Operations for the Modern Data Centre

Ansible, Satellite and Red Hat Insights

Chris Milsted
Principal Solutions Architect, FSI, Red Hat
UK
cmilsted@redhat.com

Disclaimer

The content set forth herein is Red Hat confidential information and does not constitute in any way a binding or legal agreement or impose any legal obligation or duty on Red Hat.

This information is provided for discussion purposes only and is subject to change for any or no reason

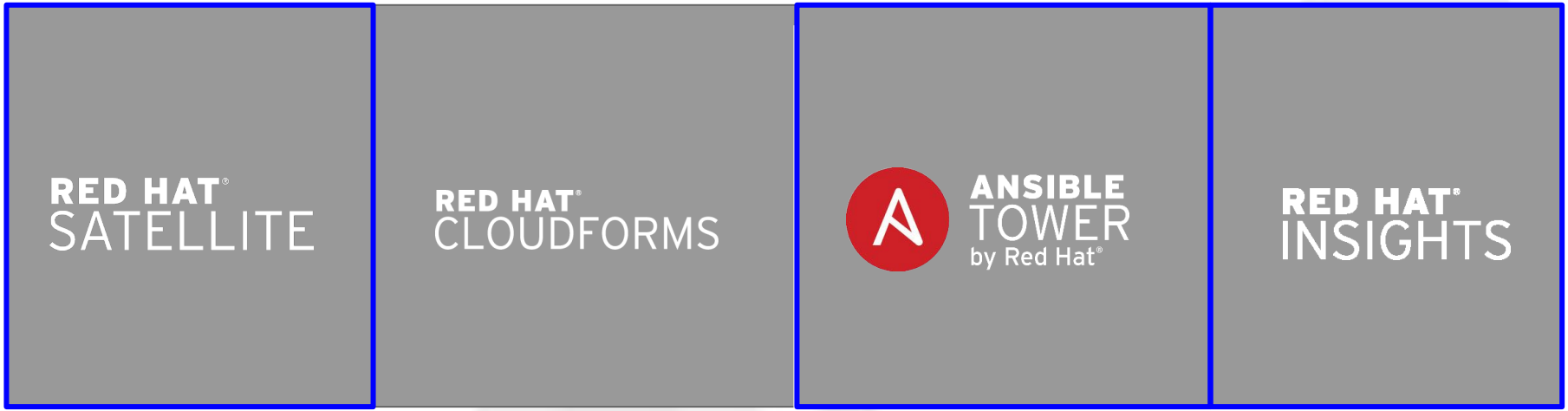
Agenda

- Red Hat Management
- Problem statement
- Walk through past operation patterns
- Proposed operational pattern
- Summary and key takeaways

Red Hat Overview

Security and Management

Focus for today



Operations needs to evolve

Operations for Next Generation I.T.

- Information Technology has evolved; it is no longer considered a cost-centre and is now a key aspect in competitive differentiation.

- Digital Disruption is impacting almost every industry, new digital technologies are being used to disrupt existing business models.

- To succeed we need to deliver:
  - Applications faster to market
  - End to End automation to deliver iterative developments quickly and error free
  - Integrations to emerging technology to take advantage of changes such as Hybrid Cloud.
  - **All of the above without increasing our costs…..**

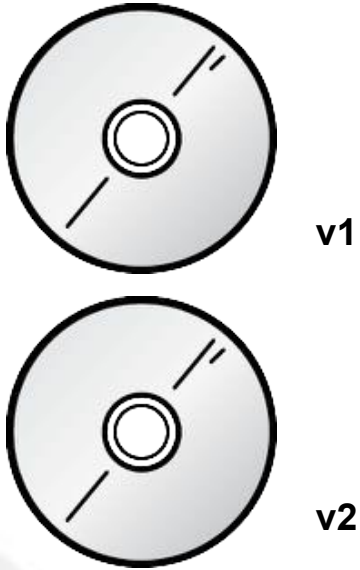
A look back at the past - building snowflakes

Gold Builds, monthly patch-sets.

- Gold build created
- V1 becomes basis for all servers
- Used for circa 6 months

- V2 created
- New servers build from V2
- New snowflake every day

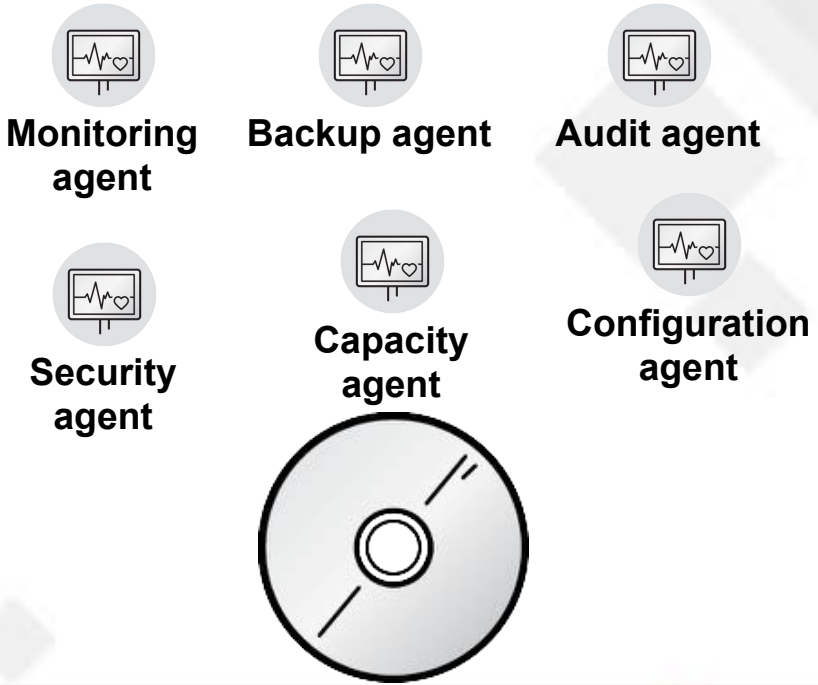
- Is V1 ever patched?



How did we Operate the servers?

The rise of the “agent”

- Agents have proliferated
- Different teams demand their own
- Agents all have lifecycles
- Agents consume resources



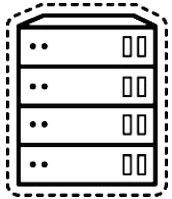
Compare this to containers

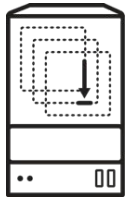
Immutable infrastructure

RED HAT ATOMIC

Application Delivery also driving changes. Microservices, containers and immutability

Business demands ever greater pace of change - micro-services and containers assist



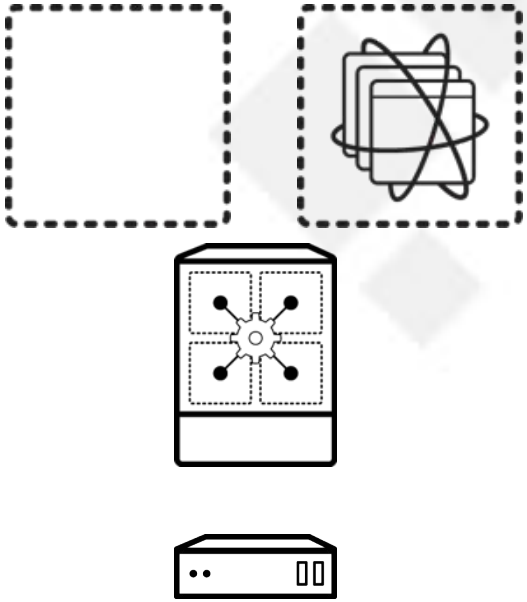


1 physical server	10 Virtual Machines	100 Containers
1 Monolithic application	1 application - 10 environments	1 app in 100 pieces
Health = binary	Health = binary	Health = complex

Containers - what does the end state look like

Container hosts, System containers and Application containers

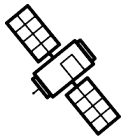
- **Containers**:
  - System containers - container services (e.g. log collection)
  - Application containers - applications or microservices
- **Container orchestration** - delivered via system containers.
- **Container host**



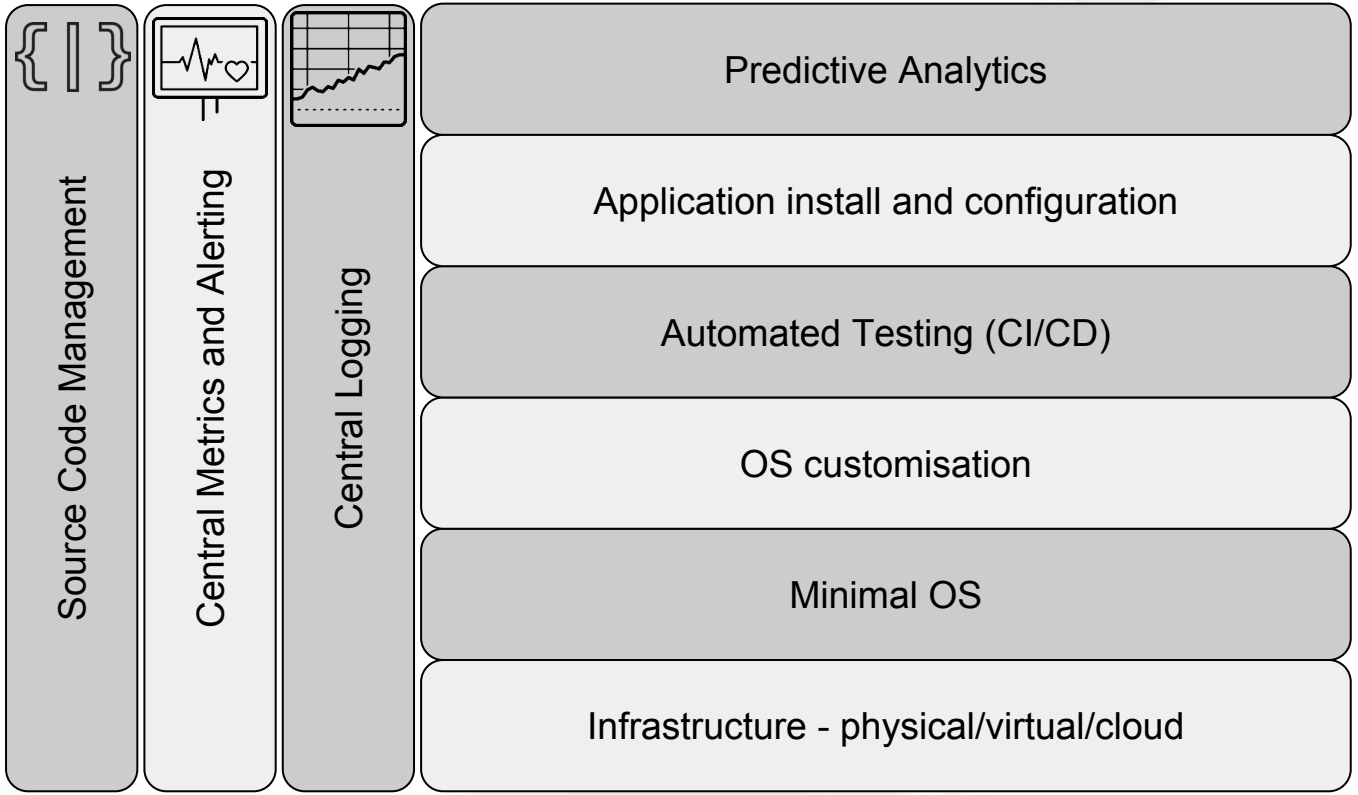
Mapping container thinking to legacy

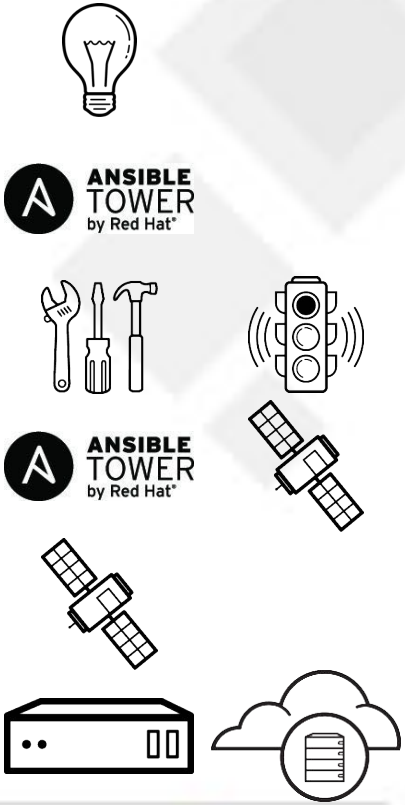
How do we need to change our thinking?

- Configuration as code - stored in Source Code Management tool.
  - Build Config - stored as code. Static information.
  - Specific config - depends on variables discovered (ip address)
  - Application configuration (dev/test/prod specifics)
- Automated deployment and (depending on life span of system) patching
  - OS + Build Config.
- Simple, Agentless, Powerful automation for configuration
  - Applies latest configuration to builds or built systems
- Automated testing tools
  - Repeatability

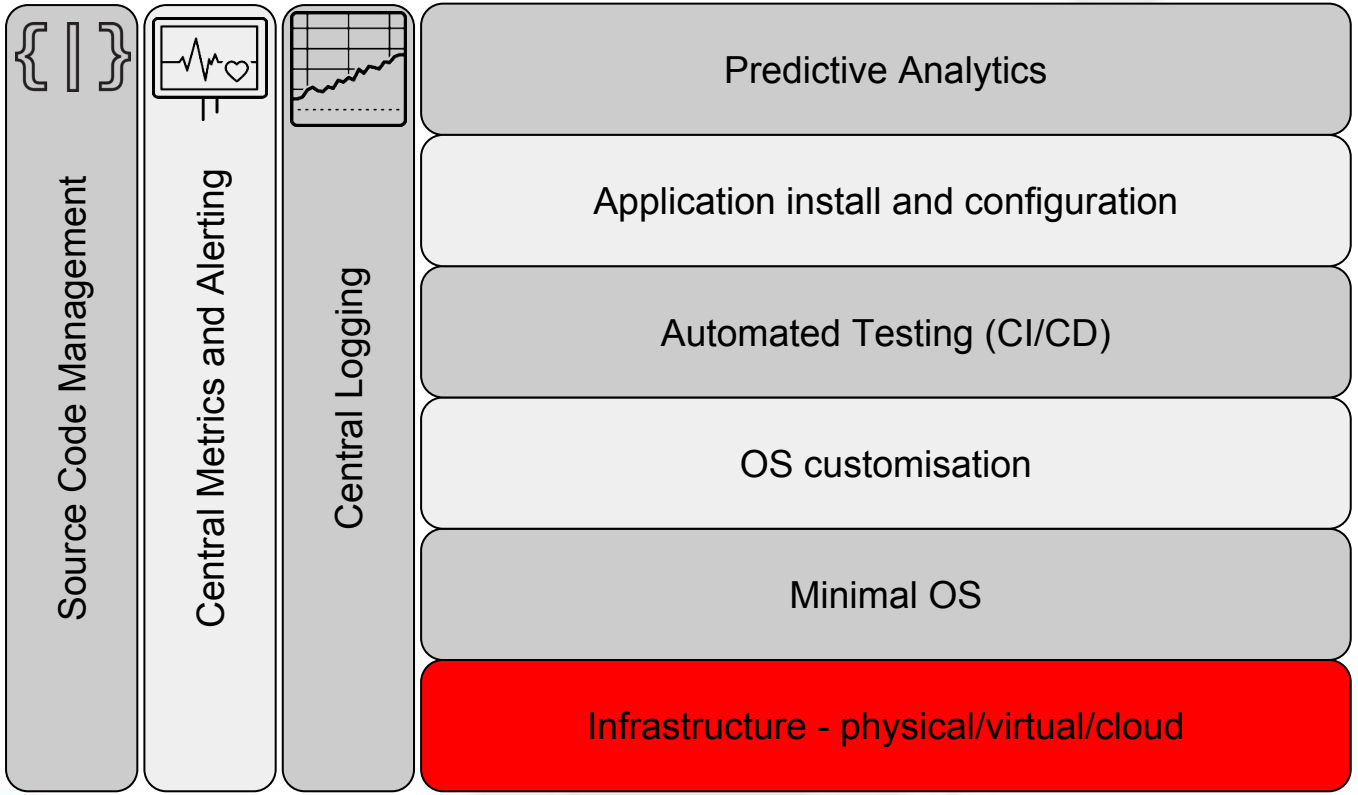


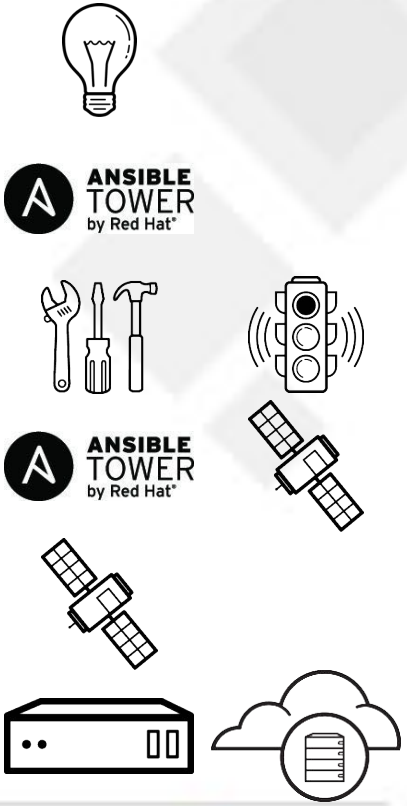
Layers with the Red Hat tooling mapped





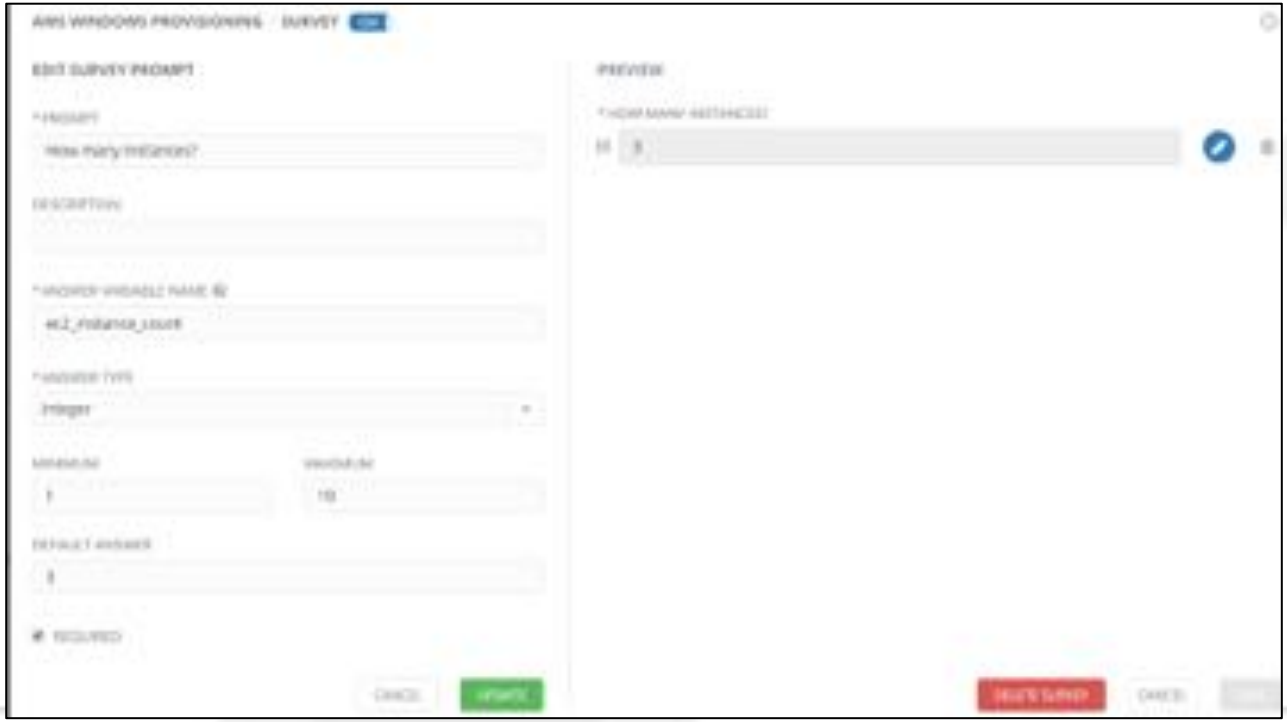
Layers and tooling





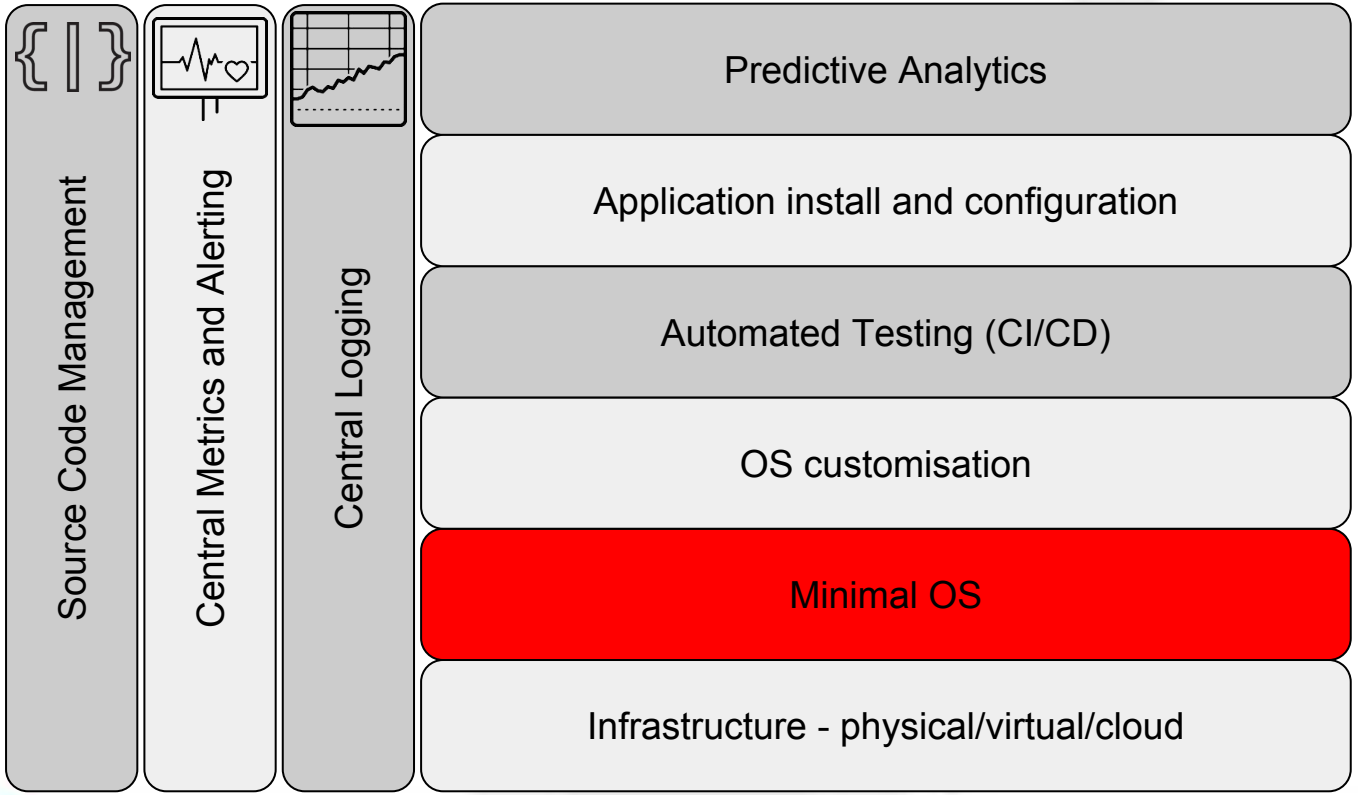
Walkthrough lifecycle of a system

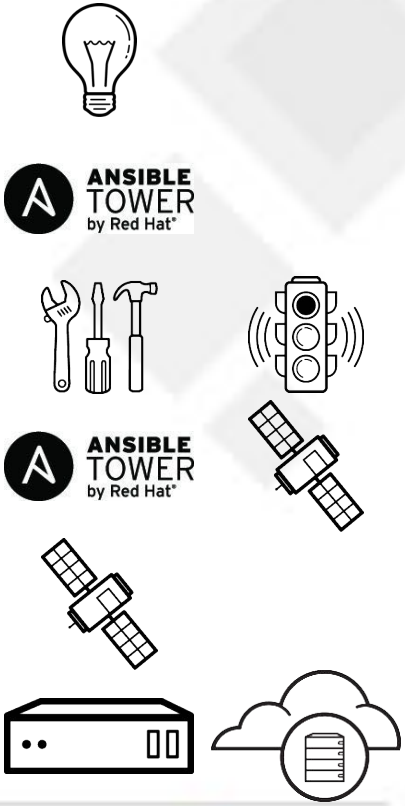
1. Deploy Build - use Tower and playbooks from Ansible



https://github.com/smapjb/ansible-examples/blob/master/windows/windaws/aws_prov.yml

Layers and tooling

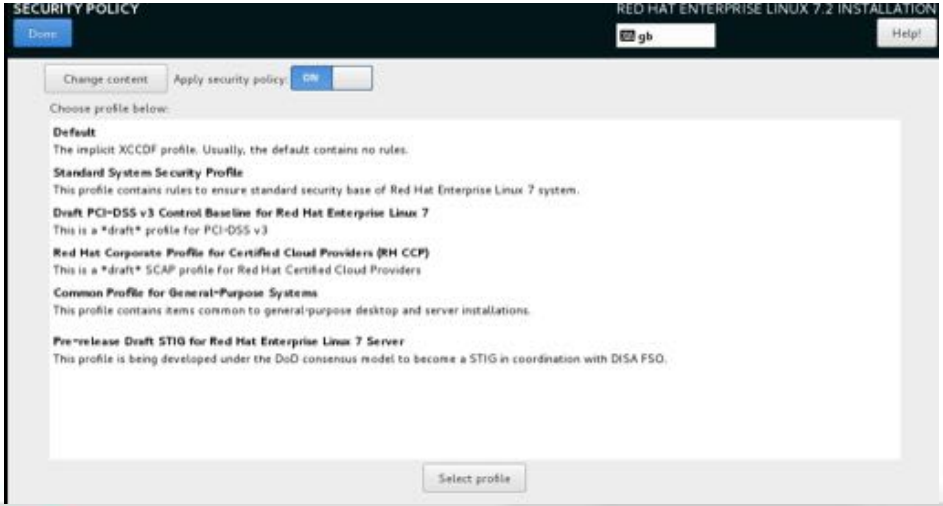




Walkthrough lifecycle of a system

2. Build gold build - use Satellite and configuration tool of choice (inbuilt puppet or Tower)

- Kickstart
- Generate “all base formats”



Walkthrough lifecycle of a system

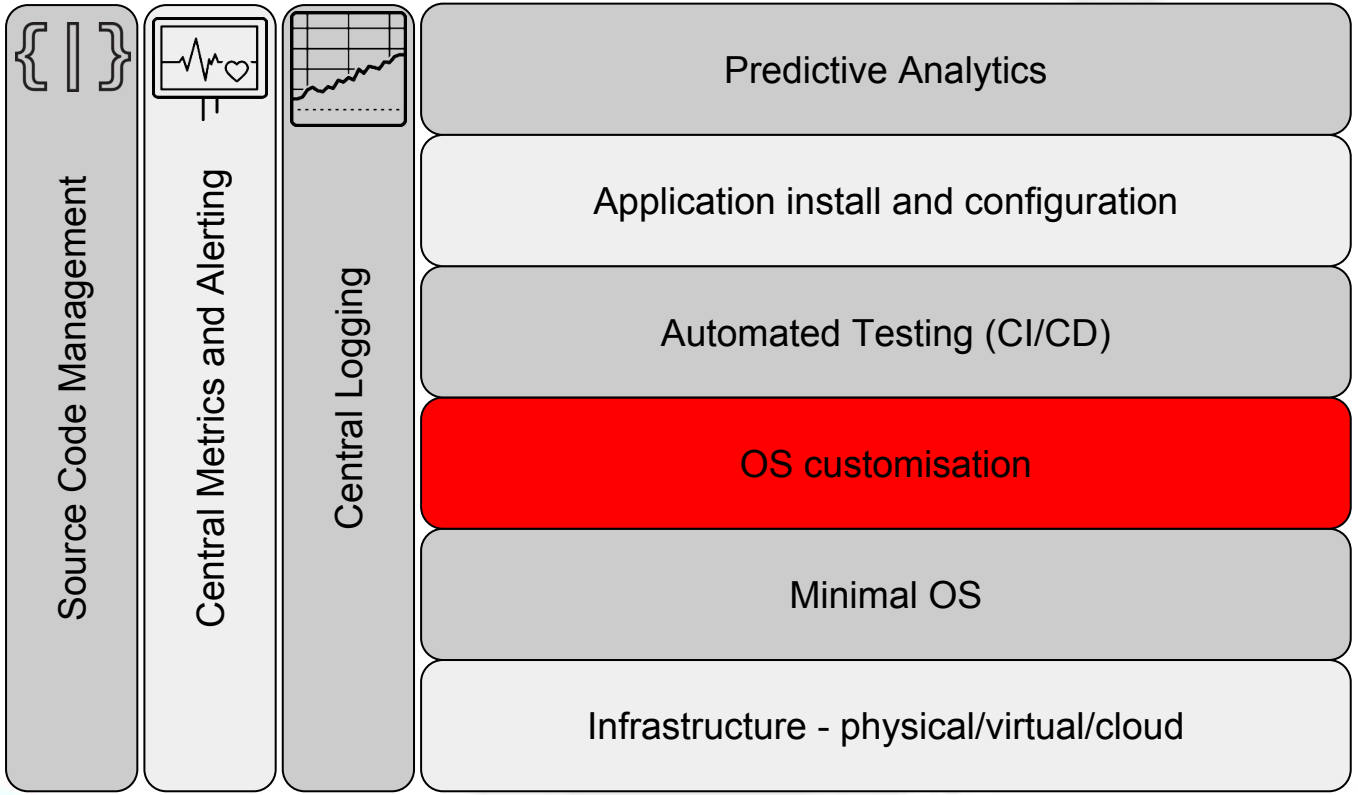
Bonus points - using callbacks to configure OS. Credit Maxim Burgerhout.

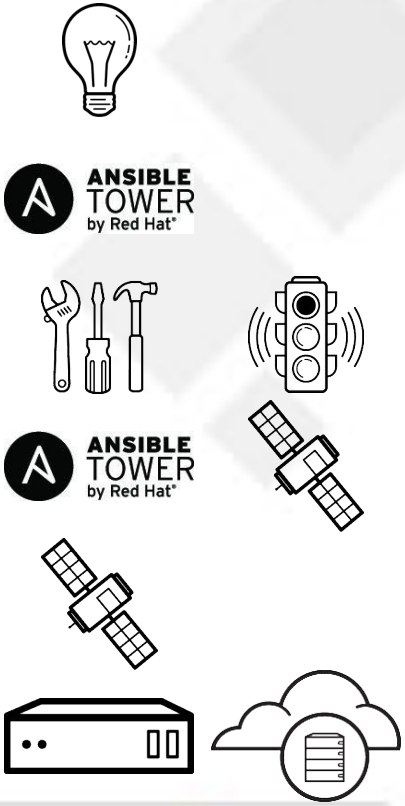
1. Add to Kickstart (below)
2. Define snippet (right)
3. Set variable “ansible_enabled=true”

```
# Using systemd will make this not work on RHEL5 and RHEL6

<% if @host.params['ansible_enabled'] == 'true' %>
cat > /etc/systemd/system/ansible-callback.service << EOF
<%= snippet 'ansible_callback_service' %>
EOF


# Runs during first boot, removes itself
/usr/bin/systemctl enable ansible-callback
<% end -%>
```

```
[Unit]
Description=Provisioning callback to Ansible
Wants=network-online.target
After=network-online.target

[Service]
Type=oneshot
ExecStart=/usr/bin/curl -k -s --data
"host_config_key=$HOST_CONFIG_KEY"
https://$YOUR_TOWER_HOSTNAME/api/v1/job_templates/$JOB_TEM
PLATE_ID/callback/
ExecStartPost=/usr/bin/systemctl disable ansible-callback

[Install]
WantedBy=multi-user.target
```

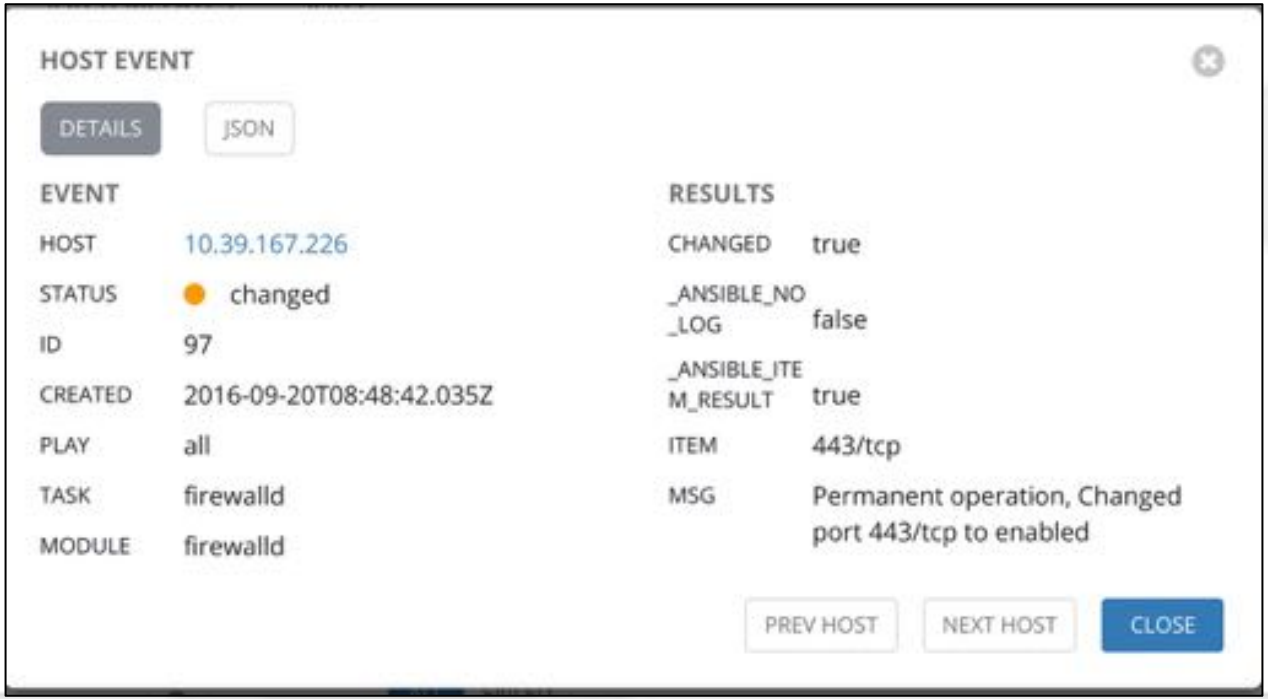
Layers and tooling





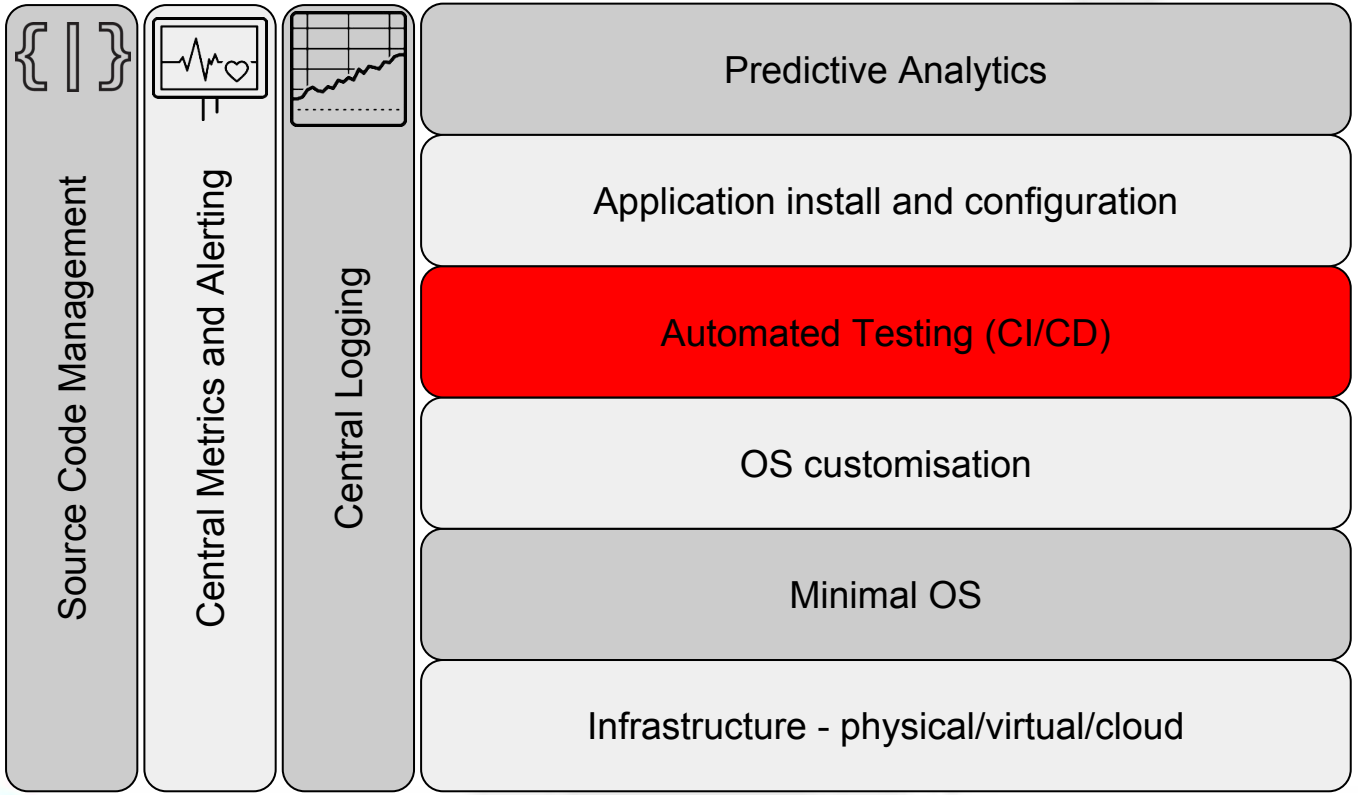
Walkthrough lifecycle of a system

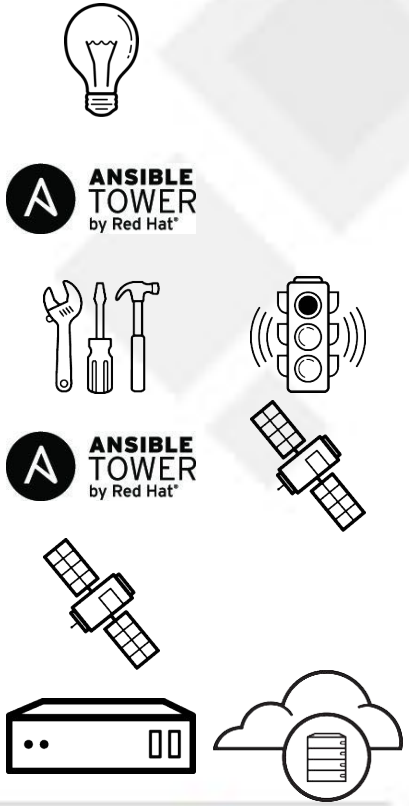
3. OS Customisations - check firewall, ntp etc. all setup



https://github.com/ffirg/ansible/blob/master/first-checks.yml

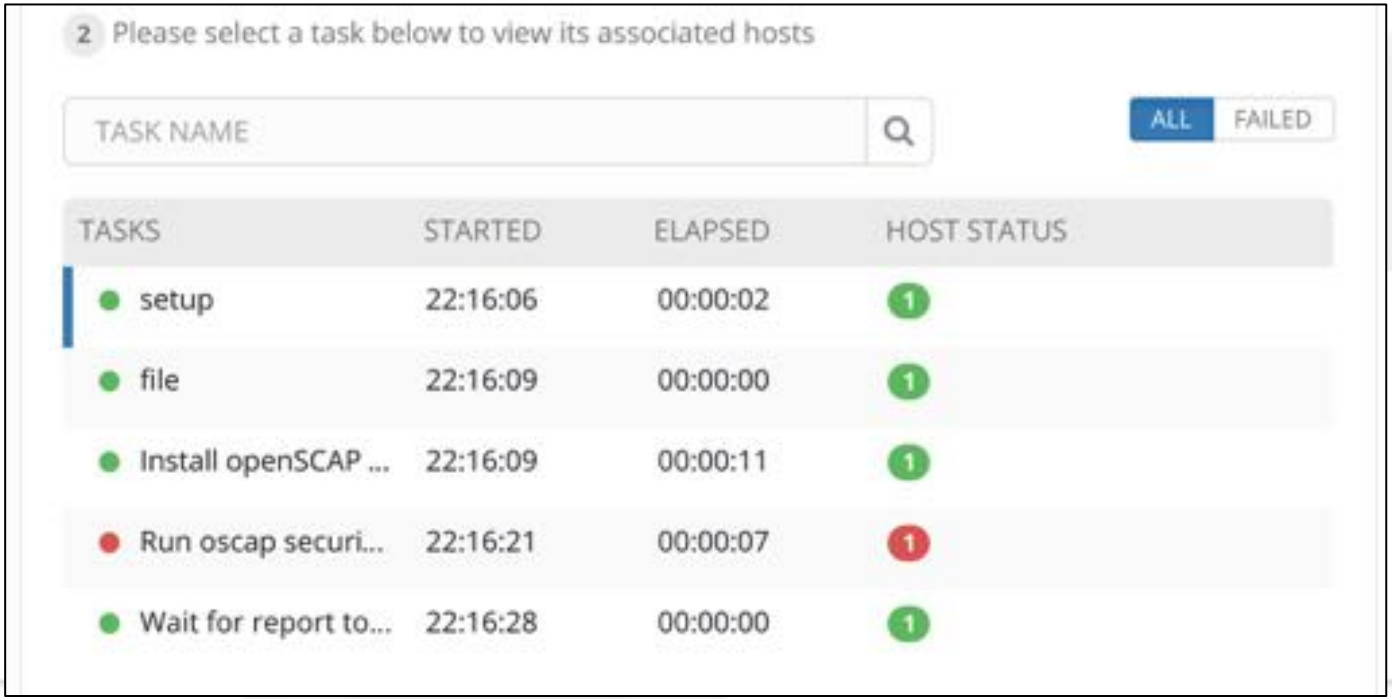
Layers and tooling





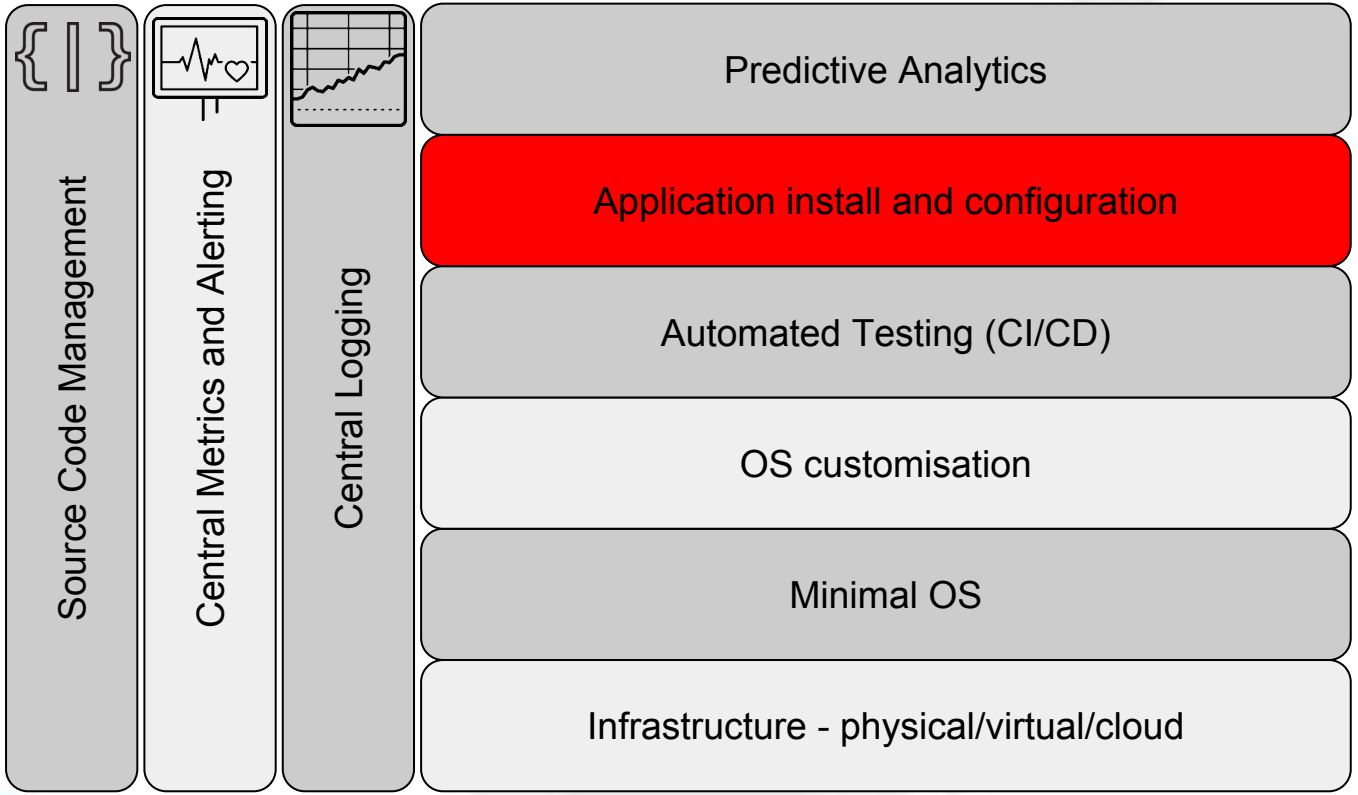
Walkthrough lifecycle of a system

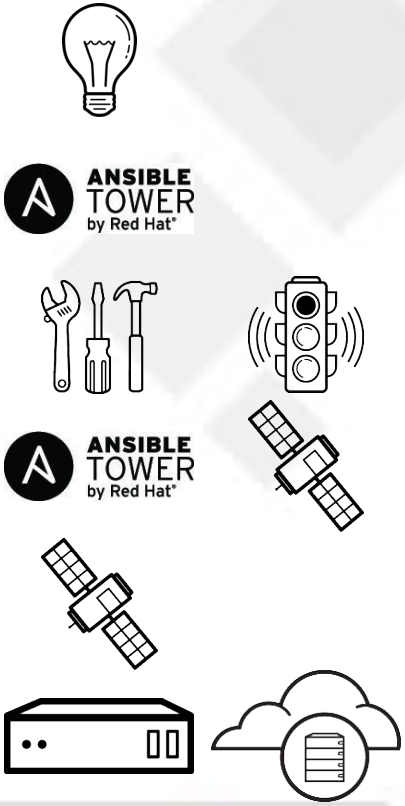
4. Automated testing - for example scan for PCI-DSS Security compliance



https://github.com/ffirg/ansible/blob/master/security/openSCAP-report.yml

Layers and tooling



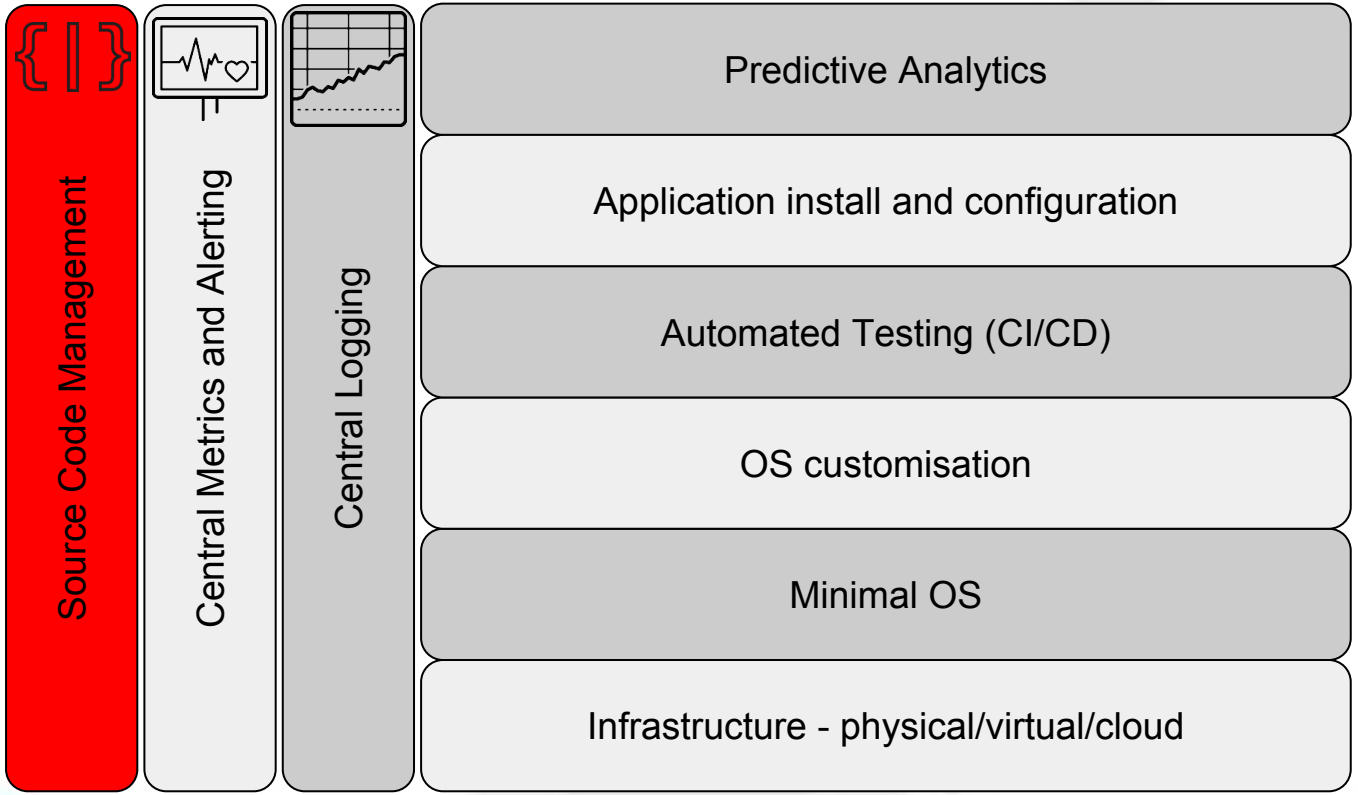


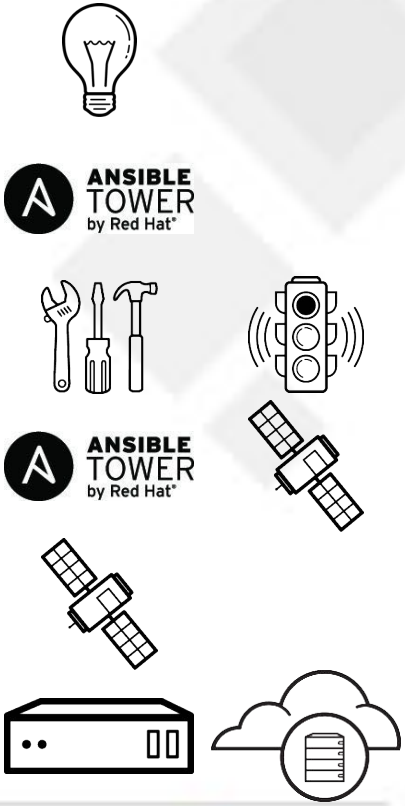
Application install and configuration

5. Application deployment

```
---
- name: install and start apache
  hosts: all
  vars:
    http_port: 80
    max_clients: 200
  remote_user: root

  tasks:
  - name: install httpd
    yum: pkg=httpd state=latest
  - name: write the apache config file
    template: src=/srv/httpd.j2 dest=/etc/httpd.conf
  - name: start httpd
    service: name=httpd state=running
```

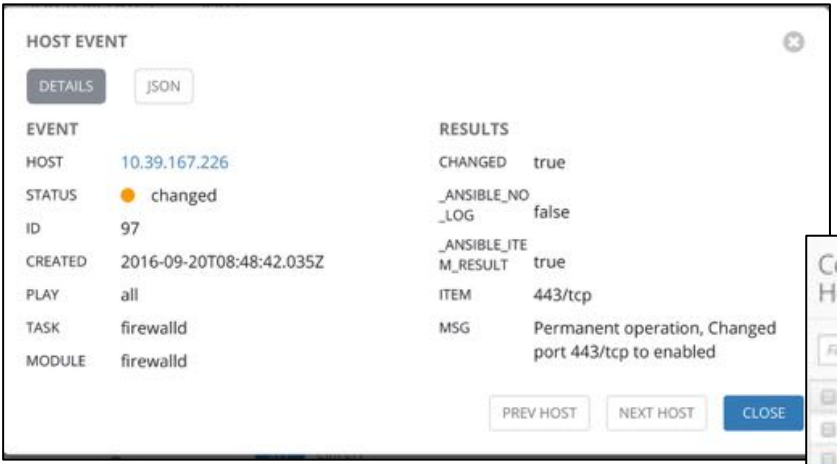
Layers and tooling

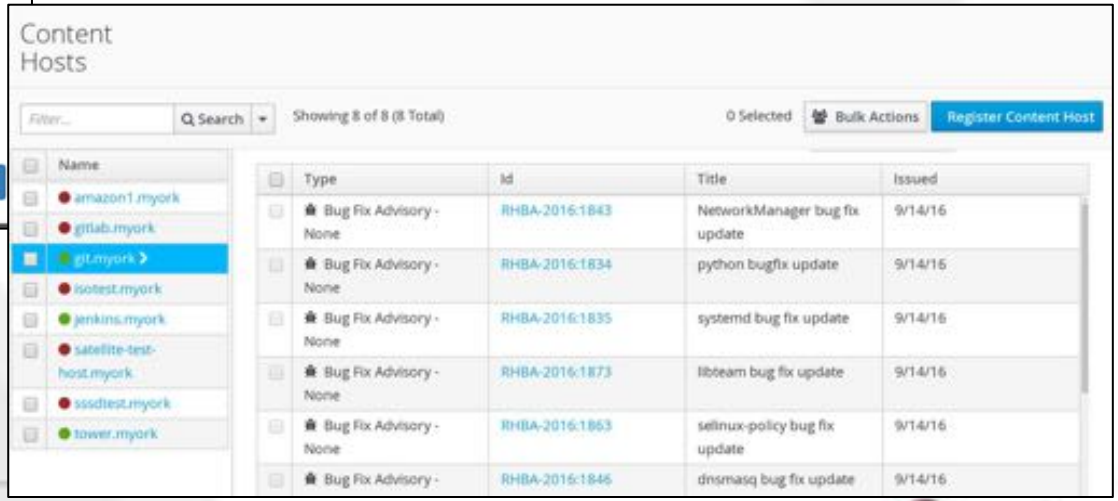




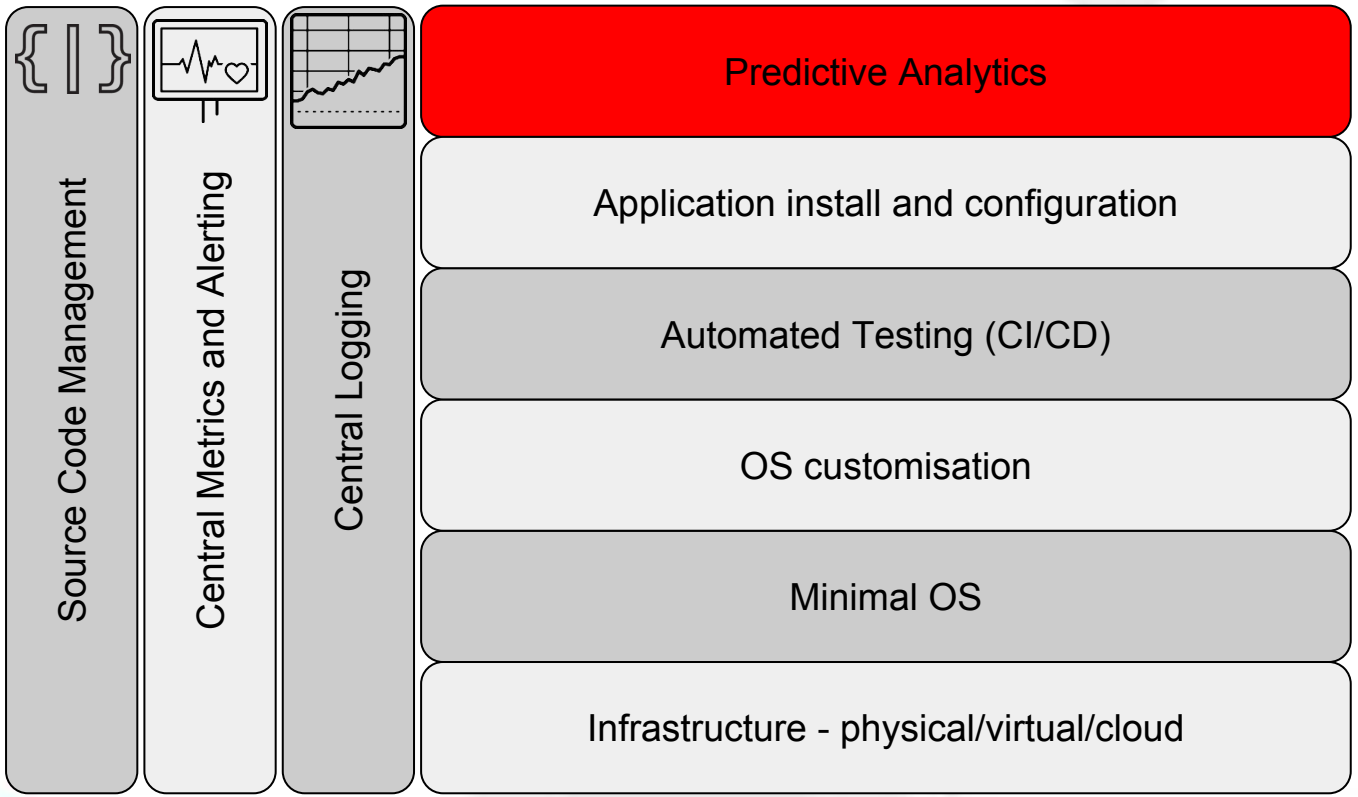
Optional step - errata and patching

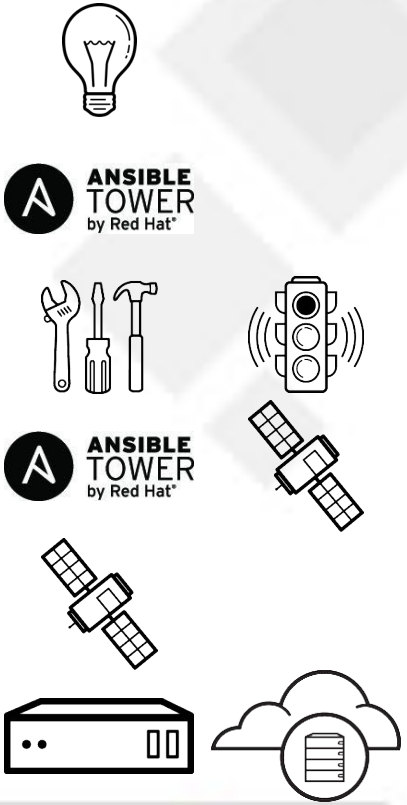
If long lived; need to keep re-applying the most recent configuration





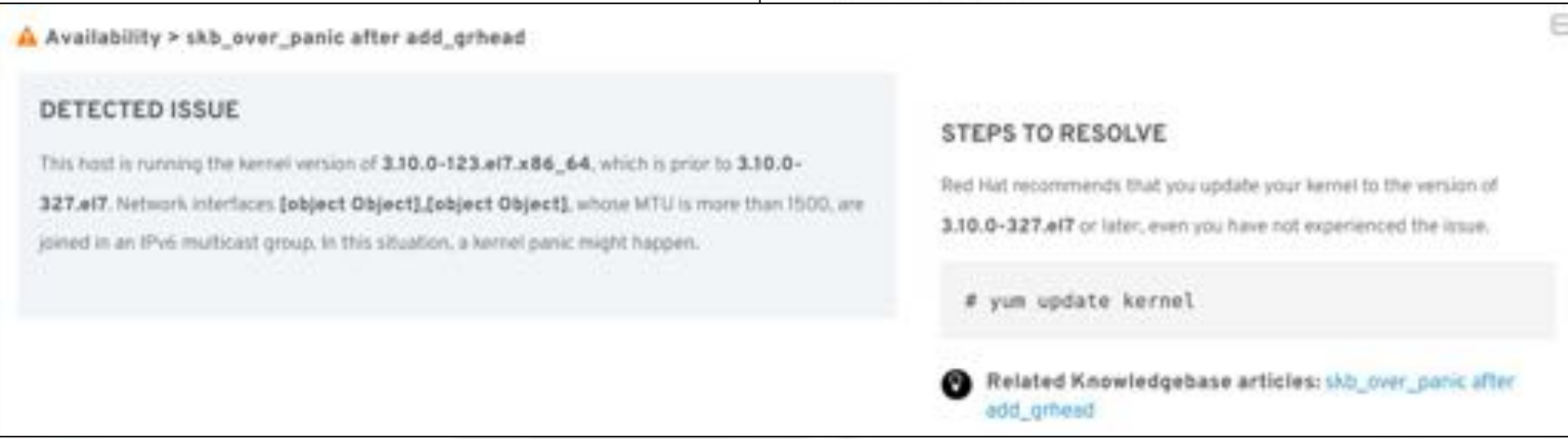
Layers and tooling





Predictive Analytics

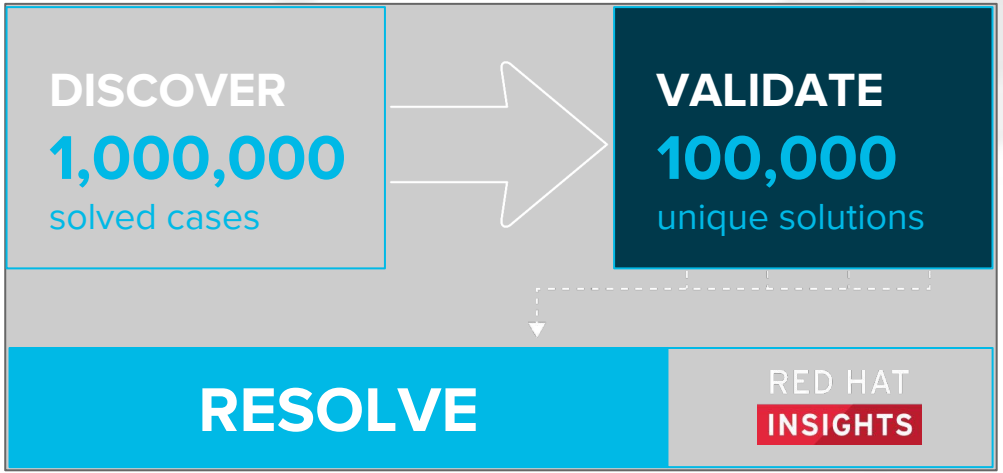
6. Find issues before they happen



https://access.redhat.com/insights/inventory

Insights

Resolve critical issues before they occur



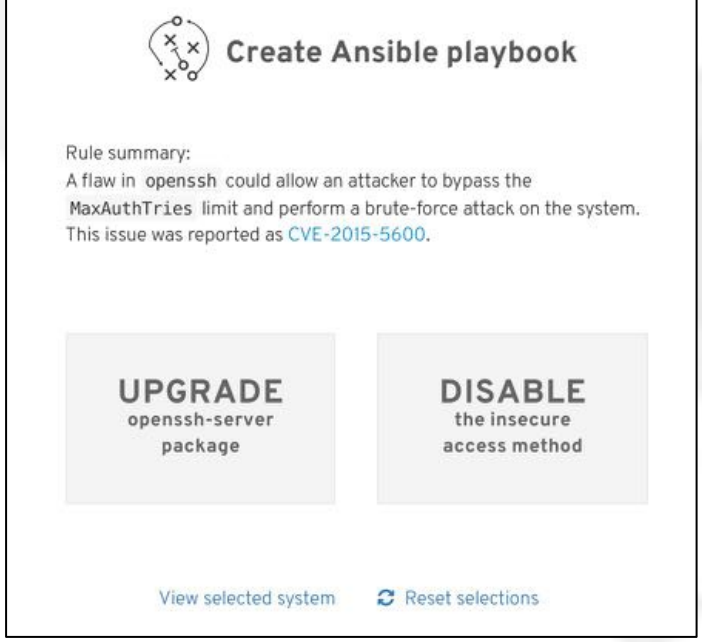
1. What happened?
    a. Descriptive
2. Why did it happen?
    a. Diagnostic
3. What will happen?
    a. Predictive
4. How can we prevent/cause it to happen?
    a. Prescriptive

Insights beta and future

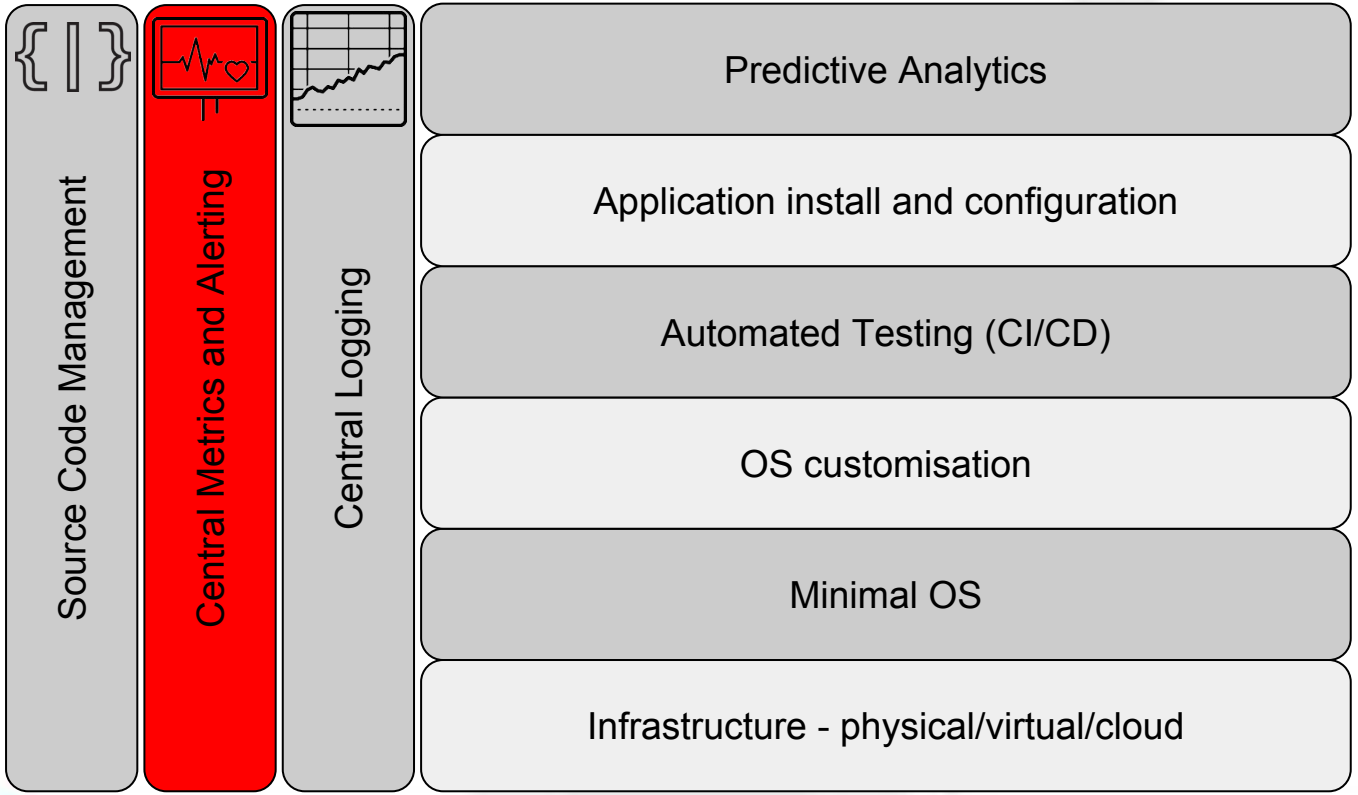
Beta and beyond

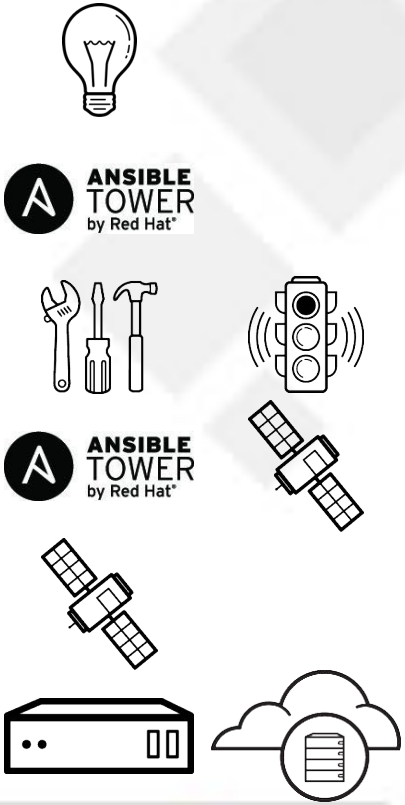
More Red Hat technologies

Automated Ansible playbooks to remediate



Layers and tooling



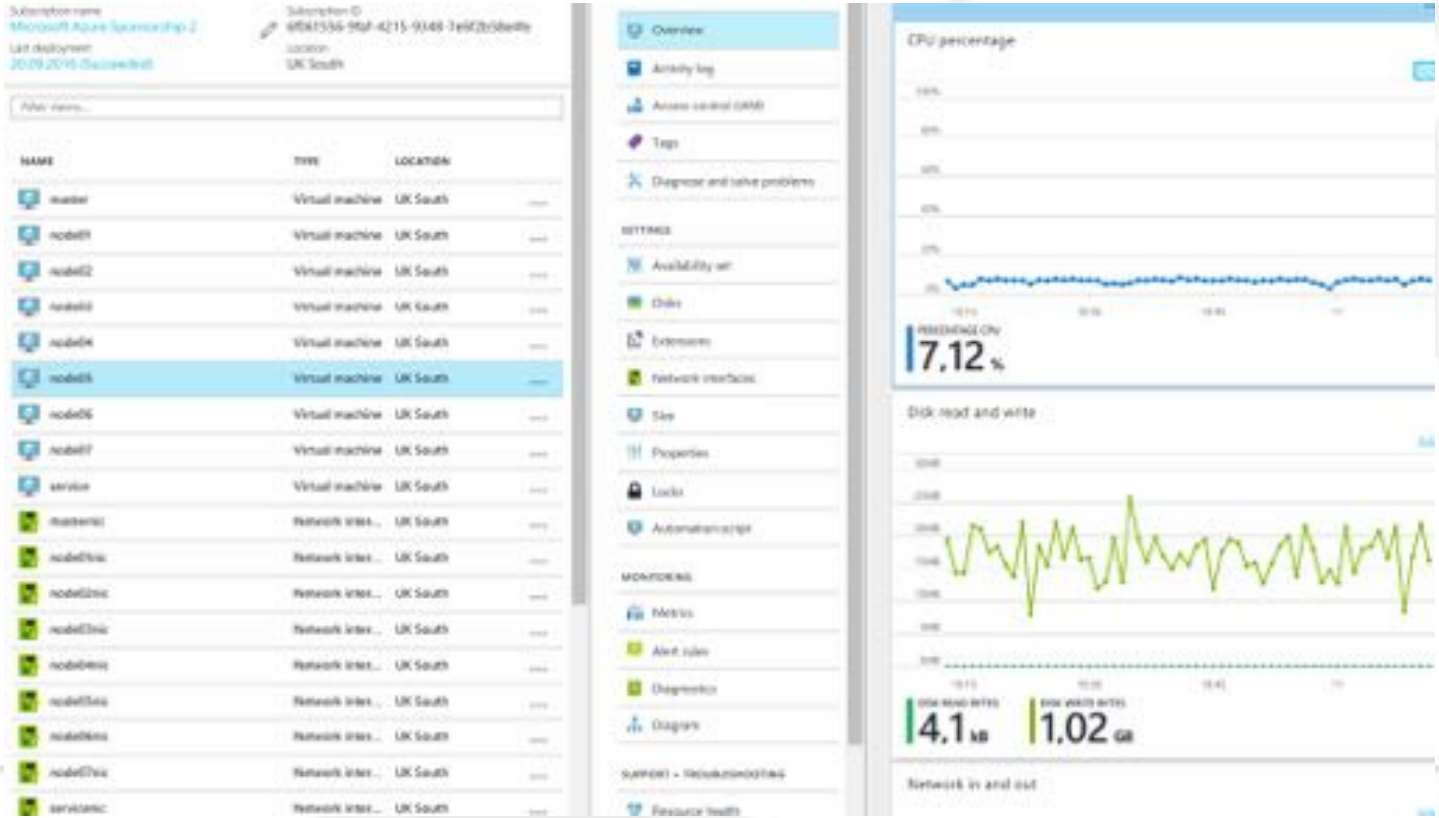


Metrics - Cloud approaches

Unified collection

- Platforms such as Azure and AWS - use hypervisor or single agent to provide common collection framework.
- So we should think about the data we wish to collect, and use a single source.
- Different requirements should process this data in different ways:
    - Real time security - stream data through real-time decision engine (Apache Spark like). For example - real time alerts for failed logins.
    - Batch oriented question - run through batch processing engine (Apache Hadoop like). For example - what are the new errors we see in logs to investigate.

Keynote demo - metrics from the “cloud”



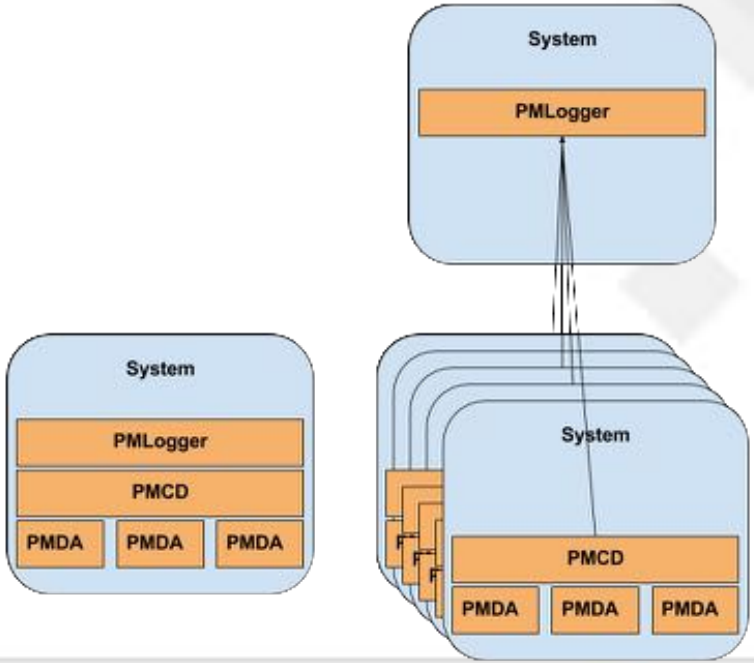
Performance Co-Pilot deployments

Sample Architectures - fully supported performance daemon in RHEL

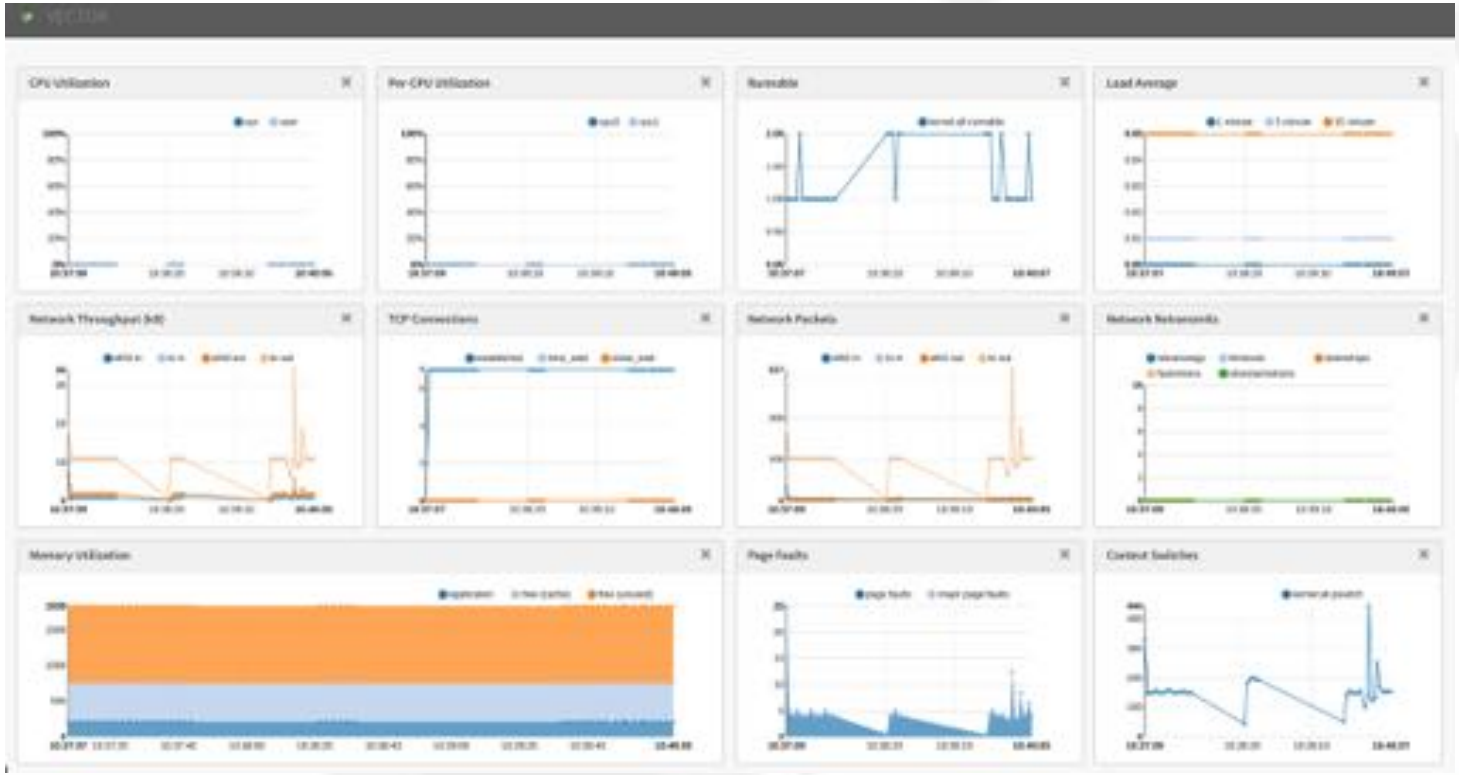
PMDA - Performance Monitor Domain Agent; responds with metrics when queried.

PMCD - Performance Metrics Collector Daemon; collects PMDA metrics.

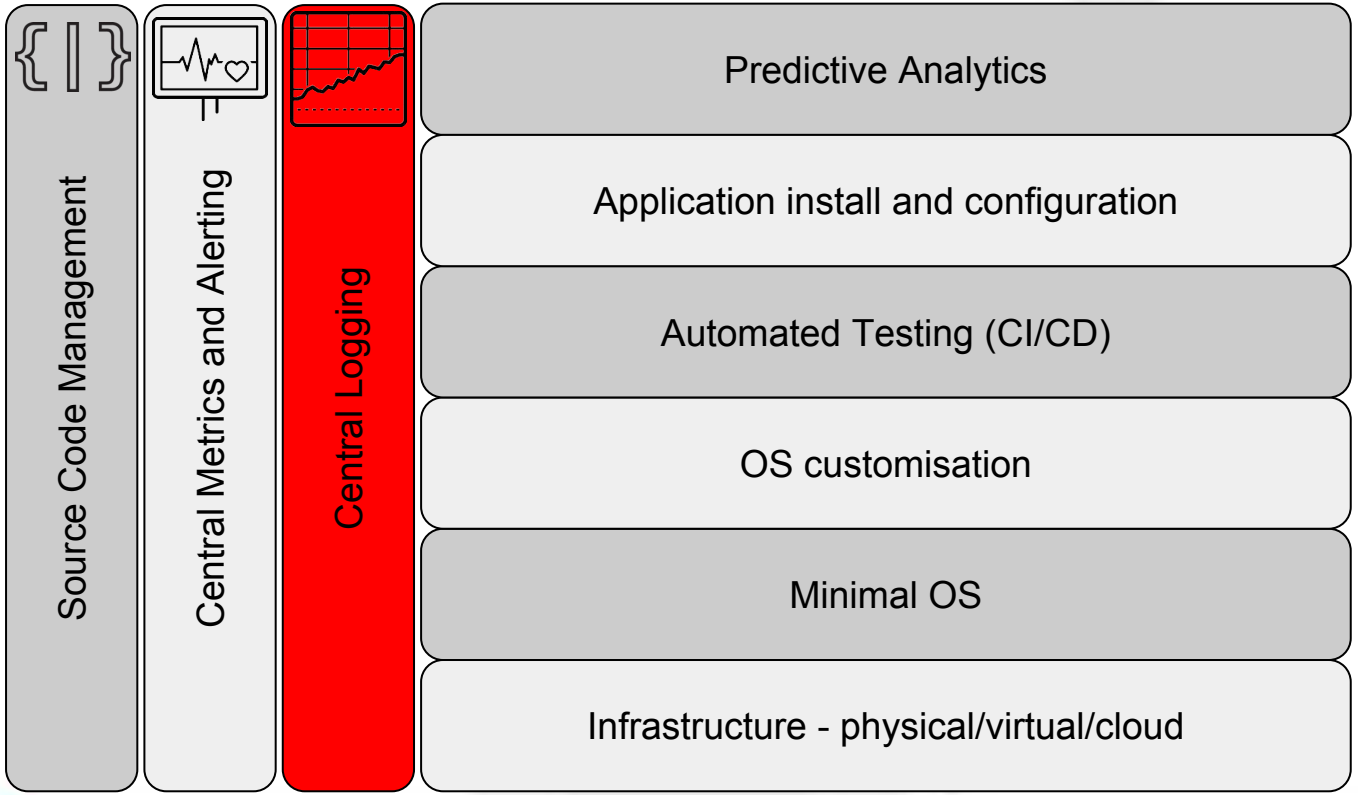
PMLogger - Performance Metric Logger; writes archivelog of performance metrics.

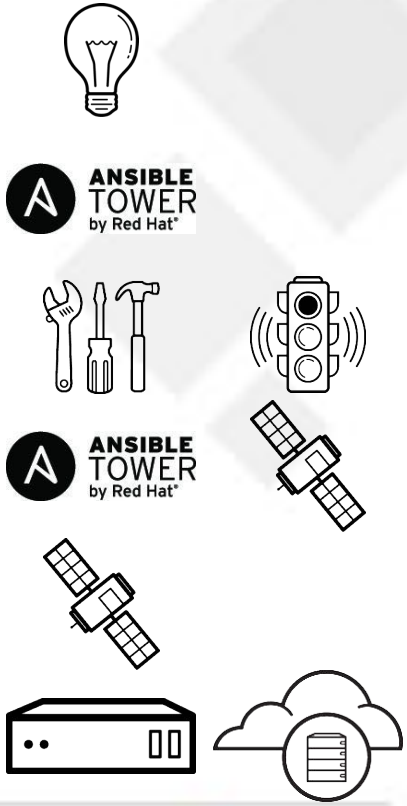


Vector - Browser based dashboard



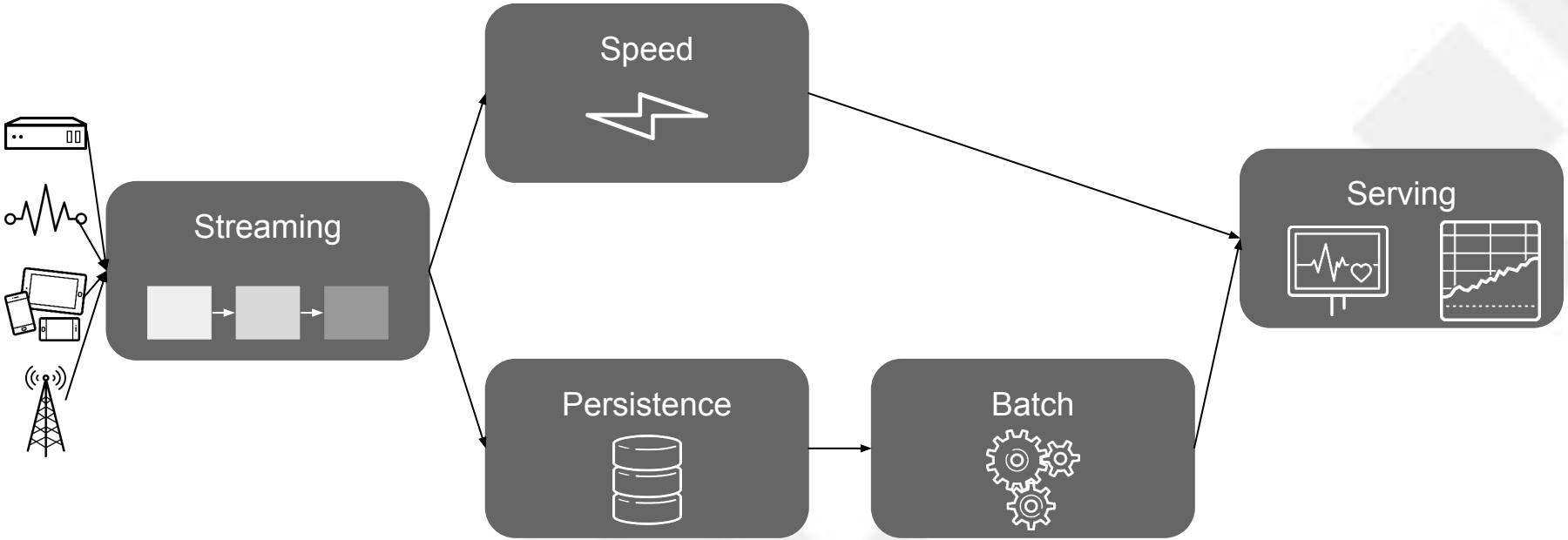
Layers and tooling





New Logging patterns

Streaming, Lambda, Kappa..... and more.



Common Logging in Redhat

Aiming to deliver as part of future releases of OpenShift and OpenStack.

- Aggregate, correlate and centrally searchable logs for the operator
  - RHEL, system specific, application
  - Across multiple product(s) and deployments
  - Node(s), Cluster(s), Data Center(s), Cloud(s)
- Do same for developer
  - Containers, pods, services
  - Across dev/CI/CD and production
  - For traditional and DevOps centric

Links to find out more

http://rhelblog.redhat.com/2015/12/18/getting-started-using-performance-co-pilot-and-vector-for-browser-based-metric-visualizations/

http://www.pcp.io/docs/lab.containers.html

Index of Performance Co-Pilot (PCP) articles, solutions, tutorials and white papers

https://access.redhat.com/insights/info/

https://www.ansible.com/tower

https://access.redhat.com/products/red-hat-satellite#getstarted

References....
And Twitter...

J.CREW

"With Ansible Tower, **we just click a button and deploy to production in 5 minutes**. It used to take us 5 hours with 6 people sitting in a room, making sure we didn't do anything wrong (and we usually still had errors). We now deploy to production every other day instead of every 2 weeks, and nobody has to be up at 4am making sure it was done right."

apg
All Pensions Group

APG

Pension fund administration

Netherlands

- Red Hat Satellite
- Red Hat Enterprise Linux
- Red Hat Training

APG, one of the world's largest collective pension fund administrators, wanted to completely phase out its IBM UNIX-based operating system. It deployed a Red Hat Enterprise Linux environment managed by Red Hat Satellite to secure continuity for applications in use and gain fast deployment of security patches and other changes.

- Improved efficiency to reduce management time
- Reduced server running costs to three times less than previous solution
- Enhanced solution-related skills with Red Hat training courses for IT staff

"The level of support provided was a major reason for us to choose Red Hat. Services such as Red Hat Satellite made Red Hat the obvious choice."

– MAURICE PIJPERS
SENIOR SPECIALIST, APG

LEARN MORE AT: HTTP://RED.HT/2A0MNEJ

RED HAT FORUM

Key Takeaways

What must we do

- Embrace automation; think about the layers and try to align this to container thinking to align to future patterns
- People and Process - break down the silos. Get the Security, Networking, Application, Linux Engineering, Cloud and Storage teams all in a room to plan deployments so that all requirements are considered - no more per-team agents or build tools.
- Think about how to leverage things like Predictive analytics to replace boring repetitive manual tasks.

Monthly Tech-Talks for more information

All held at Red Hat Monument office.
https://www.redhat.com/en/about/events/tech-talks-uk

October 26th	An introduction to 3Scale and API Management.
November 23rd	EAP 7 and A-MQ 7. JEE and core
December 13th	RHEL, RHEV, Atomic and OpenStack.
January 25th	Software Defined Storage, Gluster, Ceph.
February 22nd	Hybrid Cloud Architectures and Cloudforms

redhat.