Bringing Antarctica to Azure
Journey of The Tux

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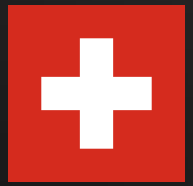

- Cloud Architect @ itnetX
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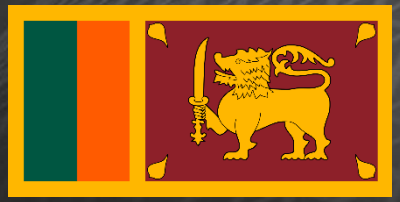

- Microsoft MVP: Cloud and Datacentre Management, 5nine Technical Evangelist , Azure Solutions Architect & MCT
- I work with Windows Server, System Center, Hyper-V, AWS, Azure, Office 365 & Linux
- Community Lead @ Sri Lanka IT Pro Forum
- Visit my blog @ http://tekronin.net

Agenda

- Azure ❤ Linux
- Deploying Linux in Azure
- ARM for Linux Workloads
- Configuration Management with Puppet
- Backup & DR for Linux in Azure
- Q & A

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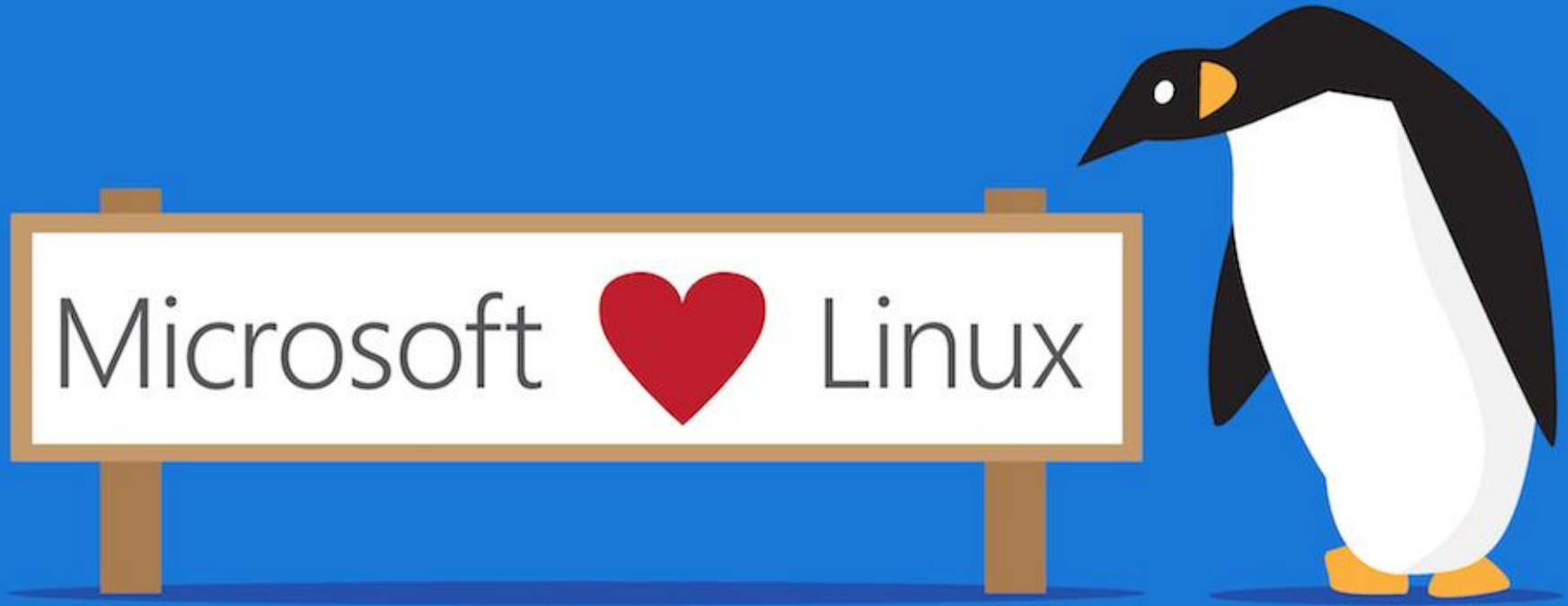
20% of Azure VMs run Linux!



Meet the Tux himself

Deploying Linux in Azure

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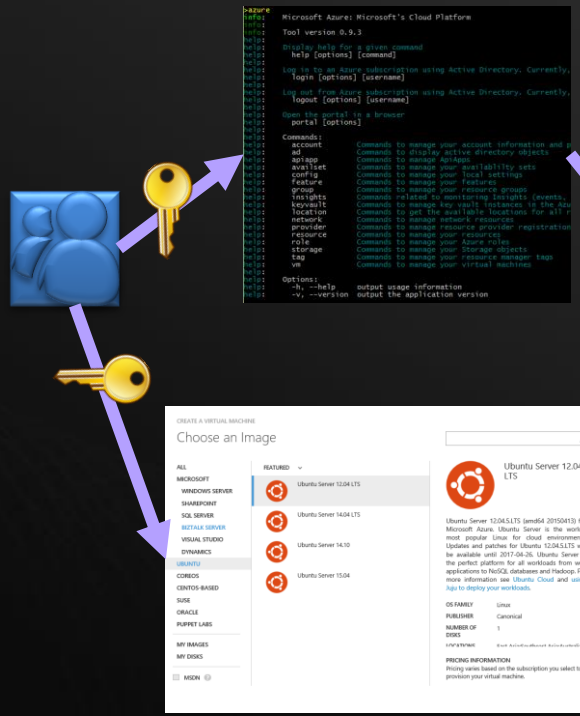
Linux VM Provisioning sequence



BYOI

Gallery

Community

Azure Storage VHD

Apps

WALA

LIS

Active VM

Hyper-V Host

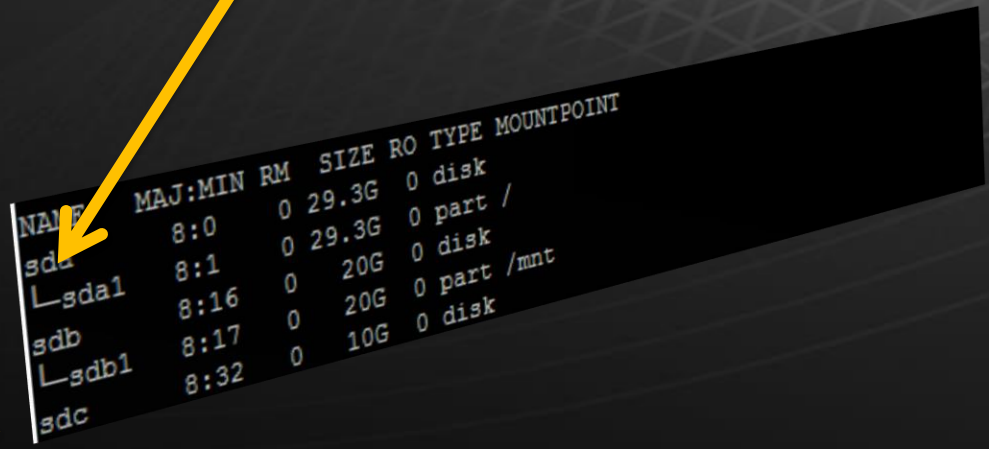
HW + local resources

VM disk layout

Temporary Storage Disk
- Local (Not Persistent)
- /dev/sdb

OS Disk
- Persistent
- /dev/sda

Data Disk(s)
- Persistent
- /dev/sdc+ (max 64)



Linux Integration Services (LIS)

- Drivers/"enlightenments" to integrate with Hyper-V
  - Present in kernel of Endorsed distributions
  - May need to be installed on generic and/or to get the latest updates
- Latest download: LIS 4.0
- Source at http://github.com/LIS/

Azure Linux VM Agent

What it will do

- Provision/manages virtual machine – Required for every Linux VM on Azure
- interaction with the Azure Fabric Controller
- Managing VM Extensions

How to get it

- If you create virtual machine from gallery, it is already included/config by distro vendors
- RPM and Deb packages available from some distributions
- If you create your own custom image, install it via GitHub and manual configure it

About VM Extensions

- Enable main VM functionalities after provision
- Offered by trusted 3rd parties or Microsoft
  - Both Windows and Linux
- Access through multiple Interfaces
  - Management portal
  - Azure PowerShell cmdlets
  - Azure Cross-Platform Command-Line Interface (Xplat-cli)
- Deployed by Azure Linux Agent(2.0.6+)

Linux Extensions Released

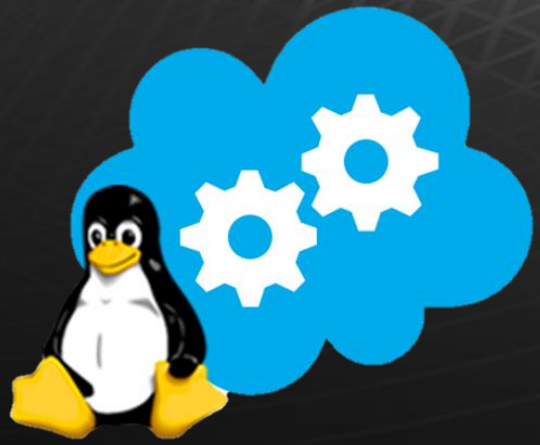
Name	Latest Version	Description
Custom Script	1.3	Allow the owner of the Azure Virtual Machines to run customized scripts in the VM
DSC	1.0	Allow the owner of the Azure Virtual Machines to configure the VM using Windows PowerShell Desired State Configuration (DSC) for Linux
OS Patching	2.0	Allow the owner of the Azure VM to configure the Linux VM patching schedule cycle
VM Access	1.3	Provide several ways to allow owner of the VM to get the SSH access back

Azure cross-platform command-line interface

- Install and connect to Azure subscription
- Basic commands, help
- Creating scripts

The Azure Cross-Platform Command-Line Interface
(xplat-cli) provides a set of open source, cross-platform commands for working with the Azure Platform

https://github.com/azure/azure-xplat-cli



Azure Resource Manager  Linux

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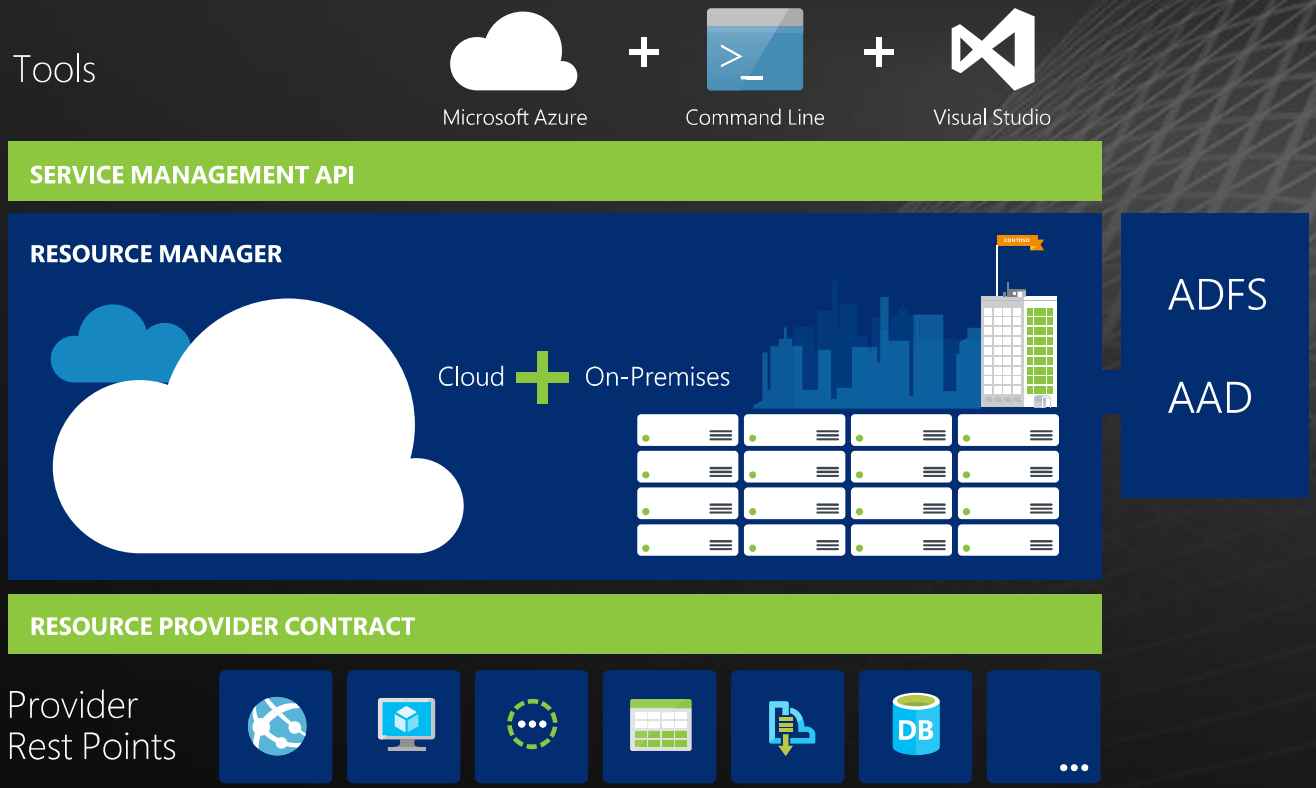
Why Azure Resource Manager?

- You can deploy, manage, and monitor resources as a group
- Repeatedly deploy your solution throughout the development lifecycle
- Manage your infrastructure through declarative templates
- You can define the dependencies between resources
- Apply access control to all services in your resource group
- Organize your resources with tags
- View the rolled-up costs for groups

Consistent Management Layer



Terminology

- Resource - An item that is part of your Azure solution
- Resource group - A container that holds related resources for an application
- Resource provider - A service that supplies the resources you can deploy and manage through Resource Manager
- Resource Manager template - A JavaScript Object Notation (JSON) file that defines one or more resources to deploy to a resource group

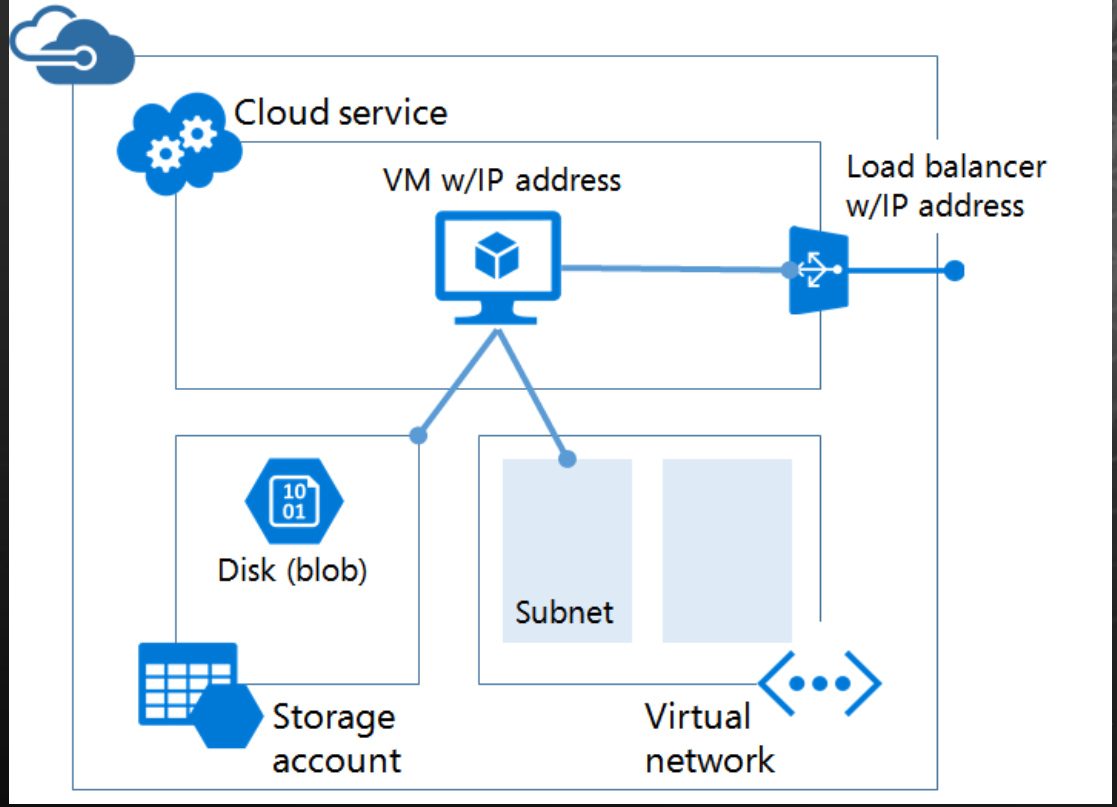
Azure Resource Manager

Azure Templates can:

- Ensure Idempotency
- Simplify Orchestration
- Simplify Roll-back
- Provide Cross-Resource Configuration and Update Support

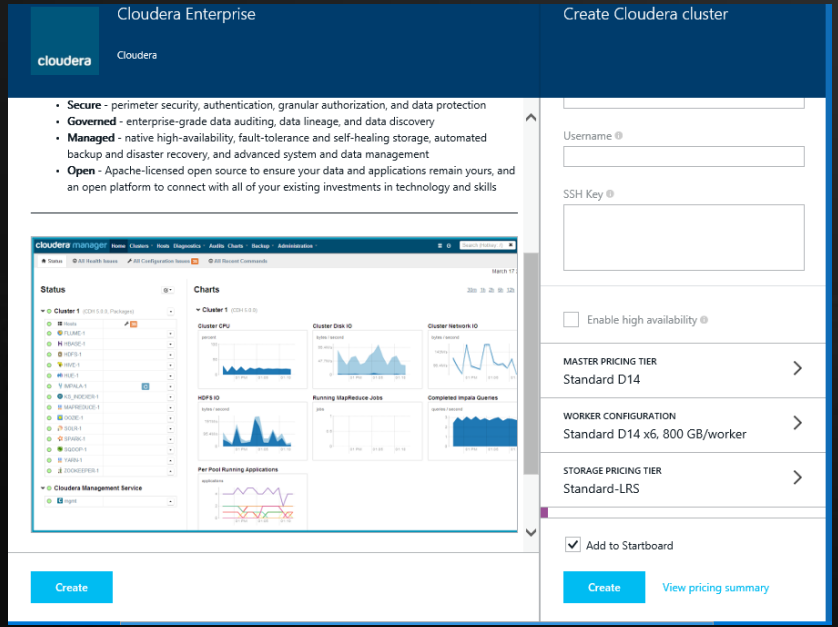
Azure Templates are:

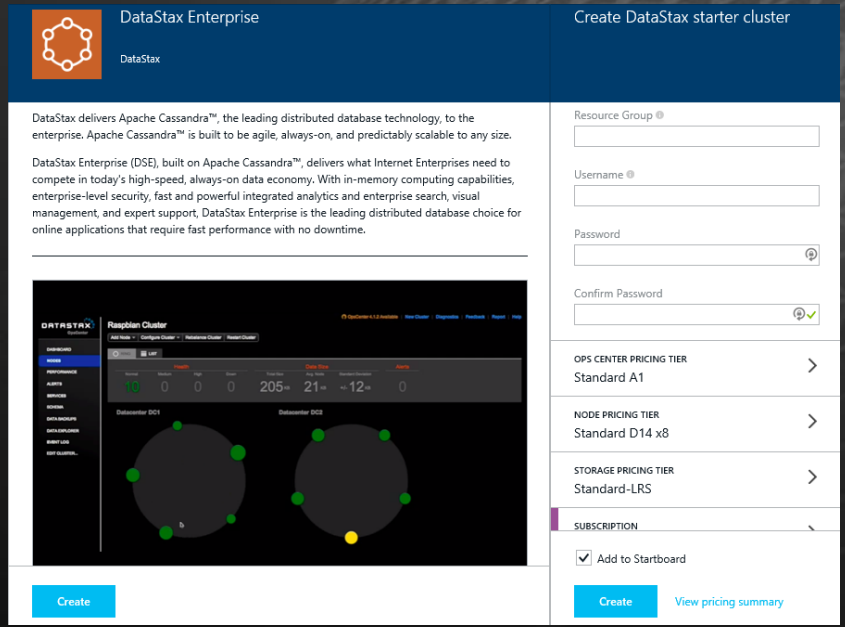
- Source files, can be checked-in
- Specifies resources and dependencies (VMs, Websites, DBs) and connections (config, LB sets)
- Support parametrized input/output



Azure Resource Manager templates

- Repeatable, consistent Deployment templates





Deploy via an ARM template

Step 1: Examine the JSON file for the template parameters (The template is also located in GitHub)

- The template will ask:
- A unique storage account name.
- An admin user name for the VM.
- A password.
- A domain name for the outside world to use.
- An Ubuntu Server version number -- but it will accept only one of a list.

Step 2: Create the virtual machine by using the template: create a resource group for your template deployment and then deploy the template

ARM Template code – parameter #1

```
"parameters": {
  "newStorageAccountName": {
  "type": "string",
  "metadata": {
    "description": "Unique DNS name for the storage account where the virtual machine's disks will be placed."
  }
  },
  "adminUsername": {
  "type": "string",
  "metadata": {
    "description": "User name for the virtual machine."
  }
  },
  "adminPassword": {
  "type": "securestring",
  "metadata": {
    "description": "Password for the virtual machine."
  }
  },
```

Additional Resources

Azure Resource Manager Sessions

- SCU 2015 – Azure Resource Manager 101
  https://channel9.msdn.com/events/System-Center/System-Center-Universe-Europe-2015/SCUE15-56

ARM Quick Start Templates

- https://azure.microsoft.com/en-us/documentation/templates/

Demo | Deploying Linux VMs with Azure CLI & ARM

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Configuration Management with Puppet

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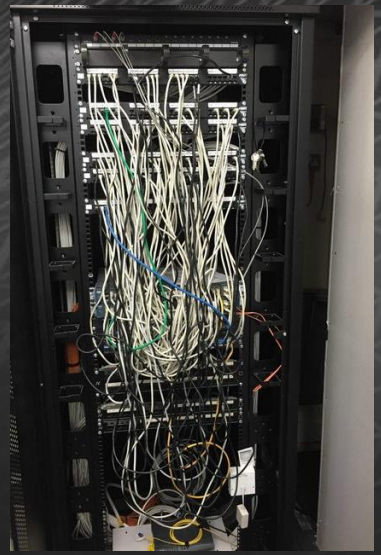
Configuration Management

how you think it's configured

how your colleagues think it's configured



how it's actually configured

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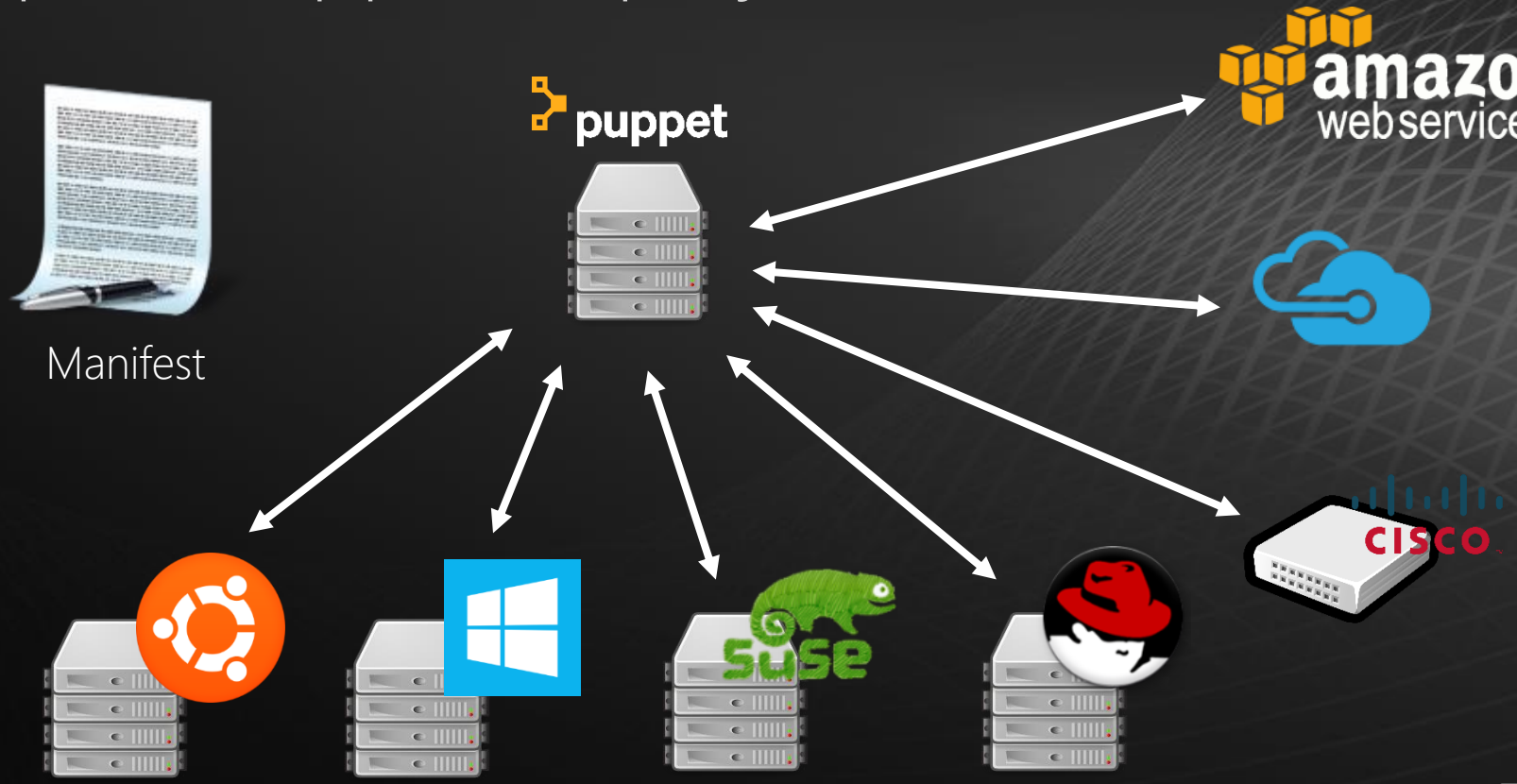
What is Puppet?

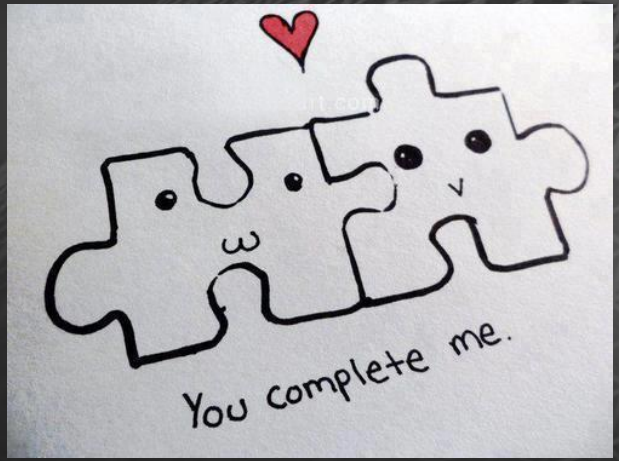
- Open Source Configuration Management Tool
- Runs on Windows and Linux
- Puppet is produced by Puppet Labs
- Released under Apache License 2.0
- Manages the configuration of Unix-like and Microsoft Windows systems
- Puppet Enterprise and Community editions available

Typical Puppet Deployment



Why "Puppet vs. DSC" isn't even a thing

- There is NO competition
- Puppetlabs DSC module available
- Use the skills you have
- Benefit from PowerShell community
- Solution vs. Plattform



DSC and Puppet: best of both worlds

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Why "Puppet vs. DSC" isn't even a thing

foo.ps1

```
# DSC

File TestFile
{
  Ensure = "Present"
  Contents = "Hi!"
  DestinationPath = "C:\foo.txt"
}

```

foo.pp

```
# Core Puppet
file { 'c:/foo.txt':
  ensure => 'file',
  content => 'Hi!'
}

# Puppet calling DSC
dsc_file { 'foo':
  dsc_ensure => 'present',
  dsc_type            => 'File',
  dsc_destinationpath => 'c:/foo.txt',
  dsc_contents        => 'Hi!',
}

```

Puppetlabs Azure Module

- Available on GitHub
  https://github.com/puppetlabs/puppetlabs-azure
- Requirements
  - Azure Account
  - Microsoft Azure Client Library for Ruby
  - Azure CLI
  - Service Principal on the Active Directory (use https://github.com/pendrica/azure-credentials)

Manage Azure with Puppet

- Manage VMs
  - Service Management API
  - Resource Management API
- Manage Storage Accounts (azure_storage_account)
- Manage Resource Groups (azure_resource_group)

Demo | Configuration Management with Puppet

Backup & DR for Linux in Azure

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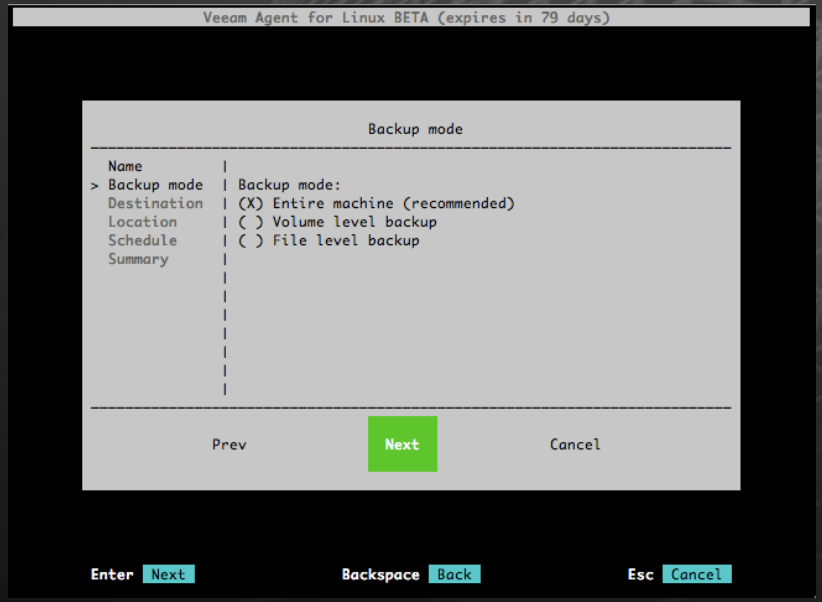
Protecting Linux VMs in Azure

- Azure Backup
  - For Linux VMs, only file-consistent backups are possible, since Linux does not have an equivalent platform to VSS.
- Veeam Agent for Linux *(New)*
- Microsoft Azure Backup Server/SCDPM
- Microsoft Azure Site Recovery
- Blob Snapshots
- Azure Files Storage for Poor Man's Backup

Veeam Agent *for Linux*

Simple and free backup agent for Linux — anywhere

- Protect entire computer, or create volume-level and file-level backups
- Built-in snapshot and change tracking drivers delivered as a dynamically loadable kernel module
- Integrated directly into Veeam Backup & Replication (backup repository, basic centralized monitoring)



Features of Veeam Agent *for Linux*

- Entire computer, volume-level and file-level image-based backup
- Built-in volume snapshot and changed block tracking drivers
- File-level, volume-level and bare metal recovery (same or different hardware)
- Backup and recovery using console UI or command line
- Integration with Veeam Backup & Replication
- Support for multiple backup jobs
- Pre-freeze/post-thaw snapshot scripts for application processing
- Guest file indexing, catalog search and restore with Veeam Backup Enterprise Manager

Blob Snapshots

- A blob snapshot is a read-only version of a blob that is captured at a point in time.
- Snapshots can be copied to another storage account as a blob to keep backups of the base blob.
- To backup for your VM disks, you can take periodic snapshots of the disk or page blob, and copy them to another storage account using tools like Copy Blob operation or AzCopy.
- When you want to restore to a previous stable version captured in one of the backup snapshots, you can copy a snapshot over the base page blob.

Demo | Backup for Linux IaaS Workloads

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Questions?

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