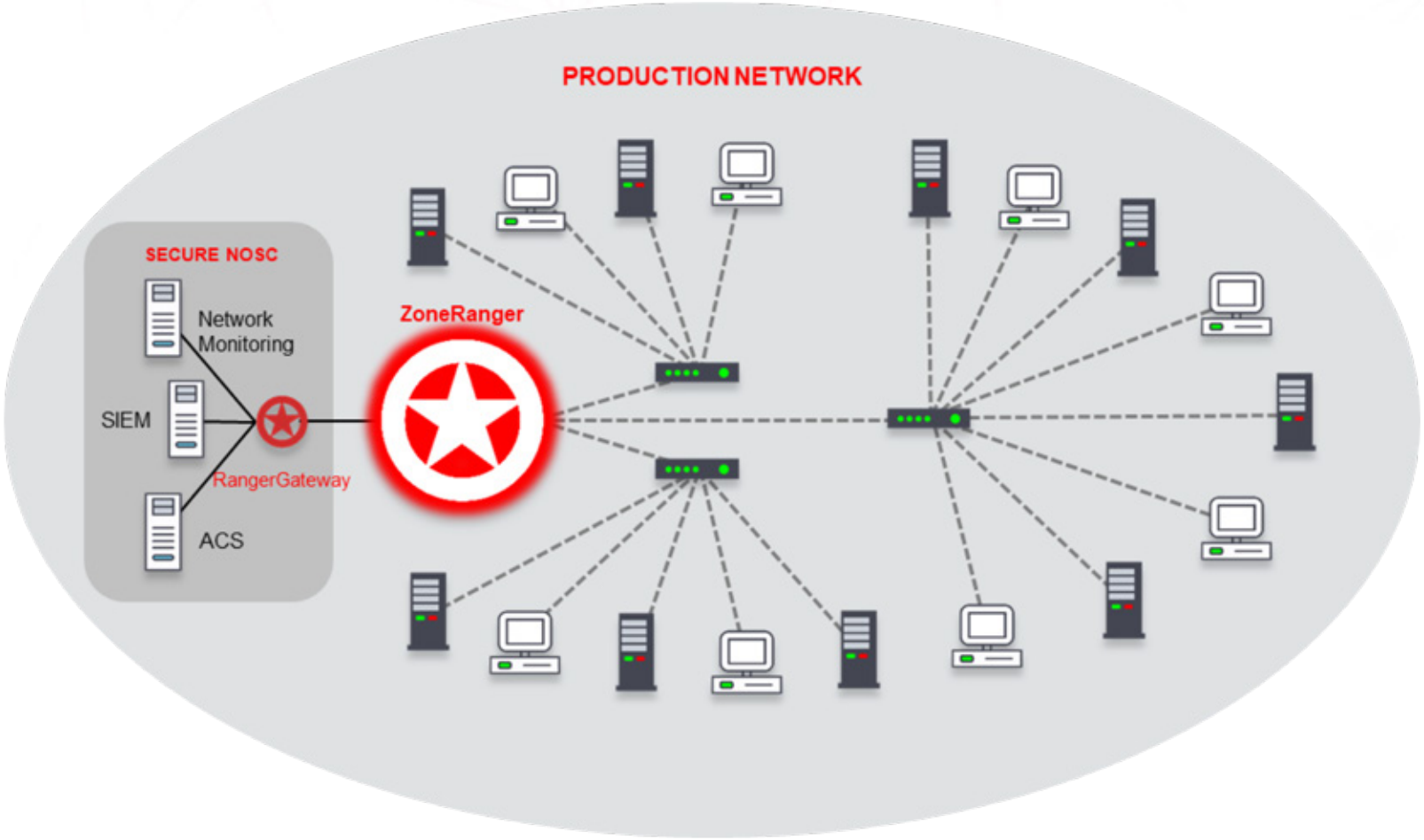
# Simplify IT Command & Control

## IT Management Proxies

- Collapses firewall openings
- Removes firewall CAB decisions when making changes in IT Management
- Extend continuous monitoring to all enclaves, including log files
- Centralize 2FA management



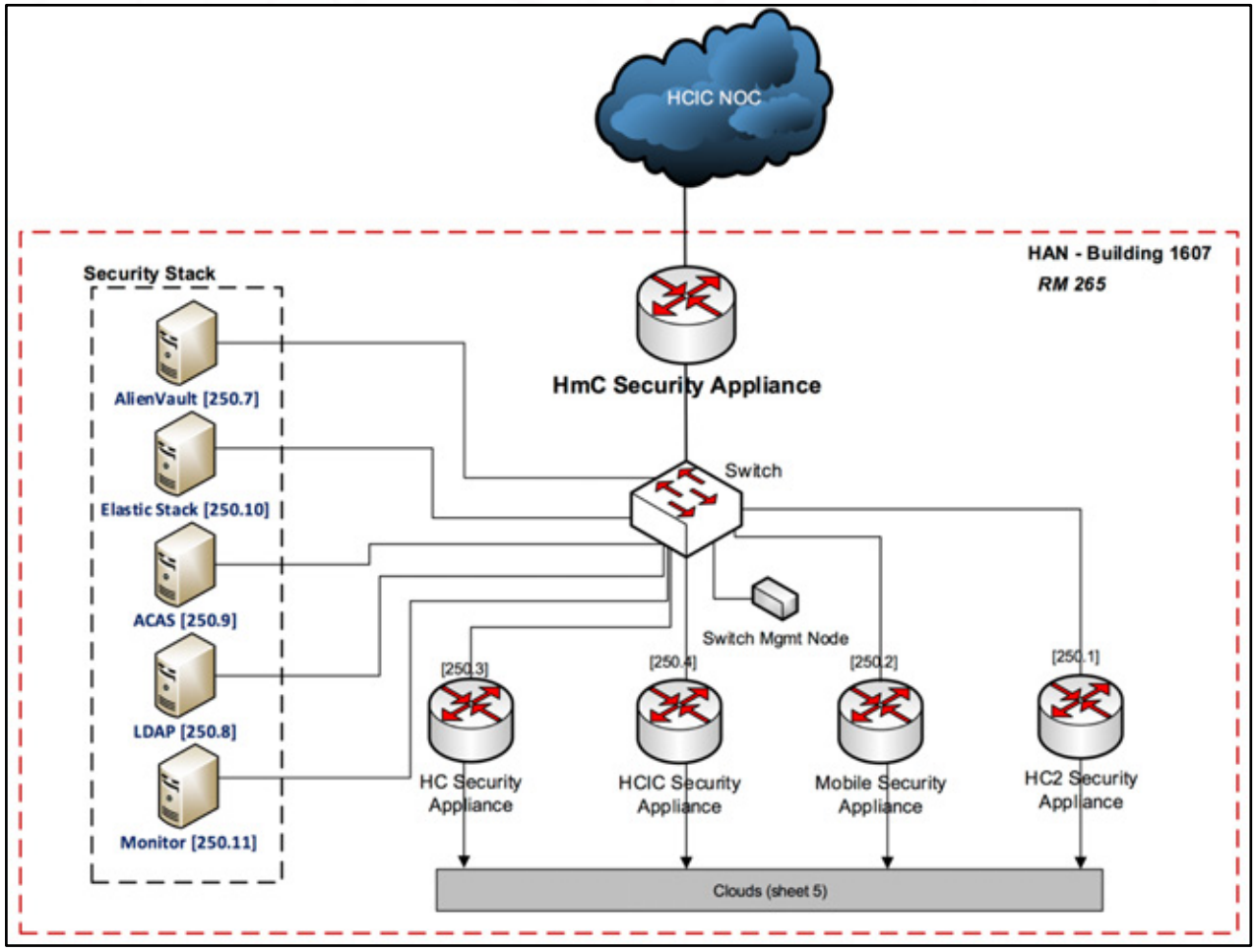
# Secure IT Command & Control




- Secure IT Command & Control across multiple enclaves
- Restrict management consoles to physically secure environments
- Simplify ACL management

IT Management Proxies deployed as Management Application Proxies

# HmC Security Stack




- Intrusion Detection System (IDS)
- Intrusion Protection System (IPS)
- Security Information and Event Management (SIEM)
  - includes crowd-sourced rules engine
- Vulnerability scanning
- Log aggregation & analytics
- Automated alarms and alerts
- System monitoring
  - resources, performance

HmC has demonstrated automating both virtual and physical security appliances

# HmC Automated Security

- Baked into design & execution
- Application quality
- Configuration discipline & management
- Source Code Analysis
- Industry Best Practice Lockdown
- Vulnerability Scans
- Penetration Testing
- Patch Management
- Policy Enforcement
- Monitoring Configuration & Analysis
- Entire Ecosystem into Design
- Validate Alternatives in Real Time

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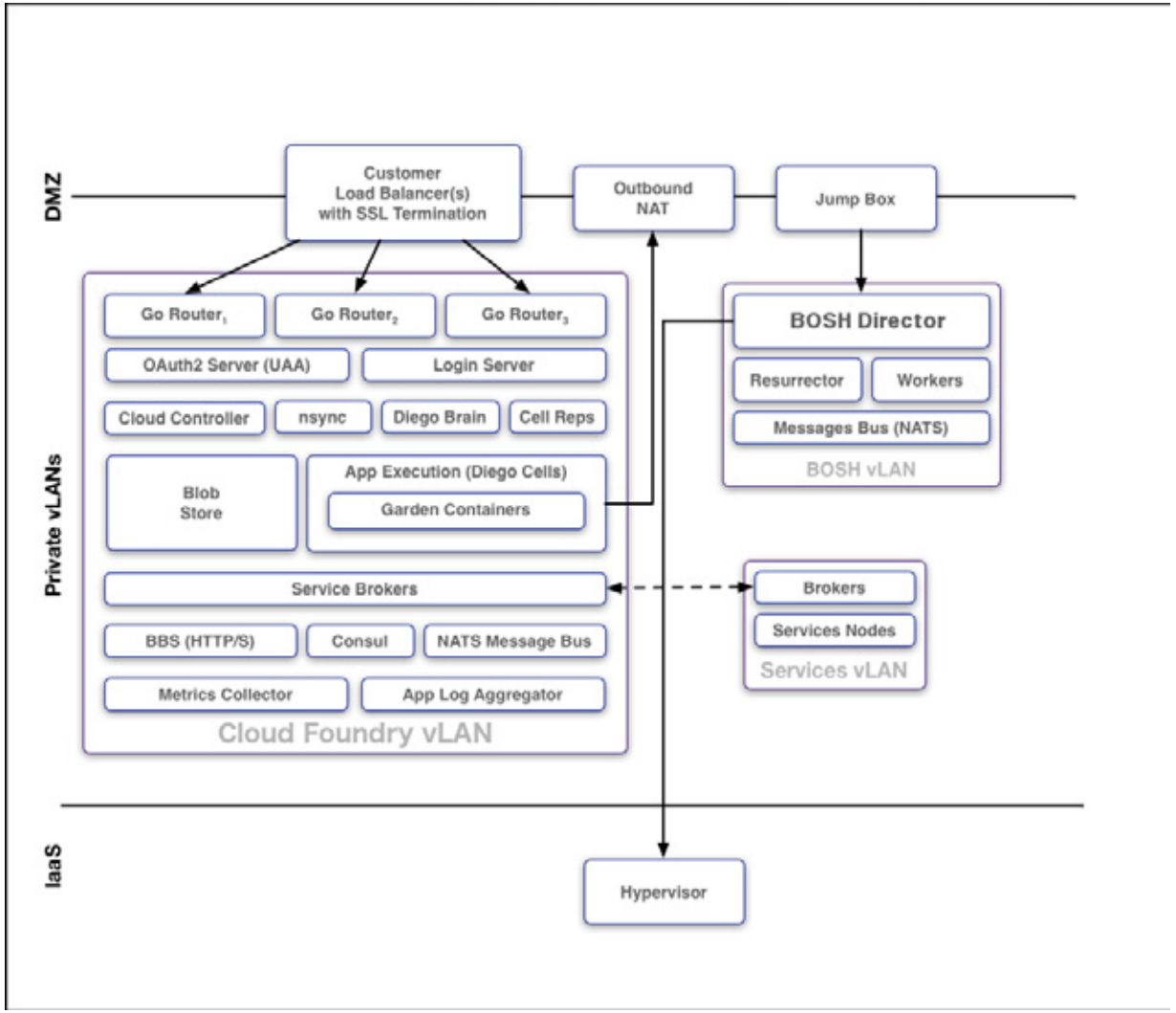
# Pivotal Cloud Foundry Security

## Cloud Native Security

## Repair | Repave | Rotate

- Minimize network surface area
- Encrypt connections
- Isolate applications and data in containers
- Role based access control



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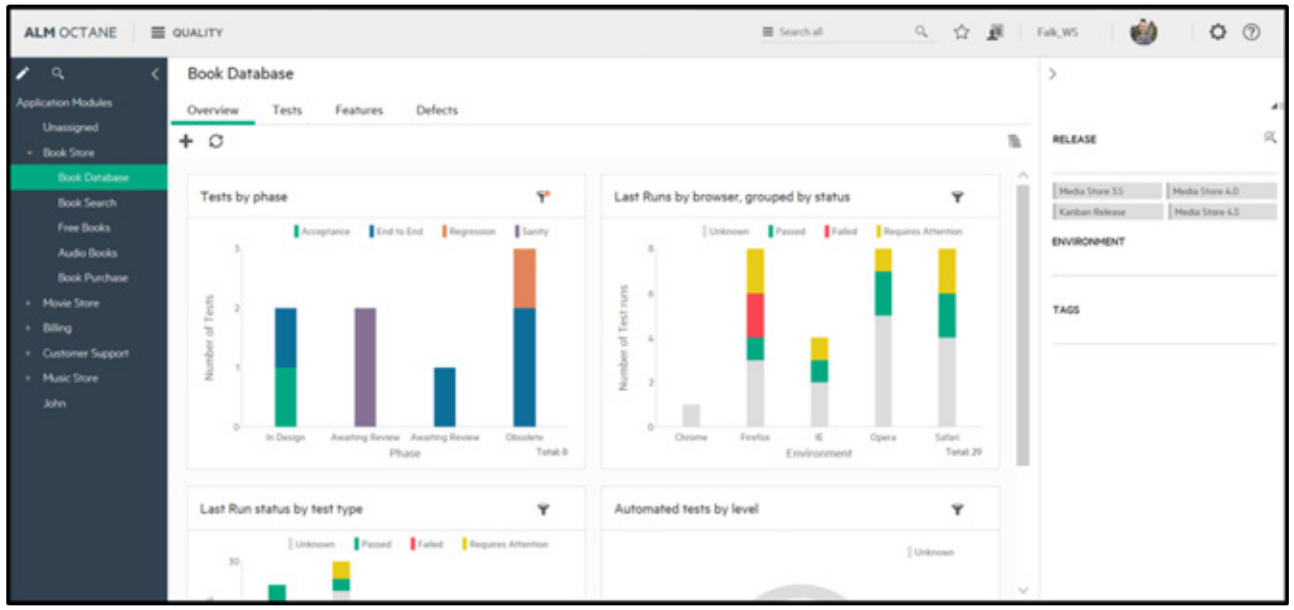
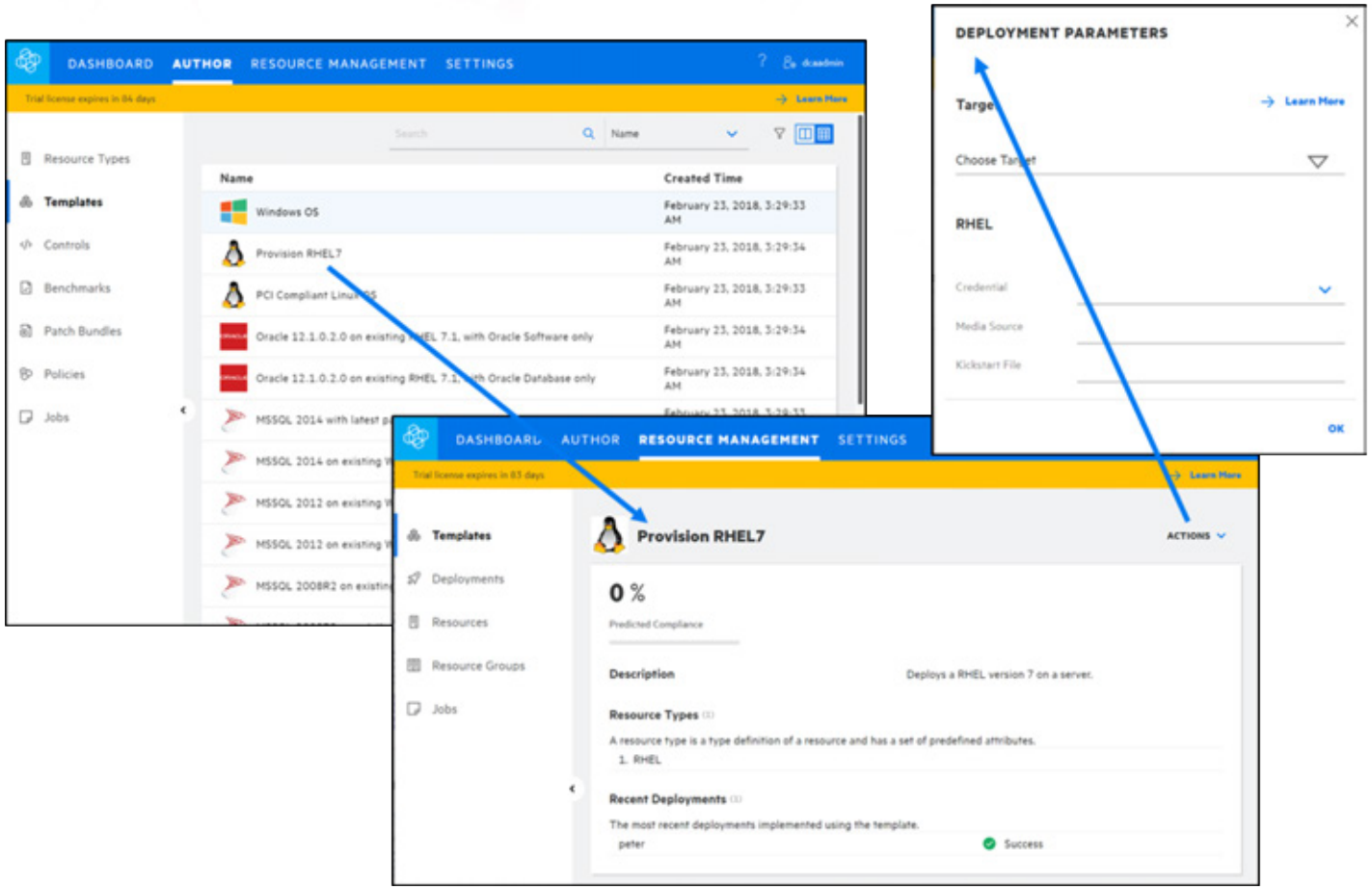
# Automated Testing From Day 1




Functional | Load | Security

- Test early & often
- Safe automation requires test and development environments
- Optimal use case for cloud computing – stand up and spin down
- Fire drill test environment first
- Testing is foundational for TDD and CICD

# Deploy Application in Secured Enclave

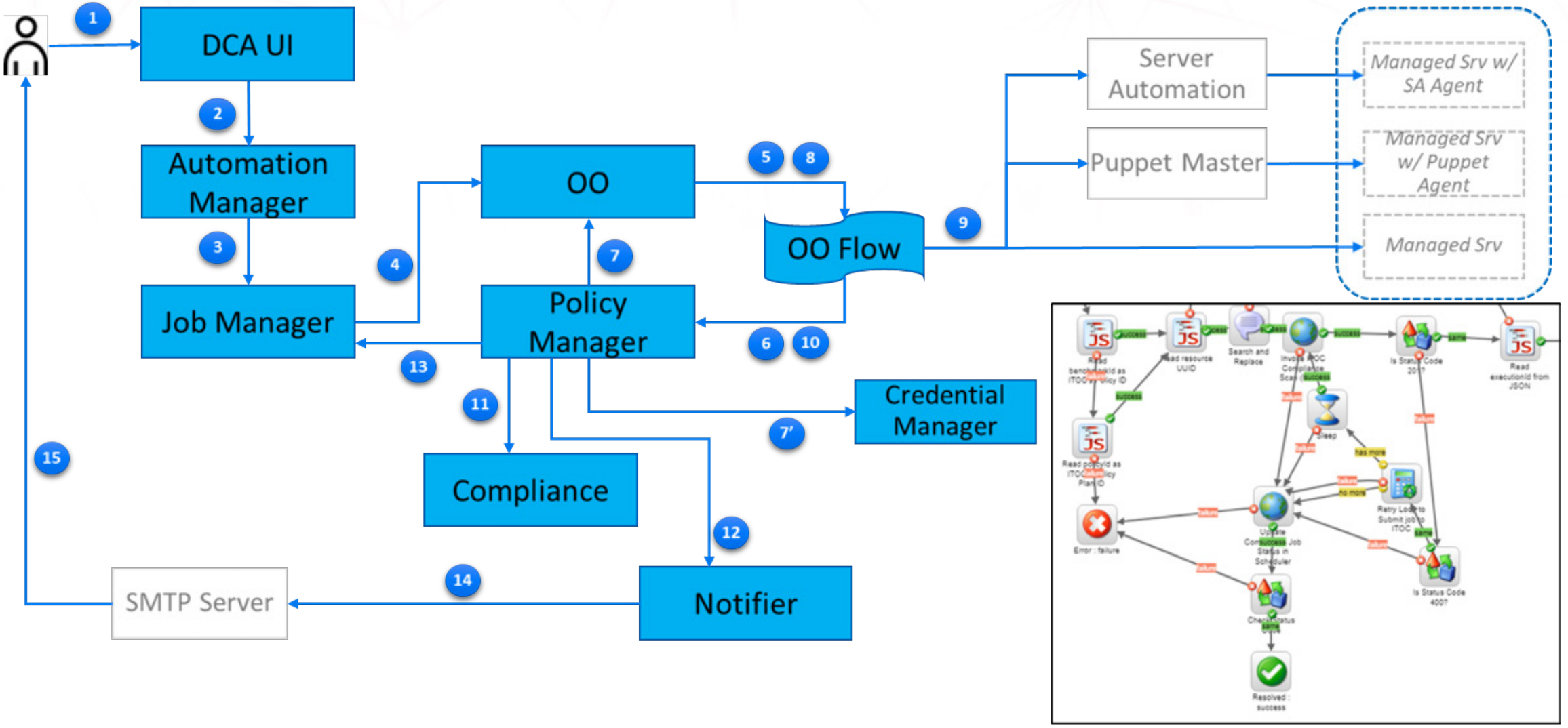



Orchestration driven network, server, and application automation

Leverage available automation tools such as

- Chef
- CONS3RT
- Nutanix Calm
- Micro Focus Data Center Automation
- Pivotal Cloud Foundry Concourse
- Puppet
- VMware vRealize Automation
- Windows System Center

# Automate Patch & Compliance



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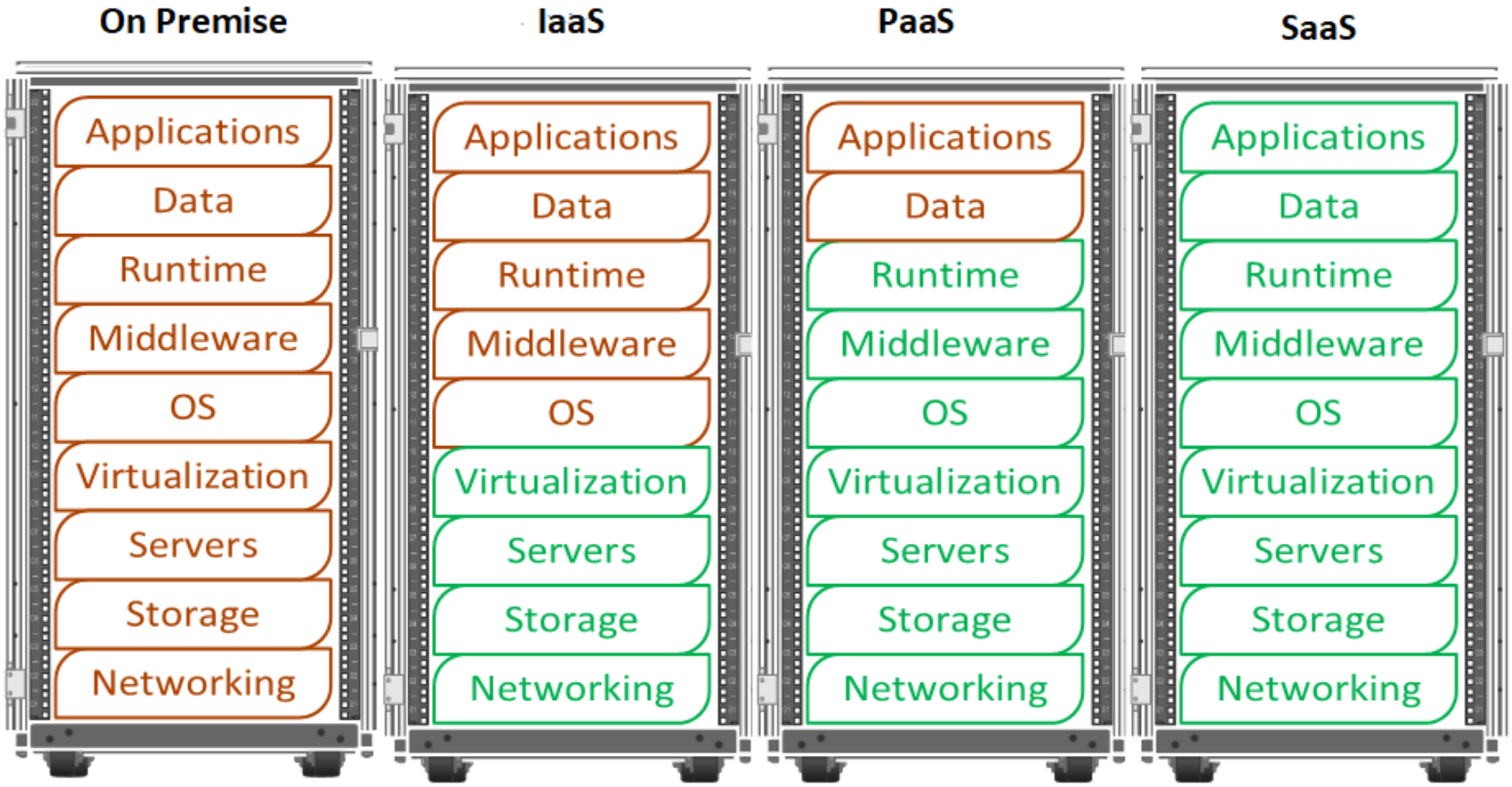
# Standardize Everything "Below the Code"

- Quicker time to field capabilities
- Reduce cost
- Fewer Errors
- Significant cost avoidance opportunities



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# PaaS Examples

- Platform examples
  - Docker Enterprise Edition
  - Microsoft Universal Windows Platform
  - Pivotal Cloud Foundry
  - Red Hat JBoss Middleware Application Platform, Openshift
  - ServiceNow
- Self hosted PaaS / Application Platform
  - Maximum flexibility
  - More resource intensive – people and equipment
- Self managed PaaS / hosted IaaS
  - HmC – IaaS with automation and orchestration
  - Still people resource intensive
- Hosted PaaS
  - Allows focus on the code, maximum return on people investment
  - Pivotal Cloud Foundry
  - ServiceNow

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# More Information

## Containers

https://training.play-with-docker.com/ - free, self-paced with labs

https://www.edx.org/school/red-hat - free MOOC, $99 for certification

## HmC

Jackpine hosts regular HmC 101, 201, and 301 lunch and learns via DCS and join.me

## Openshift

https://learn.openshift.com/ - free online, self-paced with pre-configured Openshift instance

# Way Forward

- Brutally honest evaluation of organizational capacity
- Begin by leveraging available automation tools in your environment
- Identify your gaps in automated testing; current Air Force requirements include static and dynamic code security analysis
- Pick one security function or application to start, preferably on the small side
- Not every solution is suited for every situation
- Continue the conversation with industry and peers

Jeff Hart
jeff.hart@m2ti.com
202.595.1917