

I Needed to Install 80 SQL Servers...Fast. Here's How I Did It!

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Level: Intermediate

~~Change is Coming.~~ **HERE** Are You Ready?



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Agenda

- Scenario
- What is DSC?
- DSC “resources”
- DSC Fundamentals
- Installing SQL Server With DSC
- Implementing SQL Server Best Practices
- Troubleshooting DSC
- Leveraging DSC for Disaster Recovery

The Scenario

Migrating a client between two data centers

Management mandated build new for all systems

Staff turnover left them with 0 DBAs

PowerShell DSC to the Rescue!

**Desired State
Configuration**

**Defining
configuration in code**

**Repeatable
process**

**Configuration
standardization**

**Scale out
installations**

**Reduces human error
(or increases it) 😊**

DSC isn't just deployments...it's configuration management

Learning DSC



Pluralsight

The DSC Book by Don Jones and Missy Januszko



GitHub examples

Building a test lab

Starting off with a VERY simple configuration

Creating a file

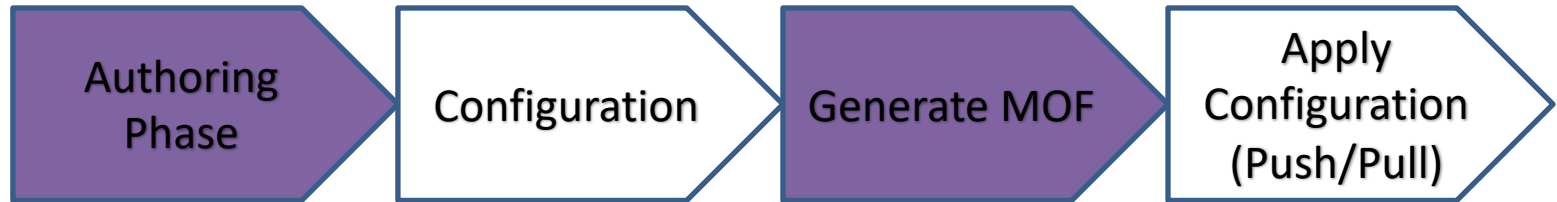
DSC Fundamentals

- Local Configuration Manager (LCM)
- Configurations
- Resources
- Deployment model – pull or push?
- MOF and the Meta-MOF
- Authoring workstation
- Windows Management Framework

DSC Resources

- Provide the implementation for your desired state
- Resources implement an interface
 - Get/Set/Test functions
- Deployed as PowerShell modules
 - `Install-Module SqlServerDsc`
 - Must exist on the authoring workstation and the target systems

The DSC “Process”



Needed a Test Lab

Domain Controller

Windows 2016 Base Template
Virtual Machine

WMF 5.1

Initial Script

Copying a file to a target

DEMO

Describing the Environment



Goal is to build many
SQL Server, fast and
consistently



Parameterized
configuration scripts



Configuration Data

Installing Two SQL Servers With DSC

DEMO



Best Practice SQL Server Configuration

- Enforcing installation standards
- Documented installs
- Reduces errors and installation inconsistency
- Implement and standardize SQL Server best practices
 - File locations
 - Instance Settings
 - Windows OS specific settings
 - Power Plan, directories, memory and swap settings

Leveraging DSC for Disaster Recovery

- Don't need to troubleshoot, just re-deploy and restore your databases
- Deploying a two replica AG configuration takes about 2 minutes
- This is hard
 - Install and configure a failover cluster
 - Deal with the Active Directory components of the cluster
 - Deploy and configure SQL Server
 - Create and configure the AG
 - Create the Listener
- There's a huge payoff...

Troubleshooting DSC

- Configuration errors are awful
 - Event logs can be helpful
 - But in the end, you'll wind up on GitHub reading the source
- Check the LCMState
 - PendingConfiguration
- `Test-DscConfiguration` isn't testing the code it's testing target state
- Code defensively

The Scenario

About half way through the project 2 DBAs were hired

Built new and migrated 80 SQL Servers

Migrated 1000+ databases

Tightly controlled configuration

Team embraced the automation mentality

Financial institution, 300 SQL Servers taken out by malware

No problem!

What's next!

- Configuration management
 - Detecting when configuration skews from the desired state
- Persisting the state of the system
- Embedded MOF for domain join and network configuration
- Test lab migration from VMWare Workstation to Hyper-V
- Containers!!!
 - Lightweight, easily deployable
 - But...SQL Server on Linux only
 - But...third party apps
 - But...Kubernetes HADR has me like, whoa!

Installing two SQL Servers with DSC (con't)

Changing our configuration with Implementing SQL Server Best Practices

DEMO

Review

- Scenario
- What is DSC?
- DSC “resources”
- DSC Fundamentals
- Installing SQL Server With DSC
- Implementing SQL Server Best Practices
- Leveraging DSC for Disaster Recovery

Resources

- **Blog**
 - www.centinosystems.com/blog
 - Email: aen@centinosystems.com
 - Twitter: @Nocentino
- **Pluralsight – www.pluralsight.com**
 - Windows PowerShell Desired State Configuration Fundamentals – Jeff Hicks
 - Practical Desired State Configuration (DSC) – Josh Duffney
- **The DSC Book** – Don Jones and Missy Januszko
- **GitHub**
 - SQL Server - <https://github.com/PowerShell/SqlServerDsc>
 - SQL Server Examples - <https://github.com/PowerShell/SqlServerDsc/tree/dev/Examples>
 - DSC Resource Kit - <https://github.com/PowerShell/DscResources>