

PowerShell

let's talk about automation



Bernhard
Frank

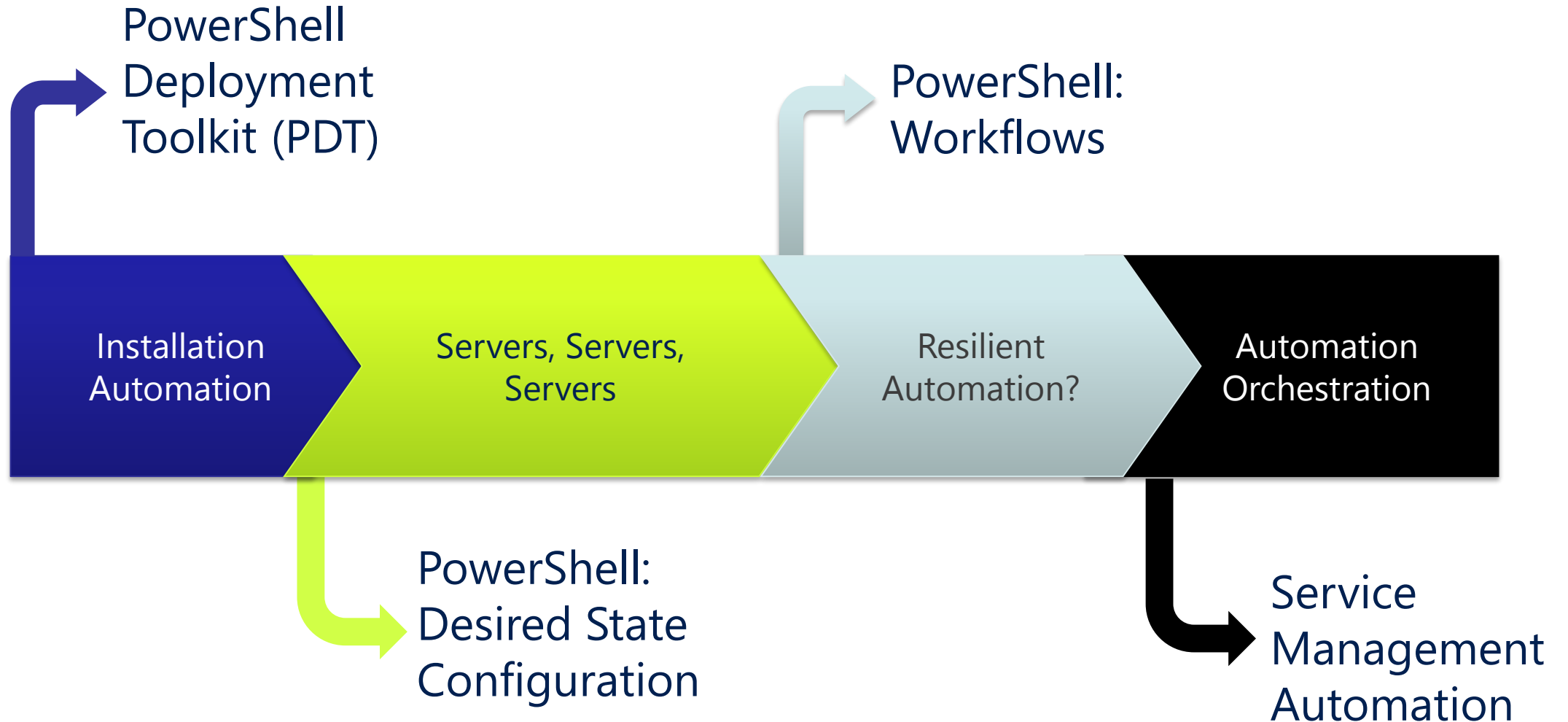
Microsoft
blogs.technet.com/bernhard_frank



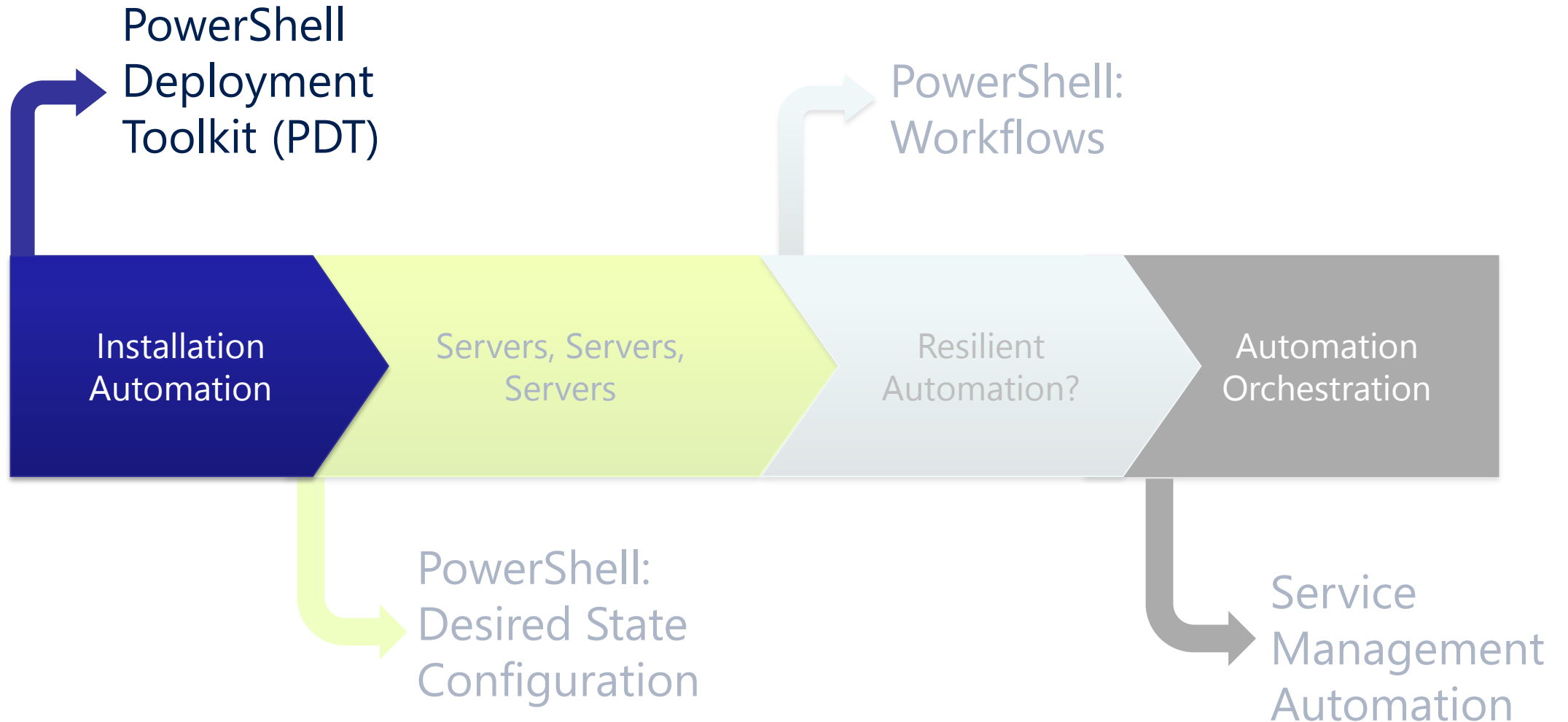
Carsten
Rachfahl

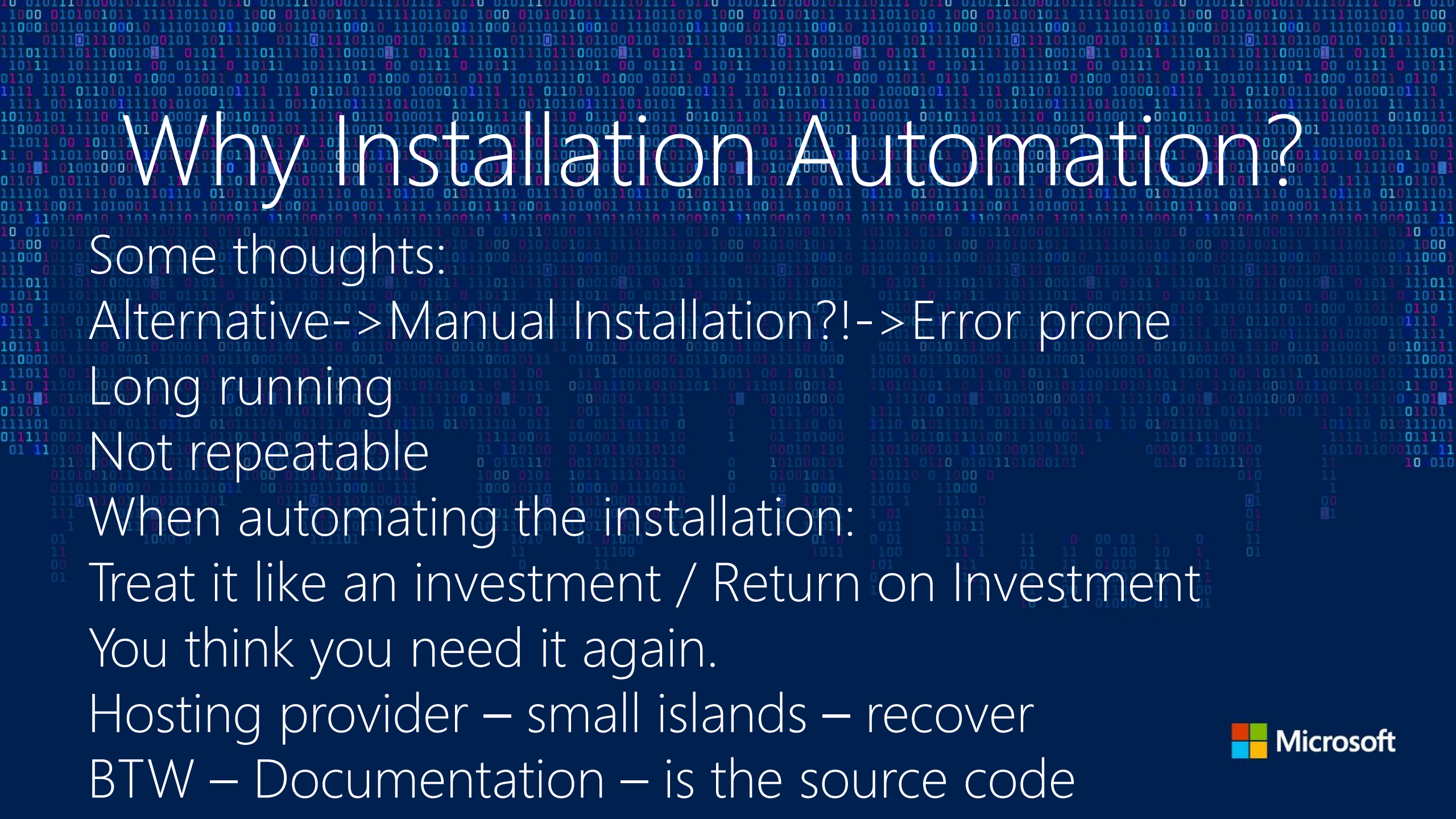
Rachfahl IT-Solutions GmbH
www.hyper-v-server.de

Agenda



Agenda





Why Installation Automation?

Some thoughts:

Alternative->Manual Installation?!->Error prone

Long running

Not repeatable

When automating the installation:

Treat it like an investment / Return on Investment

You think you need it again.

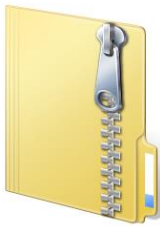
Hosting provider – small islands – recover

BTW – Documentation – is the source code



PDT (PowerShell Deployment Toolkit)

„Unattended Private Cloud Installer“



PDT2.64.2611.zip

[PDT 2.6.....zip](#)

Search-String: „powershell
deployment toolkit 2.6“

- .xml / .ps1
- Deployment time: hours vs. ~~days~~
- customizable / repeatable / extendable

```
PowerShell Deployment Toolkit

System Center 2012 R2 Virtual Machine Manager
Database Server: DB02.contoso.com: End DB02.contoso.com: 00:36:50
Management Server: UMM01.contoso.com: End UMM01.contoso.com: 00:02:15
Console: RD01.contoso.com: End RD01.contoso.com: 00:25:23

System Center 2012 R2 Orchestrator
Database Server: DB02.contoso.com: End DB02.contoso.com: 00:36:50
Management Server: OR01.contoso.com: End OR01.contoso.com: 00:12:53
Primary Runbook Server: OR01.contoso.com: End OR01.contoso.com: 00:12:53
Web Components Server: OR01.contoso.com: End OR01.contoso.com: 00:12:53
Runbook Designer: RD01.contoso.com: End RD01.contoso.com: 00:25:23

System Center 2012 R2 Service Provider Foundation
Database Server: DB02.contoso.com: End DB02.contoso.com: 00:36:50
Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54

System Center 2012 R2 Service Management Automation
Database Server: DB02.contoso.com: End DB02.contoso.com: 00:36:50
Web Service Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54
Runbook Worker Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54

System Center 2012 R2 Service Reporting
Datawarehouse Server: DB06.contoso.com: End DB06.contoso.com: 00:31:03
Analysis Server: DB06.contoso.com: End DB06.contoso.com: 00:31:03
Server: DB06.contoso.com: End DB06.contoso.com: 00:31:03

System Center 2012 R2 App Controller
Database Server: DB02.contoso.com: End DB02.contoso.com: 00:36:51
Server: UMM01.contoso.com: End UMM01.contoso.com: 00:02:15
Console: RD01.contoso.com: End RD01.contoso.com: 00:25:23

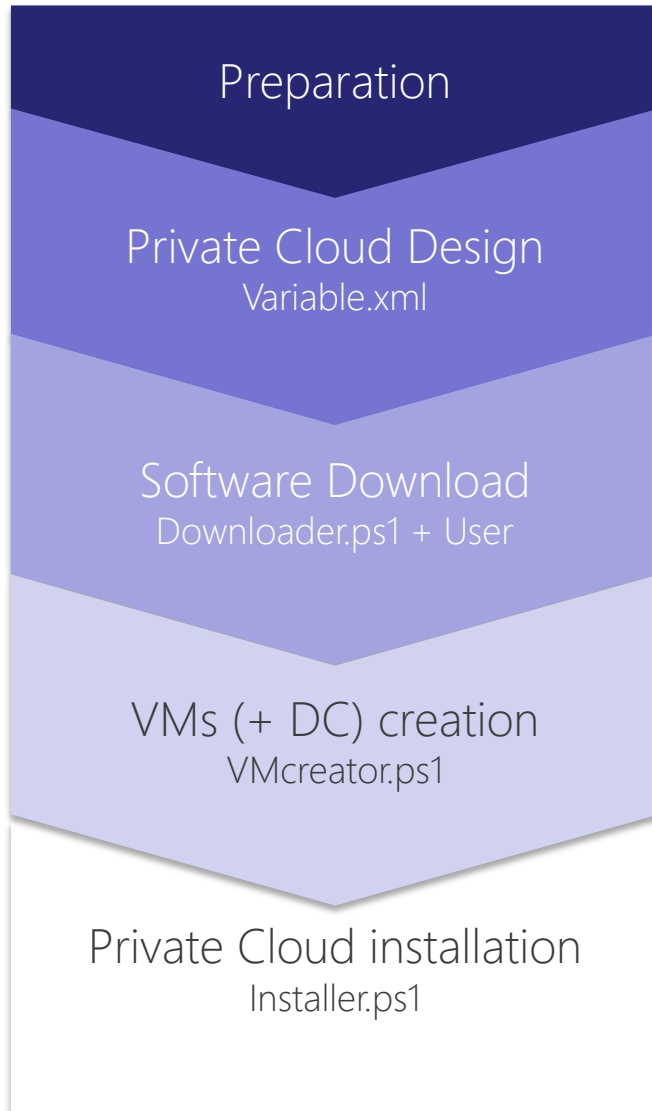
System Center 2012 R2 Operations Manager
Database Server: DB03.contoso.com: End DB03.contoso.com: 00:00:06
Datawarehouse Server: DB03.contoso.com: End DB03.contoso.com: 00:00:06
Management Server: OM01.contoso.com: End OM01.contoso.com: 00:03:23
Reporting Server: DB03.contoso.com: End DB03.contoso.com: 00:00:06
Web Console Server: OM01.contoso.com: End OM01.contoso.com: 00:03:23
Console: RD01.contoso.com: End RD01.contoso.com: 00:25:23

System Center 2012 R2 Data Protection Manager
Database Server: DPM01.contoso.com: End DPM01.contoso.com: 00:06:34
Reporting Server: DPM01.contoso.com: End DPM01.contoso.com: 00:06:34
Server: DPM01.contoso.com: End DPM01.contoso.com: 00:06:34
Console: RD01.contoso.com: End RD01.contoso.com: 00:25:24

Windows Azure Pack
Database Server: DB02.contoso.com: End DB02.contoso.com: 00:36:51
Admin API Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54
Tenant API Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54
Tenant Public API Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54
Admin Site Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54
Admin Authentication Site Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54
Tenant Authentication Site Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54
Tenant Site Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54
Console: RD01.contoso.com: End RD01.contoso.com: 00:25:24

SQL Server 2012
Database Server: DB02.contoso.com: End DB02.contoso.com: 00:36:51
Reporting Server: CM01.contoso.com: End CM01.contoso.com: 00:38:14
Management Tools: RD01.contoso.com: End RD01.contoso.com: 00:25:24
```


PDT - Walkthrough



```
DC01 on HYPERV1 - Virtual Machine Connection
File Action Media Clipboard View Help
PowerShell Deployment Toolkit

System Center 2012 R2 Virtual Machine Manager
Database Server: DB02.contoso.com: End DB02.contoso.com: 00:36:50
Management Server: UMM01.contoso.com: End UMM01.contoso.com: 00:02:15
Console: RD01.contoso.com: End RD01.contoso.com: 00:25:23

System Center 2012 R2 Orchestrator
Database Server: DB02.contoso.com: End DB02.contoso.com: 00:36:50
Management Server: OR01.contoso.com: End OR01.contoso.com: 00:12:53
Primary Runbook Server: OR01.contoso.com: End OR01.contoso.com: 00:12:53
Web Components Server: OR01.contoso.com: End OR01.contoso.com: 00:12:53
Runbook Designer: RD01.contoso.com: End RD01.contoso.com: 00:25:23

System Center 2012 R2 Service Provider Foundation
Database Server: DB02.contoso.com: End DB02.contoso.com: 00:36:50
Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54

System Center 2012 R2 Service Management Automation
Database Server: DB02.contoso.com: End DB02.contoso.com: 00:36:50
Web Service Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54
Runbook Worker Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54

System Center 2012 R2 Service Reporting
Datawarehouse Server: DB06.contoso.com: End DB06.contoso.com: 00:31:03
Analysis Server: DB06.contoso.com: End DB06.contoso.com: 00:31:03
Server: DB06.contoso.com: End DB06.contoso.com: 00:31:03

System Center 2012 R2 App Controller
Database Server: DB02.contoso.com: End DB02.contoso.com: 00:36:51
Server: UMM01.contoso.com: End UMM01.contoso.com: 00:02:15
Console: RD01.contoso.com: End RD01.contoso.com: 00:25:23

System Center 2012 R2 Operations Manager
Database Server: DB03.contoso.com: End DB03.contoso.com: 00:00:06
Datawarehouse Server: DB03.contoso.com: End DB03.contoso.com: 00:00:06
Management Server: OM01.contoso.com: End OM01.contoso.com: 00:03:23
Reporting Server: DB03.contoso.com: End DB03.contoso.com: 00:00:06
Web Console Server: OM01.contoso.com: End OM01.contoso.com: 00:03:23
Console: RD01.contoso.com: End RD01.contoso.com: 00:25:23

System Center 2012 R2 Data Protection Manager
Database Server: DPM01.contoso.com: End DPM01.contoso.com: 00:06:34
Reporting Server: DPM01.contoso.com: End DPM01.contoso.com: 00:06:34
Server: DPM01.contoso.com: End DPM01.contoso.com: 00:06:34
Console: RD01.contoso.com: End RD01.contoso.com: 00:25:24

Windows Azure Pack
Database Server: DB02.contoso.com: End DB02.contoso.com: 00:36:51
Admin API Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54
Tenant API Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54
Tenant Public API Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54
Admin Site Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54
Admin Authentication Site Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54
Tenant Authentication Site Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54
Tenant Site Server: OR01.contoso.com: End OR01.contoso.com: 00:12:54
Console: RD01.contoso.com: End RD01.contoso.com: 00:25:24

SQL Server 2012
Database Server: DB02.contoso.com: End DB02.contoso.com: 00:36:51
Reporting Server: CM01.contoso.com: End CM01.contoso.com: 00:38:14
Management Tools: RD01.contoso.com: End RD01.contoso.com: 00:25:24
```


More?

<http://aka.ms/buildmycloud>

YouTube DE

Aufbau einer Cloud mit Windows Server 2012 R2, Hyp...
von TechNet Deutschland in Kooperation mit ESCde • 1/38 Videos

(4) PowerShell Deployment Toolkit (PDT) oder "Unattended" System Center installieren | TechNet Deutschland in Kooperation mit ESCde

(5) PDT: Downloader.ps1 lädt Software Voraussetzungen für System Center herunter | TechNet Deutschland in Kooperation mit ESCde

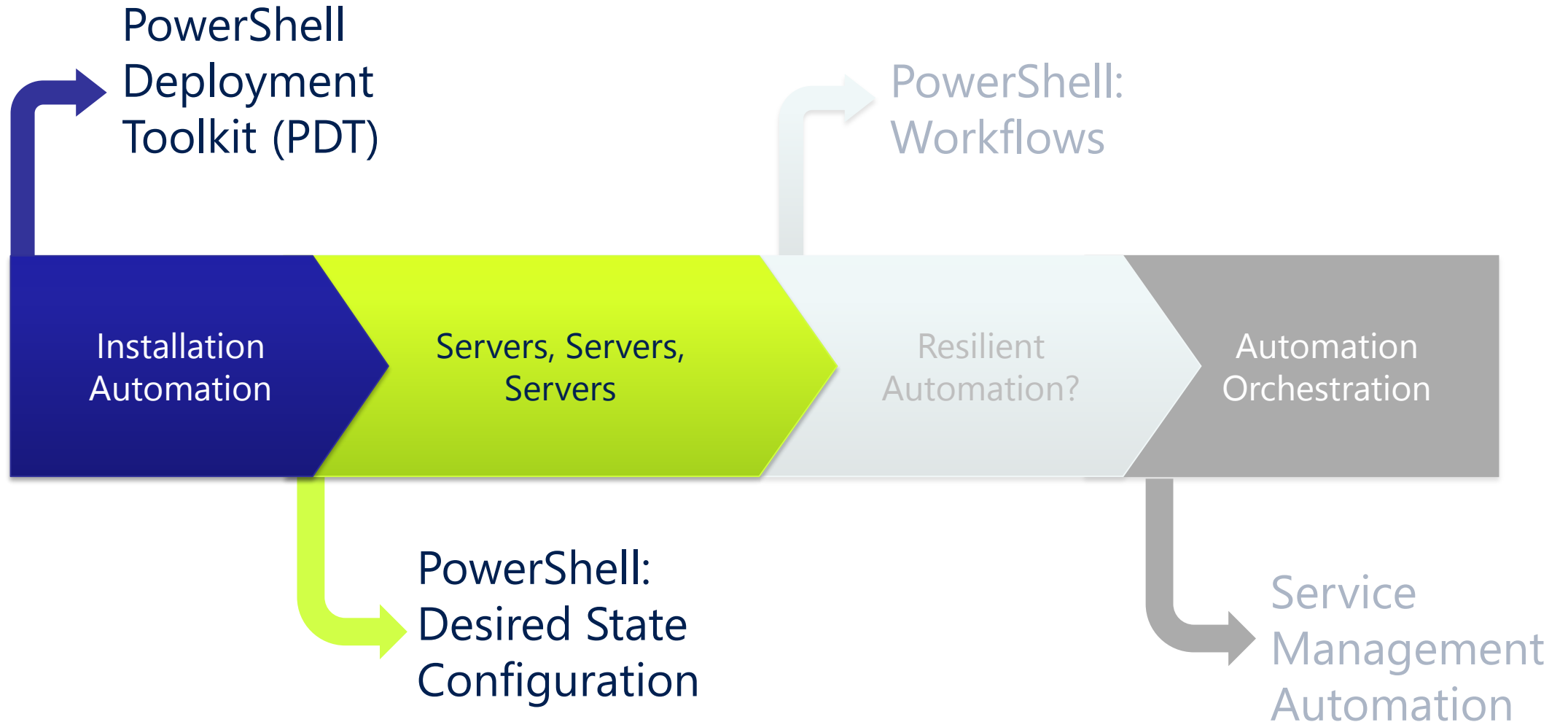
(6) PDT: Variable.xml (Teil 1): Hier steht wie die System Center Umgebung aussehen soll | TechNet Deutschland in Kooperation mit ESCde

(7) Cloud OS: So soll unsere System Center Demoumgebung zur Serie aussehen | Microsoft TechNet Deutschland in Kooperation mit ESCde

(8) PDT: Variable.xml (Teil2): Eigenschaften einzelner System Center Rollen festlegen |

Microsoft

Agenda



The Problem

Business



Number of servers



Number of IT people



Number of failures



Overall happiness



Remedy?

Automation!

Scripts

Lots of scripts

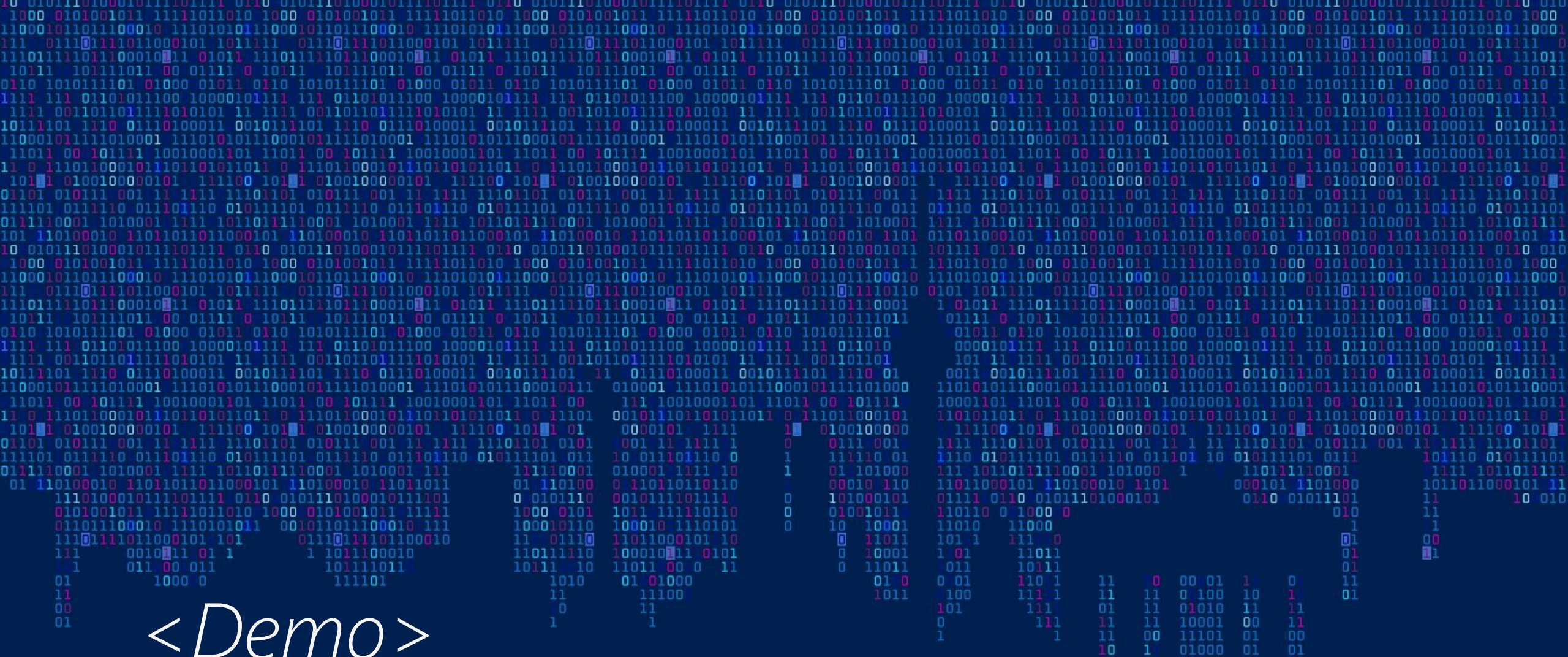
Error handling? lots of work / not implemented ;-)

„Scripting Anarchy“



Remedy!

Desired State Configuration

```
1 configuration myConfig
2 {
3     # One can evaluate expressions to get the node list
4     # E.g: $AllNodes.Where("Role -eq Web").NodeName
5     node ("Node1","Node2","Node3")
6     {
7         # Call Resource Provider
8         # E.g: WindowsFeature, File
9         WindowsFeature FriendlyName
10        {
11            Ensure = "Present"
12            Name = "Feature Name"
13        }
14        File FriendlyName
15        {
16            Ensure = "Present"
17            SourcePath = $SourcePath
18            DestinationPath = $DestinationPath
19            Type = "Directory"
20            DependsOn = "[WindowsFeature]FriendlyName"
21        }
22    }
23 }
24 }
```

Configuration and Continuous Deployment

Intent 	Environment Configuration (Dev -> Test -> Production)	<pre>\$SystemDrive = "C:" \$DemoFolder = "\$SystemDrive\Demo" \$global:WebServerCount = 3 ...</pre>
	Structural Configuration	<pre>WindowsFeature IIS { Name = "Web-Server" Ensure = "Present" } ...</pre>
Make It So 	Idempotent Automation	<pre>foreach -parallel (\$featureName in \$Name) { \$feature = Get-WindowsFeature -Name \$featureName if((\$Ensure -eq "Present") -and (!\$feature.Installed)) { Install-WindowsFeature -Name \$featureName } } ...</pre>

Push Model

Authoring Phase

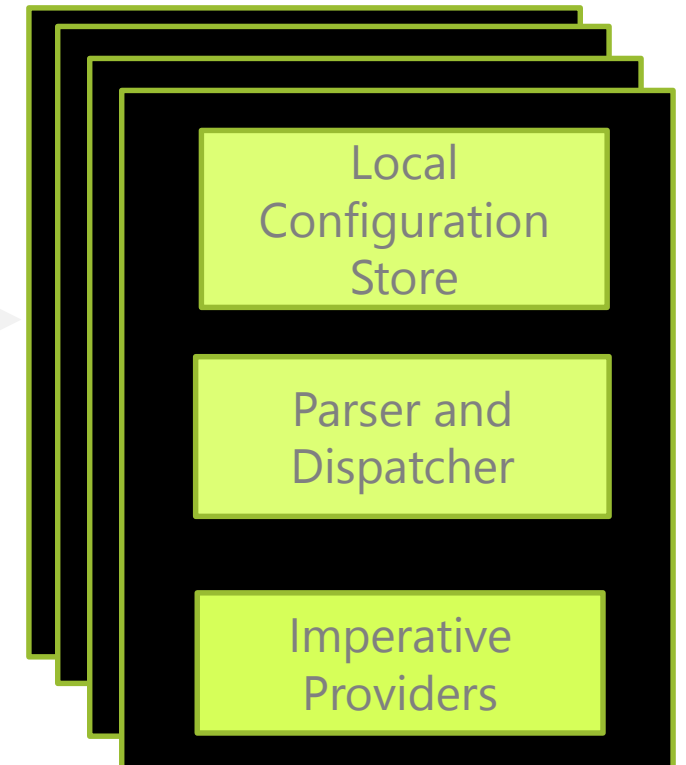
PowerShell

3rd party
languages and
tools

Staging Phase

**Configuration
Staging Area**
(Contains DSC data)

"Make it So" Phase



Pull Model

Authoring Phase

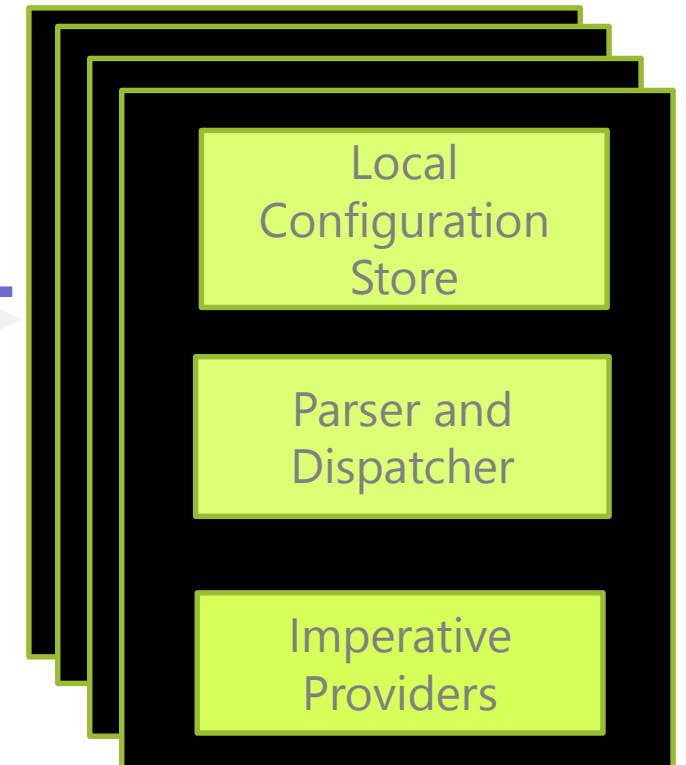
PowerShell

3rd party
languages and
tools

Staging Phase

Pull Server
(Contains DSC data
and Modules)

"Make it So" Phase



Where is DSC available?

- PowerShell V4

Windows Server 2012 R2	Included
Windows 8.1	
Windows Server 2012	Install with Windows Management Framework 4.0
Windows Server 2008 R2	
Windows 7	

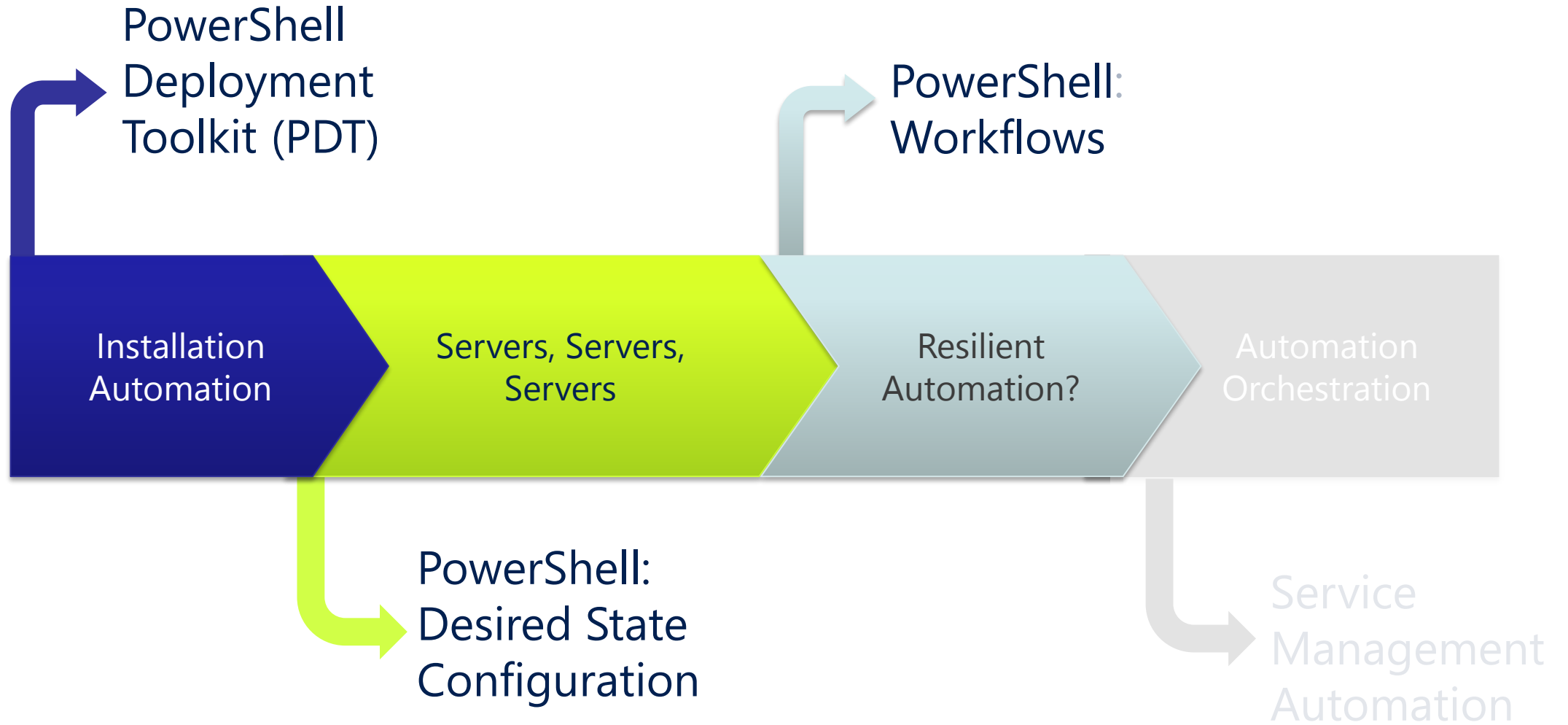
PowerShell Desired State Configuration

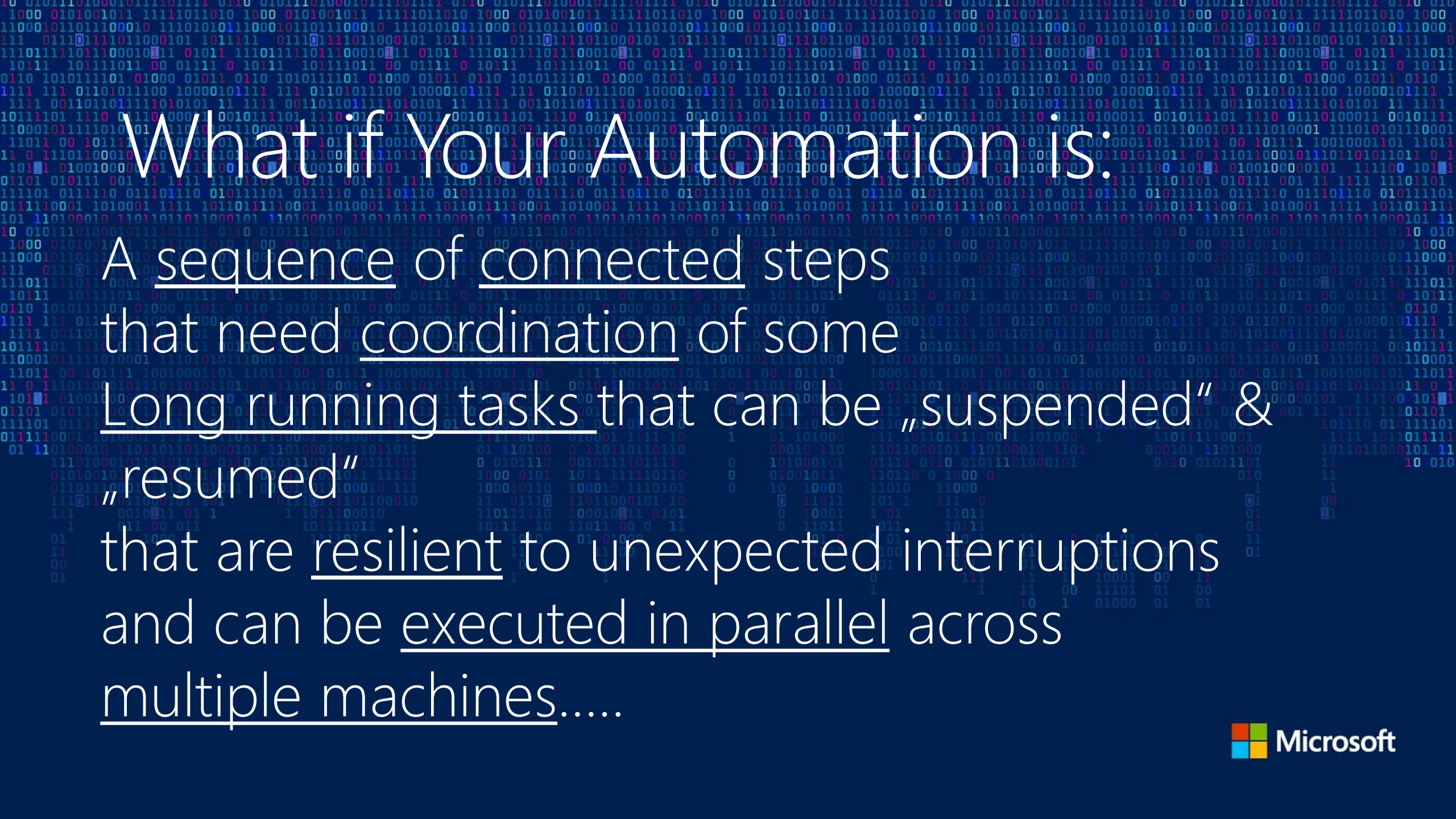
Enables you to **ensure** that the components of your data center have the **correct configuration**

Allows **“continuous deployment”** and prevents **“configuration drift”**

Uses language extensions and providers to enable declarative, autonomous and idempotent (repeatable) Deployment, Configuration and Conformance of **standards-based managed elements**

Agenda





What if Your Automation is:

A sequence of connected steps
that need coordination of some
Long running tasks that can be „suspended“ &
„resumed“
that are resilient to unexpected interruptions
and can be executed in parallel across
multiple machines.....

PowerShell Workflow = Workflow Foundation (WWF) + PowerShell

```
workflow Test-workflow
```

```
{  
    ...  
}
```

Consists activities
allows nesting

Written in PowerShell language

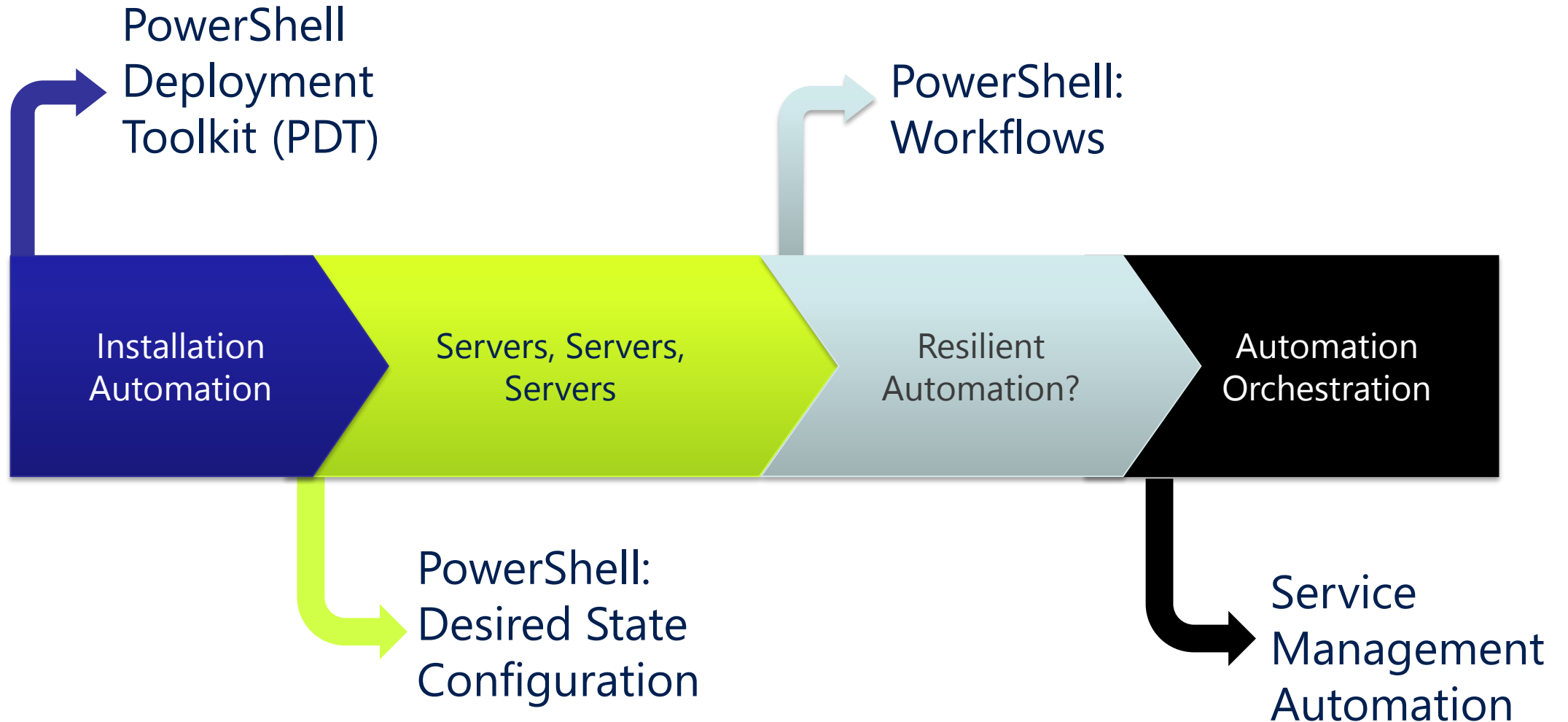
Compiled to .net

Can set checkpoints

Demo

PowerShell Workflow

Agenda





Automation Orchestration

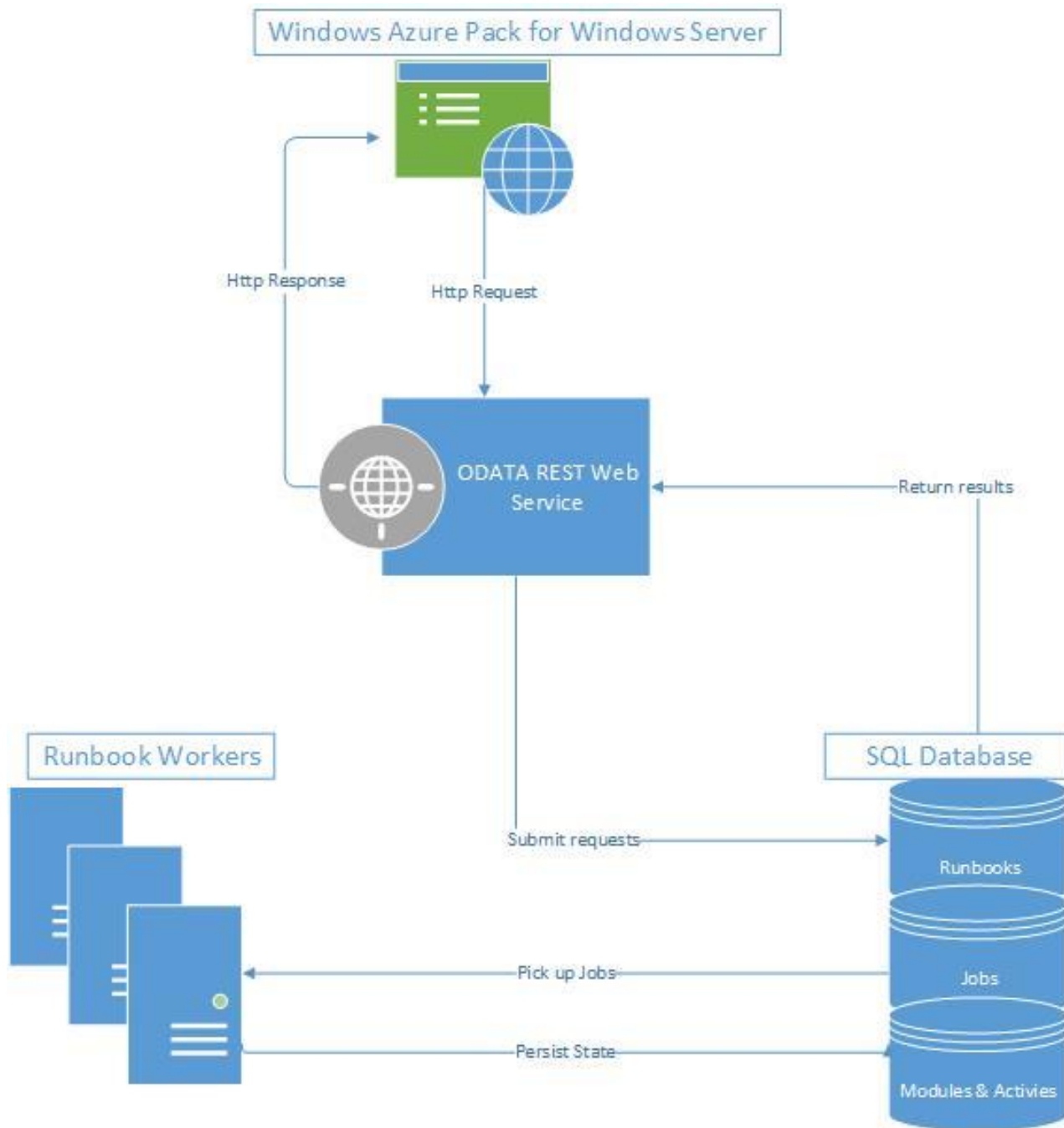
Execution Engine – Scalable / High Availability

Workflow „Runbook“ Repository

Execution History

->Service Management Automation (SMA)

SMA - Architecture



Demo

Service Management Automation (SMA)



Service Management Automation (SMA)

Installable – Orchestrator (2012 R2)

GUI – Administration through Azure Pack (WAP)

PowerShell Administration Module

Vielen Dank