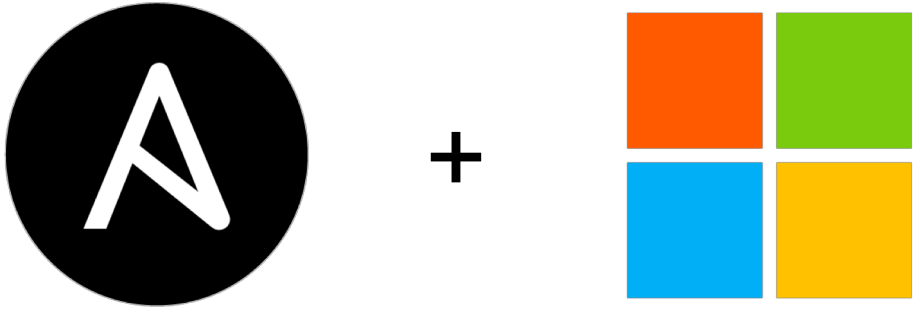
Analog transformation: Scaling network automation culture with Ansible Tower at Microsoft

Bart Dworak
Software Engineering Manager
May 8th 2019

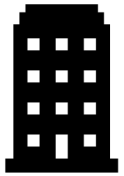
Overview



This is the story of how an organization at Microsoft implemented Ansible and Ansible Tower. The resulting changes not only changed the way the network is managed, but also sparked a cultural transformation.

Some history..

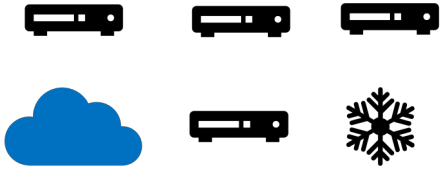
400+ infrastructure engineers



600+ buildings worldwide

Network scale

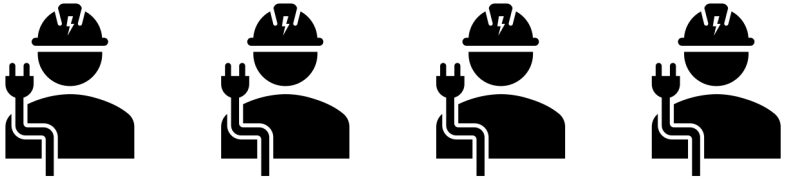
2015 – ~13,000



2019 – 17,000+

History continued..

Automation was basic scripting



Sparse developer skillset, primarily network engineers

```
Router# conf t
Router(config)# interface fastethernet 0
Router(config-int)# shutdown
Router(config-int)# exit
Router(config)# exit
Router# copy run start
```

Scripts had little to no logic

Primary tools used

Agenda

Engineering Problems

Engineering Principles

Cultural Transformation

Big Bets

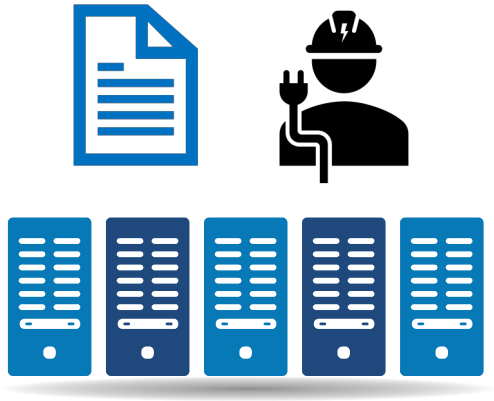
Engineering Problems

Environment purpose

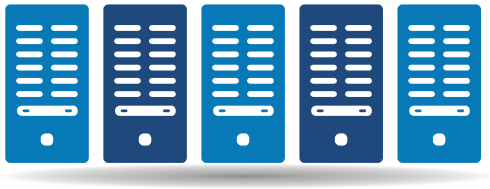
Version Control

Promote to production

Environment Purpose



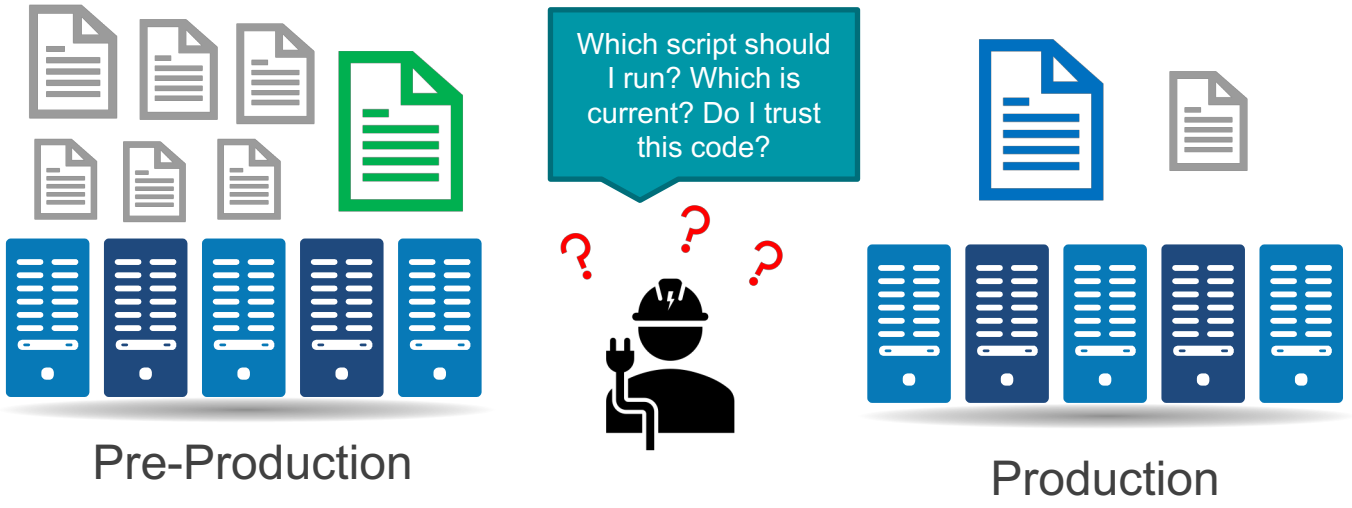
Pre-Production
Network Access



Production
Network Access

Network access environments did not have a well defined purpose, leading to the problem of running production workloads from a non production environment

Version Control



Code was not checked-in, version controlled, or peer reviewed. Additionally, the old platform did not support storing these scripts in a VCS natively.

Promote to production

Pre-Production

✓ Full network access

Production

✓ Full network access

Since Pre-Production was available, very little code made it into production.
Most code ran from PPE with no testing/approvals.

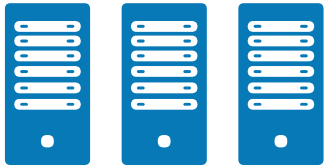
Engineering Principles

Testing environments

Version control

Promote to production

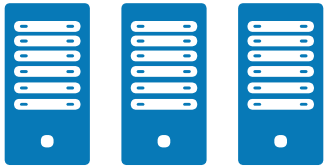
Ansible Environment



Dev/Test

Full network access

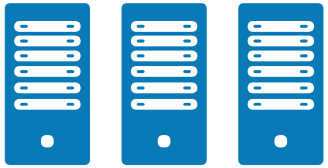
All Branches



Pre-Production

Full network access

Develop/Master



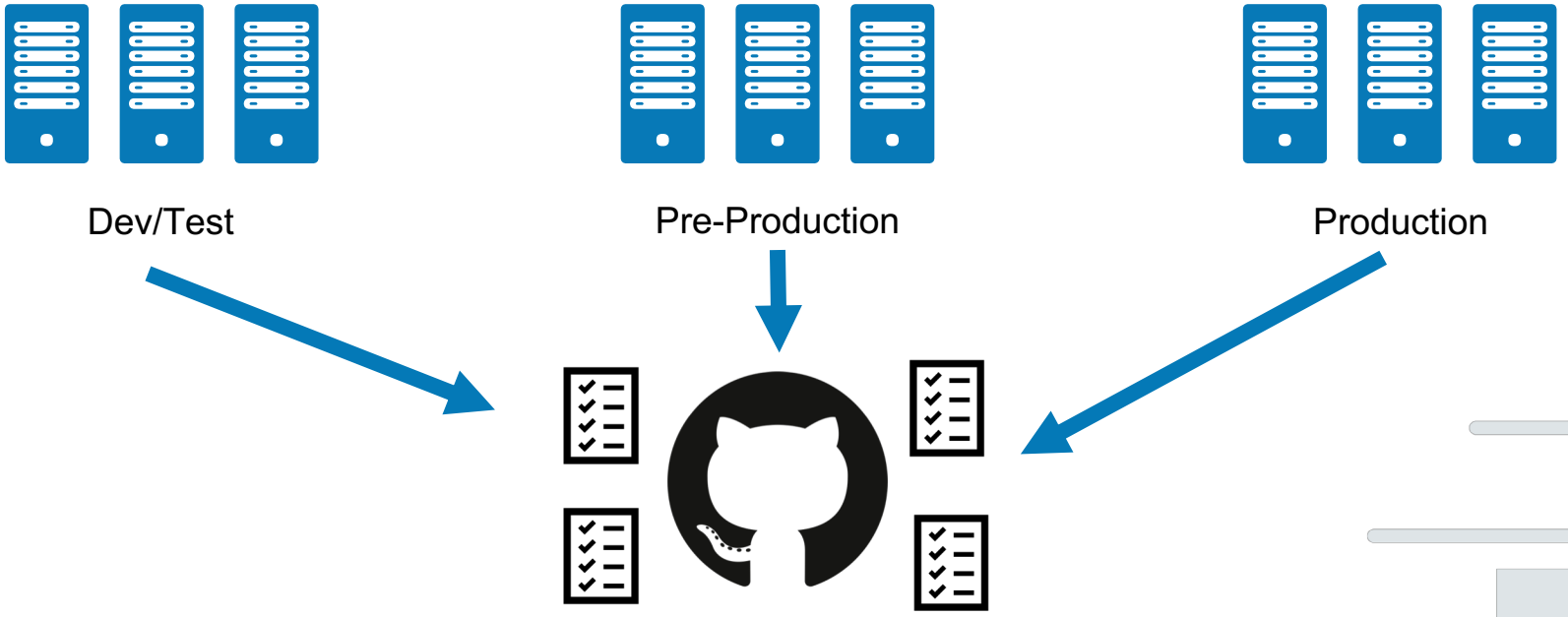
Production

Full network access

Master

In order to enable testing of playbooks, three environments were created for testing playbooks.

Version Control



A Version Control System was put in place and using Ansible Tower integration all playbook development is centralized

Promote to production

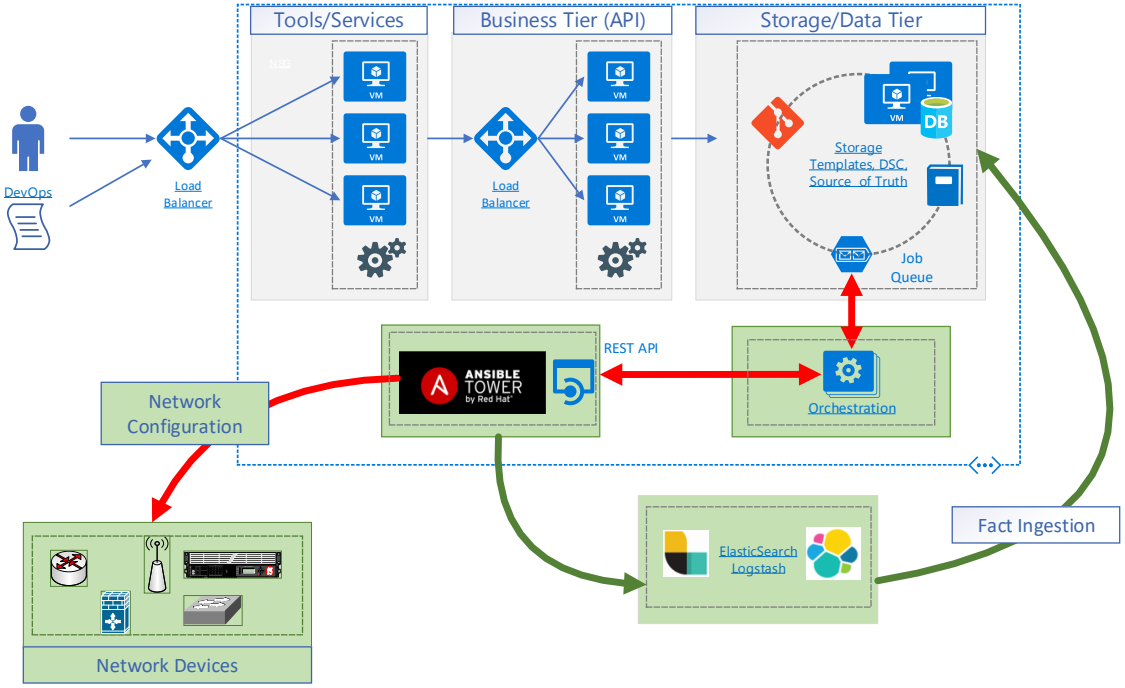
Feature	Develop	Master
Code is developed in feature branches and tested against development devices	Reviewed code is staged in the develop branch and can be tested at scale	Code is released to production every 2 weeks on a sprint release schedule

Pull Request

Sprint Release

A promote to production workflow was created to protect code quality and release to production. Strict enforcement of code review was implemented and a release schedule was established.

Automation Platform



We built integrations on top of Ansible Tower to interact with our existing systems and environment.

Cultural Transformation

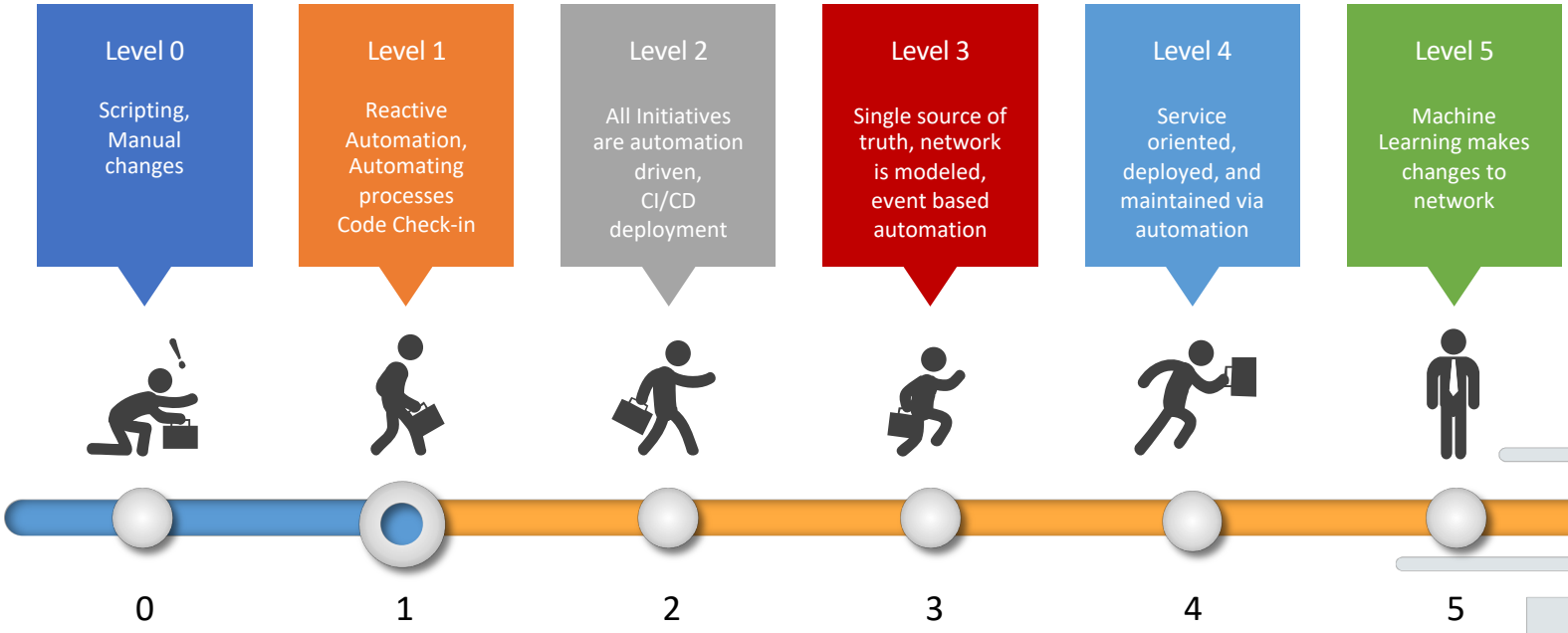
How do we measure cultural transformation?

Building new skillsets

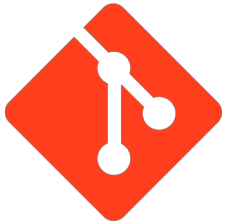
Zero to Hero

Automation Community

Culture Transformation



Building new skillsets



Our engineers went through optional internal git training. Many started learning python and hosting their own python learning groups to learn from each other.

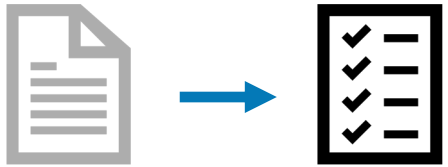
Zero to Hero

One of our engineers created a training series and named it Zero to Hero. This training was intended to teach engineers how to write Ansible playbooks and start understanding various automation concepts such as roles, reusability, and our promote to production workflows.

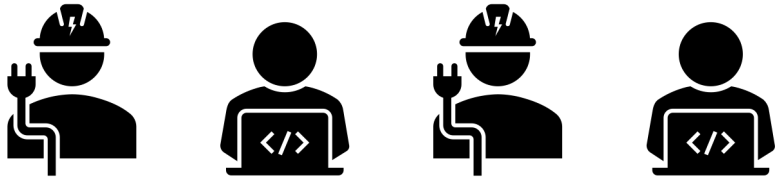
Automation community

In order to encourage knowledge sharing and learning between our engineers, we created a Teams channel and constantly moderate it. Engineers ask questions about automation and we have discussions that allow everyone to participate to learn and grow.

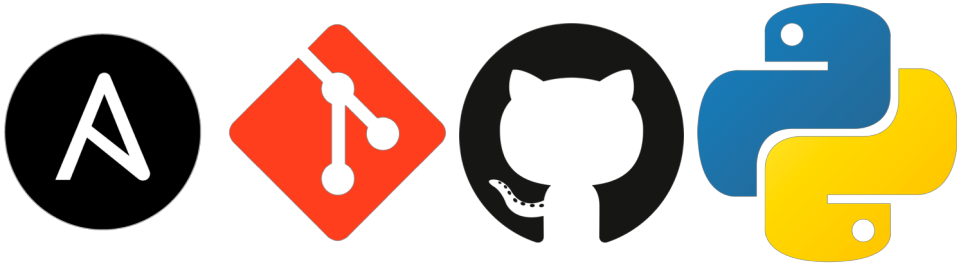
Cultural Transformation

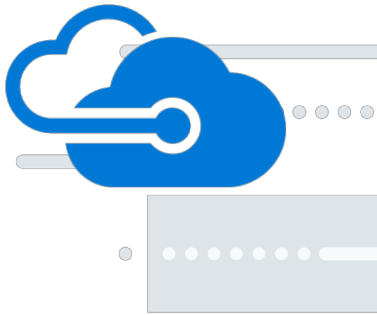


Automation became advanced playbooks and reusable roles



Network engineers are becoming network developers





Primary tools used

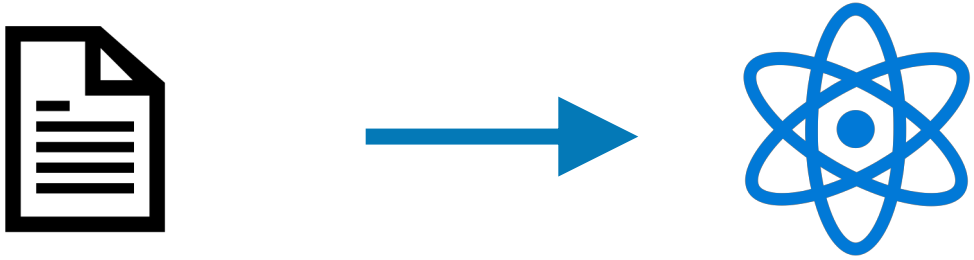
Big Bets

Network modeling

Single source of truth

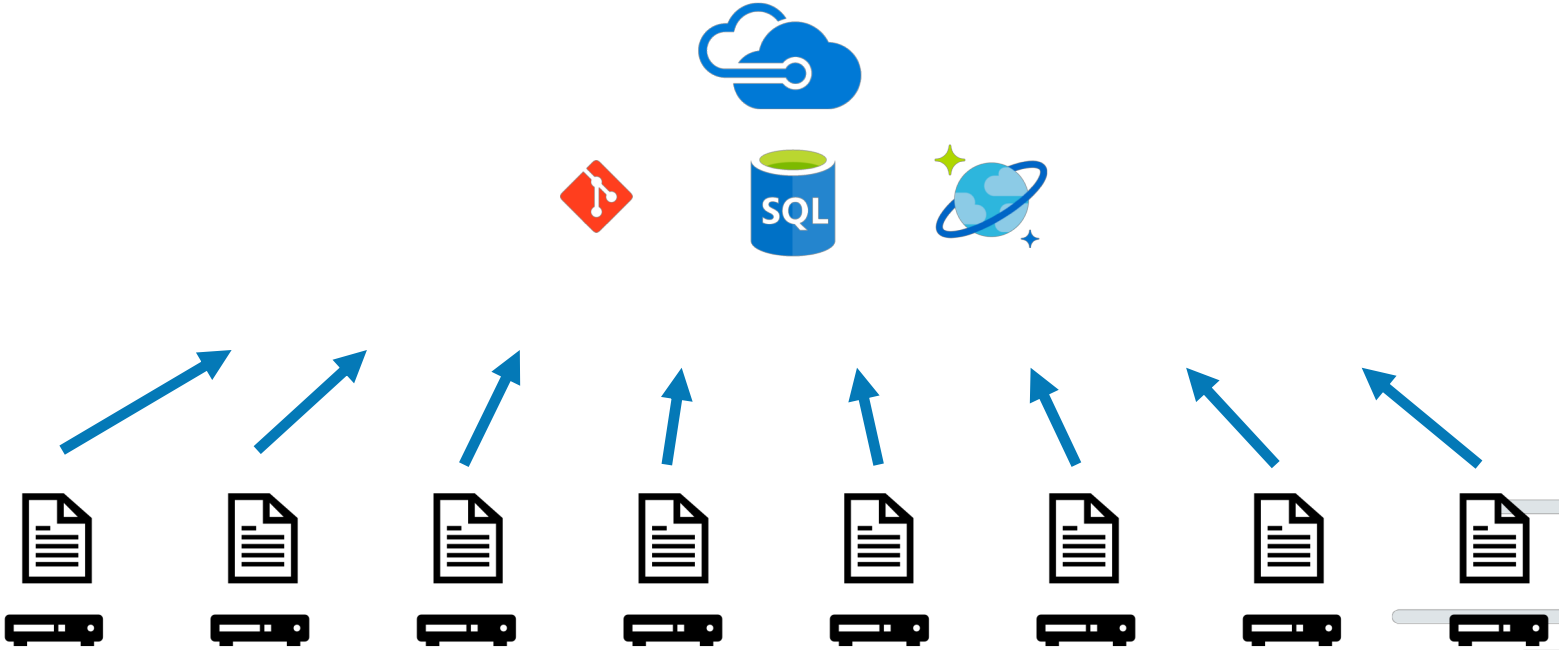
Event based automation

Network Modeling



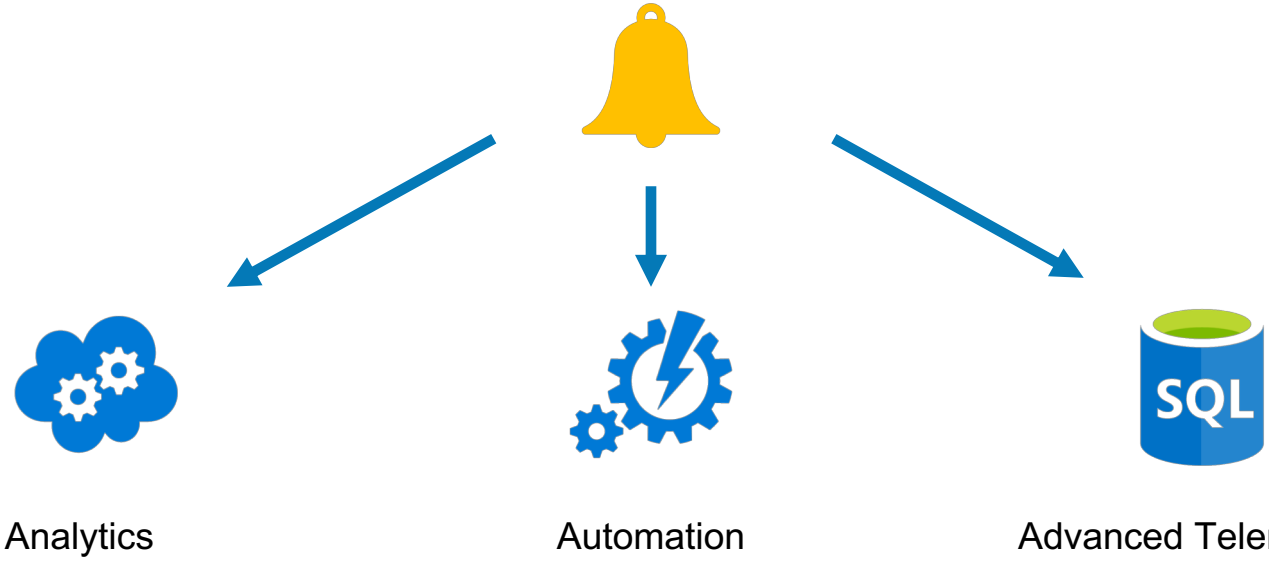
Change configuration from a text based configuration, to modeled configuration, where services, dependencies, and relationships are modeled in a single source of truth.

Single source of truth



Centralize the configuration for our infrastructure in a single source of truth and make changes to the infrastructure when the configuration deviates from the single source of truth

Event based automation



Create an event based automation pipeline and allow for events to trigger other workflows.
These triggers can trigger automation, advanced telemetry, logging, or analytics services.

“We want to empower every person and every organization on the planet to achieve more.”

- Satya Nadella, CEO of Microsoft

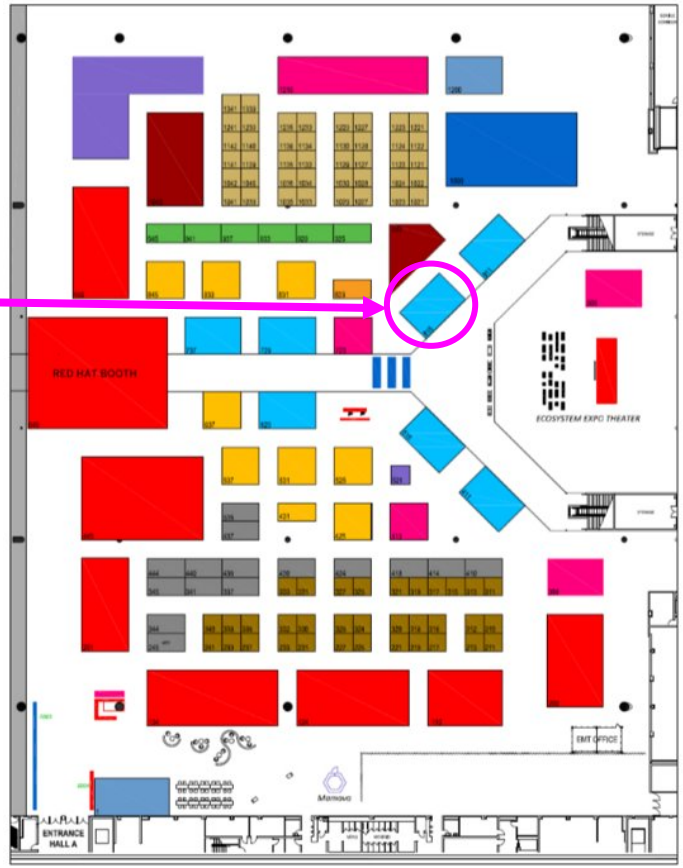
Microsoft Azure

Red Hat

Have questions about this session?

I'll be at the Microsoft Booth #815 from 5:30pm – 7:00pm

Grab some SWAG!



For more details visit
Azure.com/Linux
Azure.com/RedHat

RED HAT SUMMIT

THANK YOU


linkedin.com/company/Red-Hat


facebook.com/RedHatinc

youtube.com/user/RedHatVideos


twitter.com/RedHat