Configuring Dell Server Deployments End to End With Deployment Toolkit

Efficient techniques for setting basic, secured, and advanced tokens on Dell servers for deploying operating systems including the latest updates of respective drivers and firmwares.

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Executive Summary

It is a monotonous and time consuming task to set up operating systems on hundreds of servers across multiple generations with the respective settings and latest firmwares.

Dell Deployment Toolkit (DTK) decreases the human effort involved in the deployment process considerably. This document explains how an end user can utilize DTK for deployment per their specific needs and also utilize Systems Update Utility (SUU) to get the latest drivers and firmwares on the servers.

The deployment methodologies that are relevant to three specific groups of customers are discussed.

1. Basic - Bare Metal Server deployment [Basic configuration + OS installation + Latest Drivers and Firmwares]

2. Secured - Bare Metal Server deployment [Secured configuration + OS installation + Latest Drivers and Firmwares]

3. Advanced - Bare Metal Server deployment [Advanced configuration + OS installation + Latest Drivers and Firmwares]
**Introduction**

It is always preferred to run the latest hardware on servers to achieve the best performance. It is also preferred that these servers operate with the latest firmware and drivers to keep up with the high performance requirements.

Though this may sound simple, it is not easy to achieve. With multiple operational servers on hand, it takes a lot of effort to complete the firmware updates, create separate virtual disks, and then deploy an operating system with the latest drivers for each of the components. Although there are different approaches to handle this task, DELL DTK provides an optimized and easy way to accomplish this goal.

**DTK in a Nutshell**

DTK aids in configuring the hardware of a Dell server and deploying with supported operating system in a single continuous process. It has the unique feature of unattended deployment of operating system on both Windows and Linux. The script can be used to deploy any number of servers at a time, based on the customer needs.

**Prerequisites:**

- Deployment Toolkit (DTK) ISO or the burnt DVD from the web posting available at support.dell.com.
- Basic working knowledge on DTK and hands on experience on Command Line Interface (CLI) for tweaking the scripts.
- A Dell server with Network Port1 connected to LAN, that is, a server that can fetch and have an IP address (Mandatory for or Operating System (OS) deployment).
- Access to the NFS/SAMBA share having the latest System Update Utility (SUU).
- Access to the NFS/SAMBA share having the extracted ISO files for all the required OS.
- iDRAC7 GUI should be up for every server [recommended] and every server should have an iDRAC IP. The PowerEdge 12G servers are with iDRAC7 support while servers prior to PowerEdge 12G are with iDRAC6/DRAC support.
- Similar server setup is recommended for optimization (controllers, number of hard disks, and so on).
- Windows Automated Installation Kit (WAIK) to create WinPE ISO 32-bit and 64-bit for Windows Deployment ToolKit images.
DTK Terminologies

WINDOWS PE (WinPE) Disc Creation
Download the WinPE zip from support.dell.com and create WinPE (32-bit and 64-bit) ISO using the Windows Automated Installation Kit (WAIK) Tool. By design, using WinPE 32-bit, only 32-bit operating system can be installed and using WinPE 64-bit, only 64-bit operating system can be installed.

Currently there are multiple versions of WinPE such as 3.0 and 4.0. Ensure to use the appropriate version for the deployment on corresponding servers.

DTK Emulated Language Interface (ELI)
DTK ELI iso can be directly downloaded from the Dell website and the same can be used as bootable image to configure server tokens and deploy LINUX operating systems.

DELL Life Cycle Controller
BIOS token (syscfg) on 12G and beyond servers require the server to boot to Lifecycle Controller (LC) for setting the respective tokens.
Figure 1. End to End Flow of DTK Server Deployment

Input Section

- Run the scripts to configure bios, raid and iDrac tokens and proceed to OS deployment

Output Section

- OS Installed
- Server deployed with latest drivers

- DTK Iso
- Dell Server
- USB
- OS – Share mounted

- Latest SUU Repository mounted
Case 1 - Basic - Bare Metal Server Deployment

Consider the lab servers for a Basic server configuration. The following are the popular tokens that can be used for a basic setup.

**BIOS Tokens**

- Enable the integrated NICs
- Enable the Power button functionality
- Power On the server when power cable is unplugged and plugged in back
- Enable all the USB ports including internal USB ports
- Enable the internal SD card
- Unlock if the system password if already set from BIOS
- Set a boot sequence
- Set DHCP for getting the automatic Drac ip

**RAID Creation**

- Reset the controller
- Clear the foreign configuration if any on the Harddisks (HDDs)
- Create a virtual disk of your choice

**iDRAC Tokens**

- Create an iDRAC user “operator” and enable the user
- Set the user credentials for the user
- Set the privilege for the user

**Server OS installation**

Deploy the configured server with RHEL 6.3(64-bit )operating system.

**Updating the Drivers and Firmwares**

Post the OS installation, update all the drivers and firmwares on the server using the mounted Dell Server Update Utility (SUU) through the Command Line Interface (CLI).
Basic - Sample Script for DTK 4.2 - WINPE 4.0 x64

Basic_Win2012.bat

Basic - Sample Script for DTK 4.2 - ELI x64

Basic_RHEL6.sh
Case 2 - Secured - Bare Metal Server deployment

Consider the lab servers for a secured server configuration. The following are the popular tokens that can be used for the setup.

**BIOS Tokens**

- Disable all the USB ports including internal USB ports
- Set a setup password
- Disable the Power button functionality
- Set the Server to have the last saved configuration when power cable is unplugged and plugged in back
- Disable the internal SD card
- Set a system password
- Enable the integrated NICs
- Set a boot sequence

**RAID Creation**

- Reset the controller
- Clear the foreign configs if any on the Harddisks (HDDs)
- Create a virtual disk of your choice
- Create a secured global hotspare for the controller

**iDRAC Tokens**

- Create an iDRAC “readonly” user and enable the user
- Set the user credentials for the user
- Set the privilege for the user

**Server OS installation**

Deploy the configured server with RHEL 6.3(64-bit) operating system.

**Updating the Drivers and Firmwares**

Post the OS installation, through Command line interface (CLI), utilize the Server Update Utility (SUU) mounted to update all the drivers and firmwares on the server.
Secured - Sample Script for DTK 4.2 - WINPE 4.0 x64

Secured_Win2012.bat

Secured - Sample Script for DTK 4.2 - ELI x64

Secured_RHEI6.sh
Case 3 - Advanced - Bare Metal Server deployment

Consider the lab servers in need to have some advanced server configuration. Below are the popular tokens that can be set for that setup.

BIOS Tokens

- Enable the integrated NICs
- Enable the Power button functionality
- Power On the server when power cable unplugged and plugged in back.
- Enable all the USB ports including internal USB ports
- Enable the internal SD card
- Set a system password
- Set a convenient boot sequence
- Set DHCP for getting the automatic DRAC ip
- Set an alert destination ip address/hostname of the target server to alert
- Enable the controller BIOS turbo feature

RAID Creation

- Reset the controller
- Clear the foreign configuration if any on the Harddisks (HDDs)
- Create a partial virtual disk of your choice
- Create a secured global hotspare for the controller
- Set a boot VD on one of the created Virtual disks

iDRAC Tokens

- Create an idrac user “operator” and enable the user
- Set the user credentials for the user
- Set the privilege for the user
- Create an idrac “readonly” user and enable the user
- Set the user credentials for the created user
- Set the privilege for the user
Server OS installation

Deploy the configured server with RHEL 6.3 (64-bit) operating system.

Updating the Drivers and Firmwares

Post the OS installation, through Command line interface (CLI), utilize the system update utility (SUU) mounted to update all the drivers and firmwares on the server.

Advanced - Sample Script for DTK 4.2 - WINPE 4.0 x64

Advanced - Sample Script for DTK 4.2 - ELI x64

Windows - Auto - SUU Update (Firmwares & Drivers)

Post the Windows OS installation, update drivers using the Win2k12 Script.

RHEL6 - Auto - SUU Update (Firmwares & Drivers)

Post the RHEL6 OS installation, update drivers using the RHEL6 Script.

All Script Attachments

Scripts are embedded as attachment (winrar) with this PDF

WINDOWS Script Files Attached

RHEL Script Files Attached
DTK’s Time Saving Quotient

Manual Deployment Time
The manual deployment time includes the time involved in configuring RAID, BIOS, and iDRAC tokens, installing a specific operating system by using OS DVD in all the required servers and going through the entire deployment process step by step.

DTK Deployment Time
This includes using the DTK DVD once in any of the Dell server, starting the custom script and utilizing the same for the unattended installation on all the target servers.
Configuring and deployment on a Linux box

<table>
<thead>
<tr>
<th>Area</th>
<th>Manual Server Setup</th>
<th>Using DTK Server Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Attended Time</td>
<td>Unattended Time</td>
</tr>
<tr>
<td>DTK bootup</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Raid Configuration (raidcfg tokens)</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>System BIOS configuration (syscfg tokens)*</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>iDRAC Configuration (racadm tokens)</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Linux Server OS Installation</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>DUP update</td>
<td>10</td>
<td>60</td>
</tr>
<tr>
<td>Sub Total Time (in Minutes)</td>
<td>60</td>
<td>102</td>
</tr>
<tr>
<td>Total Time (in Minutes)</td>
<td>162</td>
<td>87</td>
</tr>
<tr>
<td>Total Time (in Hrs)</td>
<td>2.70</td>
<td>1.45</td>
</tr>
<tr>
<td>Human Percentage%</td>
<td>59.00%</td>
<td>10.00%</td>
</tr>
</tbody>
</table>

Note: *12G and later servers require to boot to Lifecycle controller (LC) for applying the BIOS tokens. So this will increase some more minutes in the unattended time section for syscfg tokens.
Figure 3. Time for Deployment of a Windows OS through DTK Vs. Manual

<table>
<thead>
<tr>
<th>Configuring and deployment of a Windows box</th>
<th>Manual Server Setup</th>
<th>Using DTK Server Setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area</td>
<td>Attended Time</td>
<td>Unattended Time</td>
</tr>
<tr>
<td>DTK bootup</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Raid Configuration (raidcfg tokens)</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>System BIOS configuration (syscfg tokens)*</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>iDRAC Configuration (racadm tokens)</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Windows Server OS Installation</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>DUP update**</td>
<td>10</td>
<td>60</td>
</tr>
<tr>
<td>Sub Total Time (in Minutes)</td>
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<td>Total Time (in Minutes)</td>
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<td></td>
</tr>
<tr>
<td>Total Time (in Hrs)</td>
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</tr>
<tr>
<td>Human Percentage%</td>
<td>45.00%</td>
<td></td>
</tr>
</tbody>
</table>

Note: *12G Servers and beyond require to enter back to Lifecycle controller (LC) for applying the BIOS tokens. So this will increase some more minutes in unattended time section for syscfg tokens

**DUP updates require the SUU repository to be available in local or virtual media or NFS/SAMBA Share. Time for the driver update might vary based on the media being used.
Summary

1. Dell Deployment Toolkit (DTK) utilizes only 10% of manual intervention that is actually required for various server configuration and deployment in total.
2. DTK along with the support from SUU is a one-stop shop for firmware update, hardware configurations along with OS installation.

Learn more

Visit dell.com/support/manuals for more information on Deployment Toolkit (DTK).