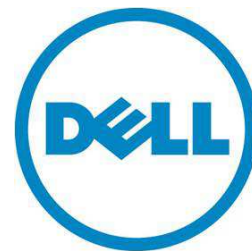

Optimizing Dell server deployments with system build and update utility

Efficient techniques for deploying multiple Dell servers in parallel with RAID configuration, BIOS settings, Firmware updates & operating system installation

Vivek S

Revan Biradar



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Executive Summary

It is a monotonous and time consuming task to set up hundreds of servers across multiple generations with the latest Firmware, respective RAIDs [Configured Virtual Disks] and required Operating System (OS).

Dell's System Build & Update Utility (SBUU), decreases the human effort involved in the deployment process considerably. This document shows how an end user can utilize SBUU for deployment per their specific needs and how well the same can be scaled to multiple servers in parallel.

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

1. Small sized labs [Minimum 1-15 Dell Servers in the lab]
2. Mid-sized labs [Minimum 25-50 Dell Servers in the lab]
3. Large-Sized Labs [50+ Dell Servers in the lab]:



Introduction

It is preferred in the IT world that all servers run the latest hardware to achieve the best performance. It is also preferred that these servers operate with the latest firmware 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 on top of it. Although there are different approaches to handle this task, DELL SBUU provides an optimized and easy way to accomplish this goal.

SBUU in a nutshell

SBUU aids in deploying a Dell server by updating firmware, performing hardware configuration, and installing the operating system all in one single continuous process. It can also facilitate the creation of a customized bootable ISO file with the same functionality that can be deployed on any number of servers based on the customer needs.

Prerequisites:

- SBUU Open Manage (OM) DVD shipped along with the Dell Servers
- An internet connection to the Dell Server [Recommended]
- Access to the NFS/ SAMBA Share having the latest System Update Utility [SUU]
- Access to the NFS/ SAMBA Share having the ISO files of all the needed OSs
- Access to any NFS/ SAMBA share with write permission having [Minimum 25GB of space just in case if you plan to create SBUU custom ISO files]
- iDRAC7 GUI should be up for every server [Recommended] and every server should have an iDRAC IP. 12G Servers are with iDRAC7 support while 11G and below legacy servers are with iDRAC6/ DRAC support.
- Similar Server setup is recommended for optimization (controllers, number of hard disks and so on).

Terminologies

1: 1 Deployment

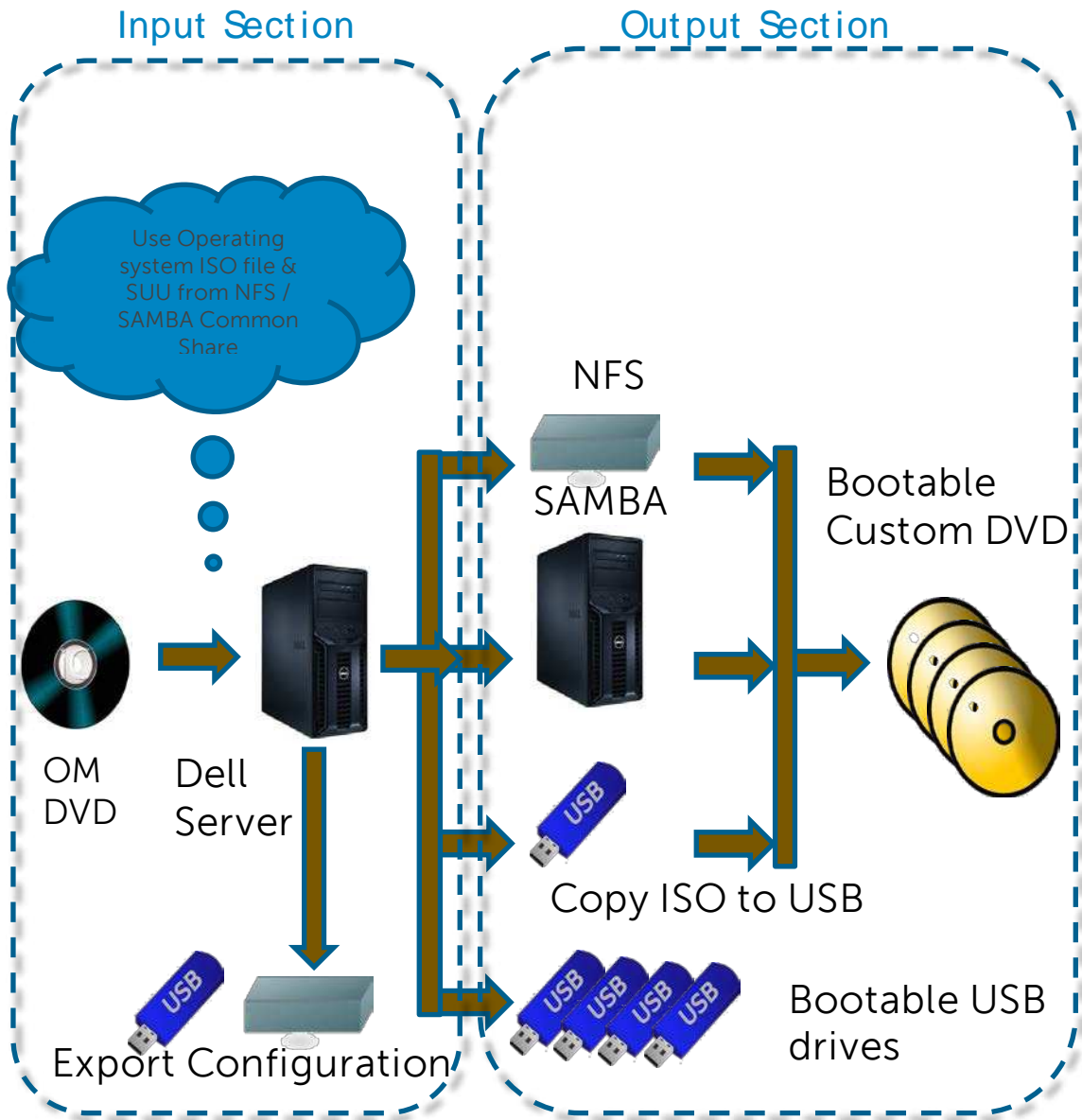
Boot a system with SBUU DVD and configure the same system for deployment.

1: N Deployment

Boot a system with SBUU DVD and create a customized bootable ISO file that can be used to deploy all target servers successfully without human intervention.



Figure 1. End to End flow of SBUU utilization [1:N]



Case 1 – Small-sized Labs

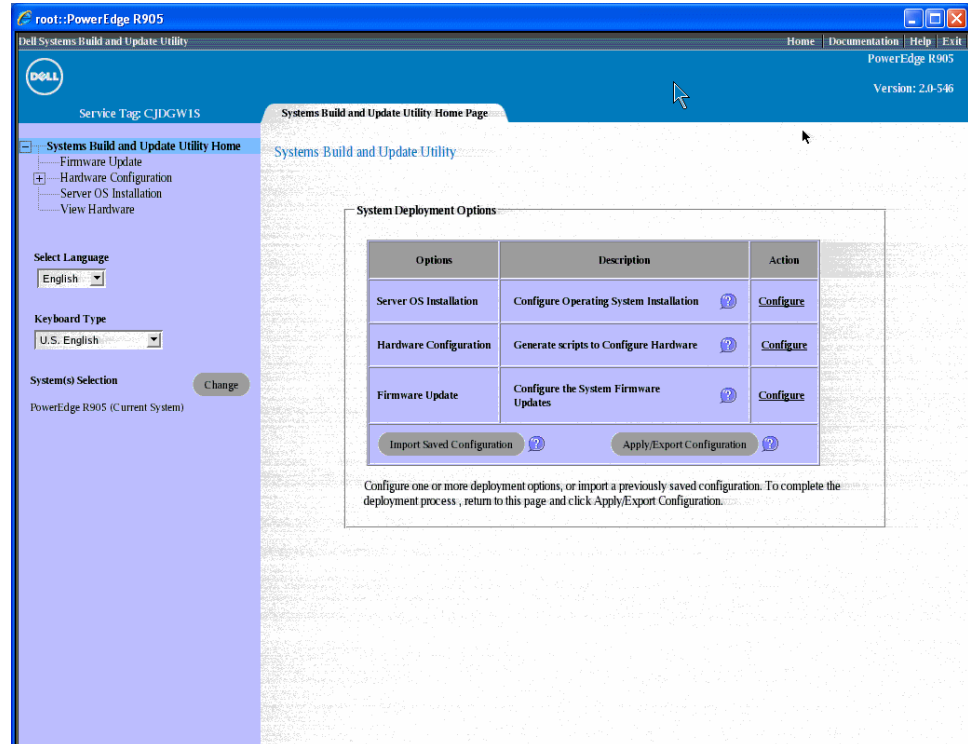
Consider a lab consisting 15 servers across generations and the lab admin needs:



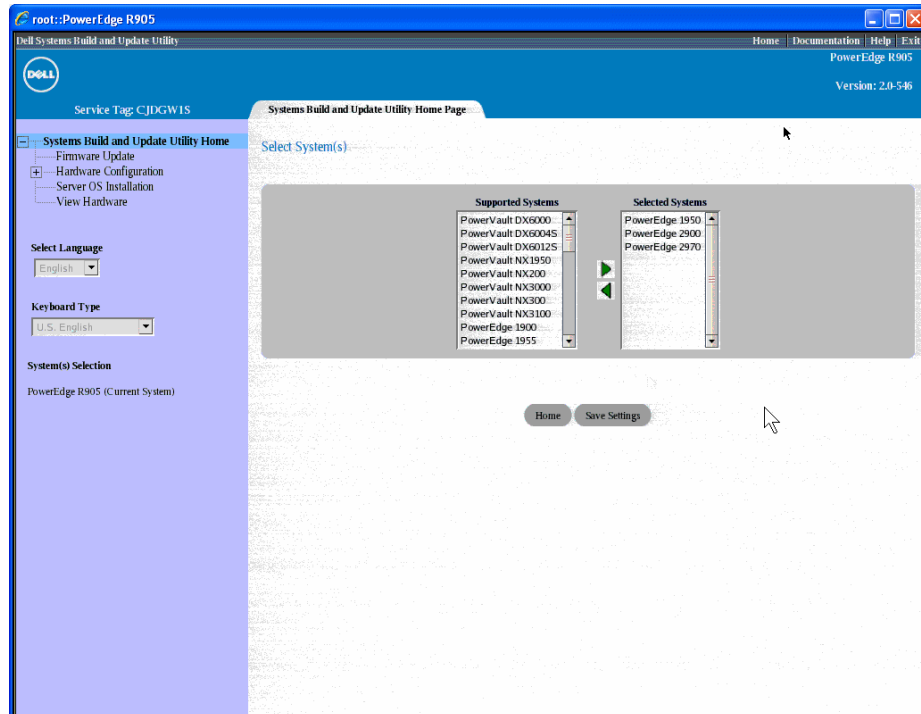
1. To Deploy 5 servers with RHEL 5.7x32 [including hardware configuration and firmware update]
2. To Deploy 10 Servers with SLES 11 Sp2 [including hardware configuration and firmware update]
- 3.

Procedure

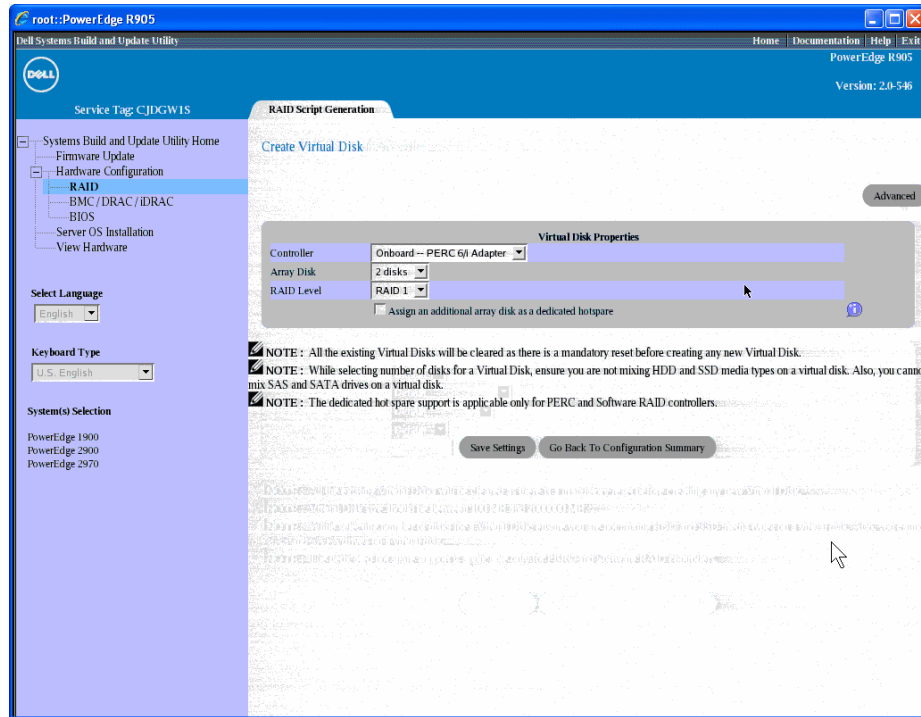
1. Boot a DELL server by inserting the SBUU OpenManage DVD.



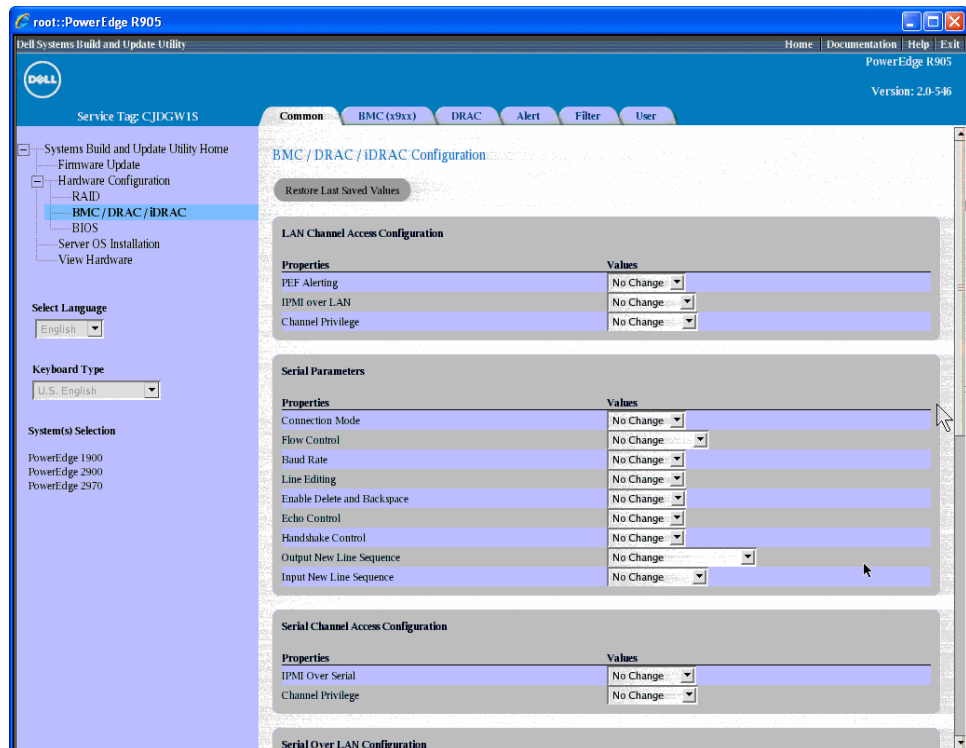
2. Under System(s) Selection, click **Change** and then select the list of Dell server that you want to set up. Save the settings and navigate back to the home page.



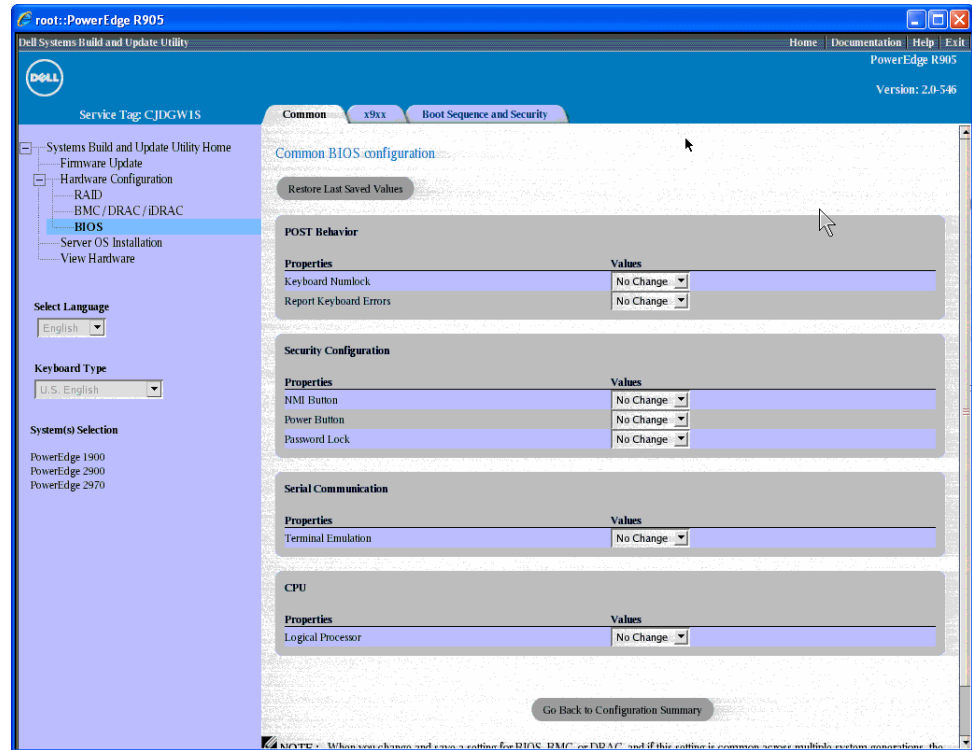
3. Make sure that the needed RAID configurations are set.



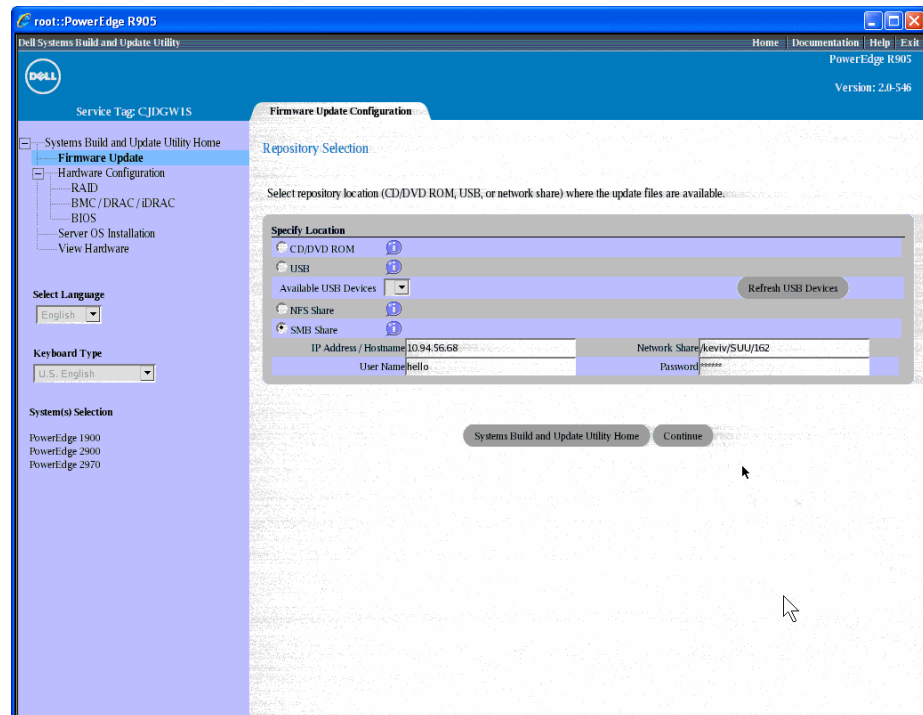
4. Make sure that the needed BMC/ iDRAC/ DRAC configurations are set.



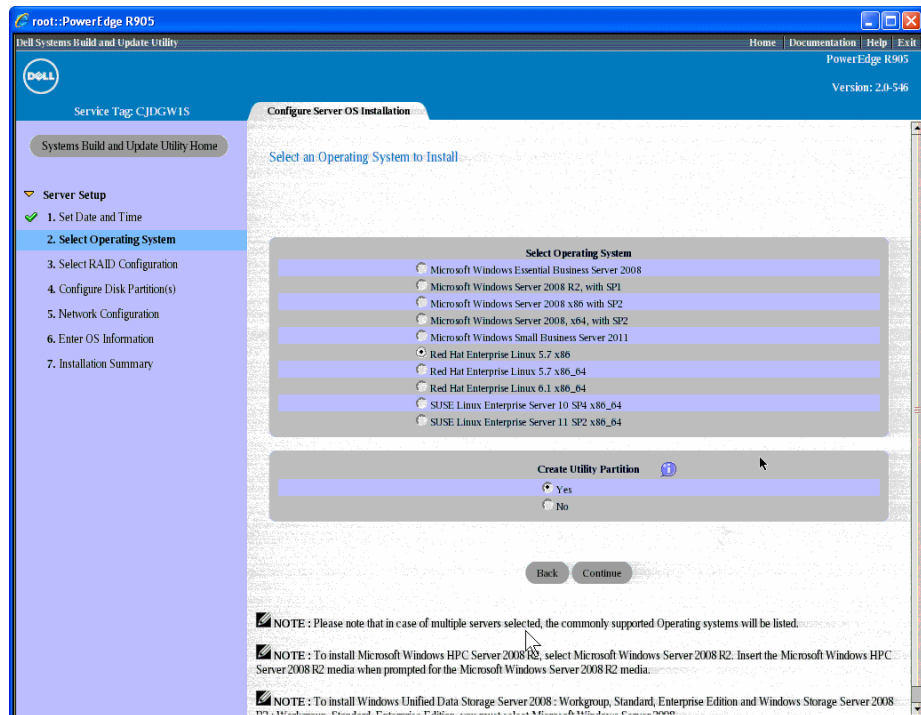
5. Make sure that the needed BIOS configurations are set.



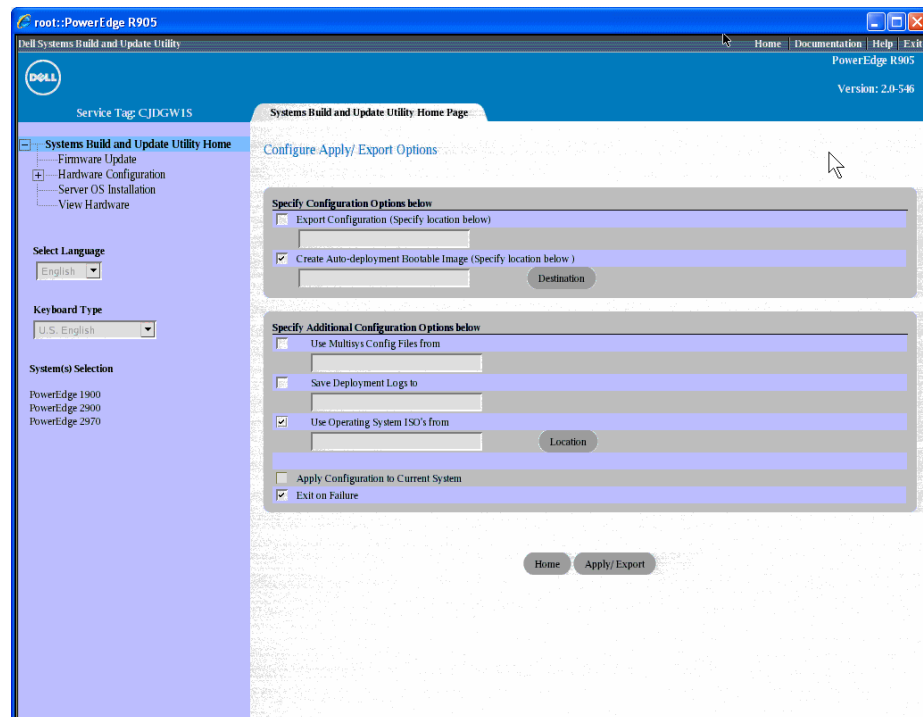
6. Update firmware by pointing the SBUU package available in the network share.



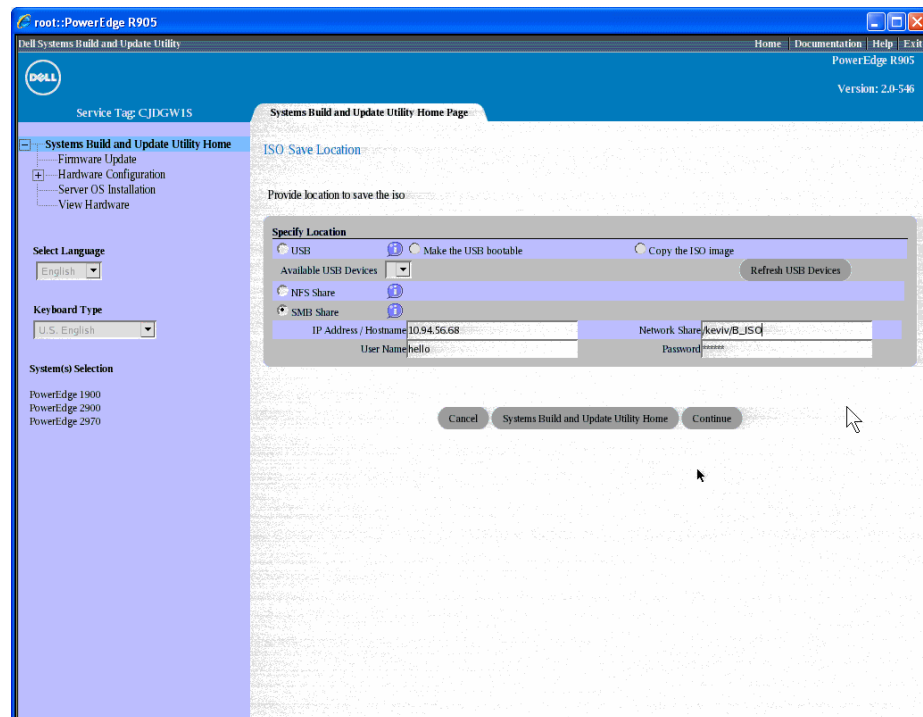
7. Proceed to the Server OS Installation [SOI] and select RHEL 5.7x32. At the end of the wizard, click **Go back to Home page**



8. Click **Apply Export Options** and then select **Use Operating System ISO** from and chose to pick it up from NFS/ SAMBA share



9. Select **Create Auto-deployment bootable image** and specify the NFS/ SAMBA location to retrieve the ISO file created there.



10. Do not select the option **Apply changes to current system** and click **Apply/Export**.

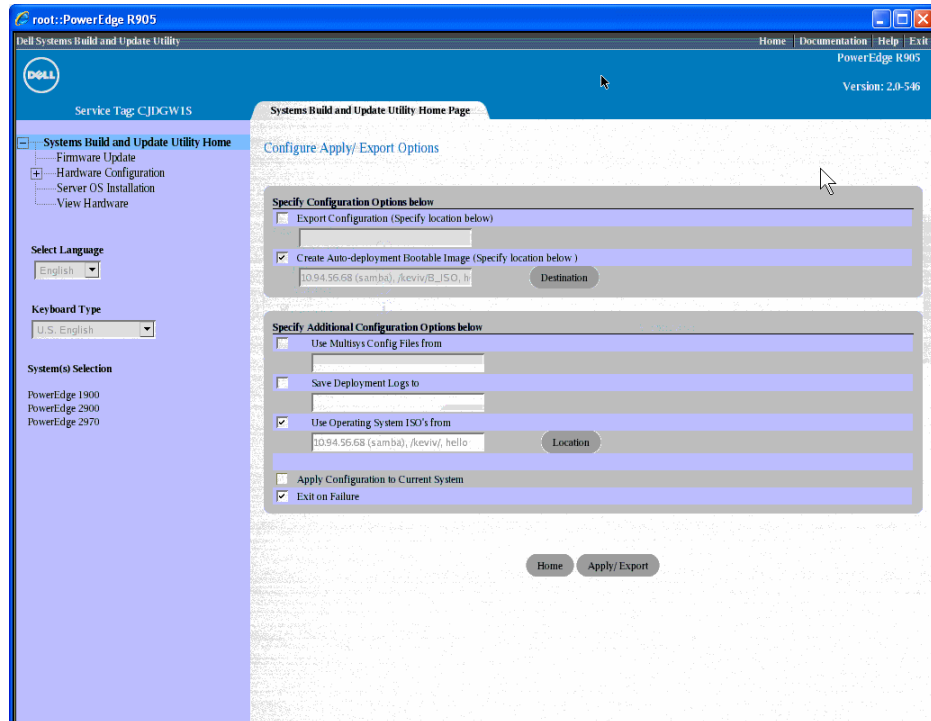
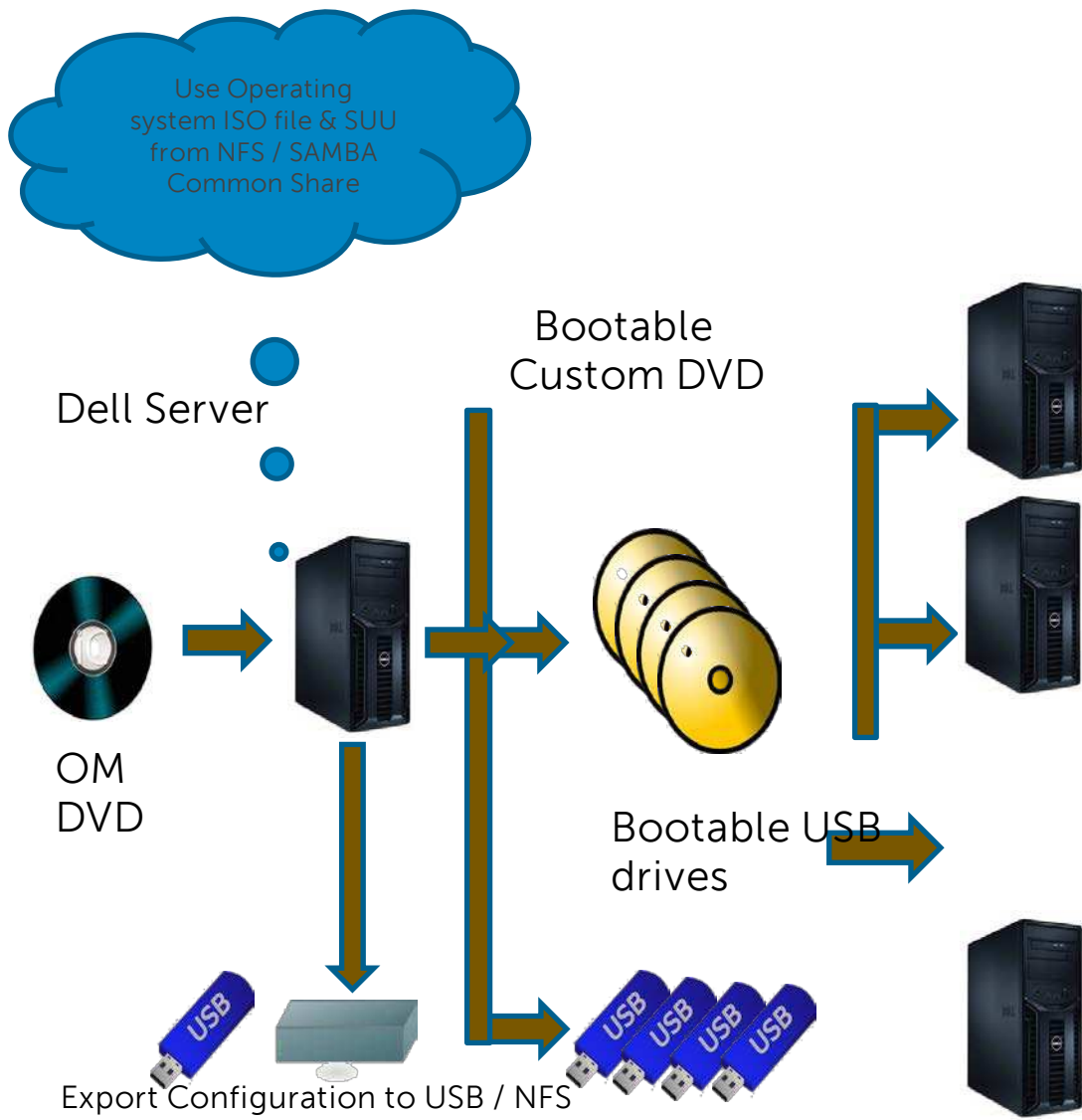


Figure 2. Small Sized Lab – Optimization representation for 1:N



A customized ISO file with all the hardware settings, required firmware packages to install and the OS [RHEL5.7x32] to deploy the system is generated. This activity can be repeated on the same server with other needed servers by selecting them in the list for the *Change* button option. During this process, you can also select a different OS. In this case, we use **SLES 11 Sp2**.

You can copy the created ISO images to USB drive or burnt into a custom DVD and used for deploying the rest of the servers per required specification in parallel.

Optimization using Export Configuration

Export Configuration is a valuable feature when there is a space crunch that might hinder big custom SBUU ISO files from being created. It uses reusing the settings created initially so that the end user does not have to remember the settings that they selected previously.

Export configuration saves all the one time performed settings into a respective ini in the NFS/ SAMBA share, so that in future the user can simply import the settings and apply the same on the target server. This export-import mechanism works on homogenous transitions (that is, between only TOWER->TOWER, RACK->RACK and BLADE -> BLADE and is not heterogeneous [TOWER->RACK or RACK->BLADE]).

Case 2 – Mid-sized Labs

Consider a lab having 30 Servers across multiple generations and the lab admin needs to:

1. Deploy 20 servers with RHEL 5.7x32 [including hardware configuration and firmware update]
2. Deploy 10 Servers with SLES 11 SP2 [including hardware configuration and Firmware update]

Procedure

The Lab admin / End user can follow the optimized procedure shown below using a SBUU DVD to get the setup done.

Repeat Steps 1 to 10 as shown in case 1.

A customized ISO file with all the hardware settings, needed firmware packages and the OS [RHEL5.7x32] to deploy is generated. The same one-time activity can be repeated on the same server by selecting other needed servers for SLES 11 SP2 OS (involves changes in Step 2 and 7).



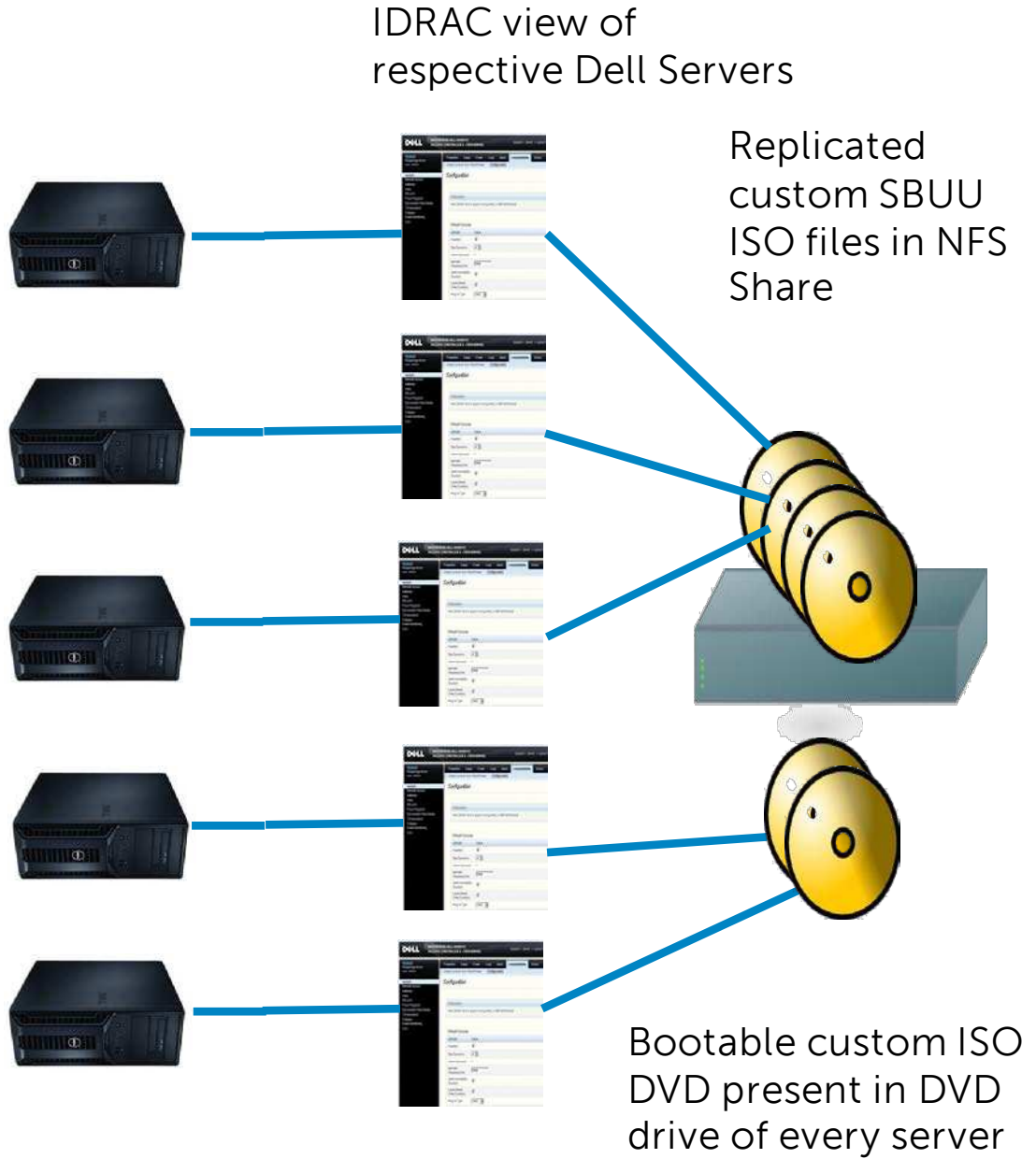
Action item

Given the situation that the admin has two custom SBUU ISO files on a NFS/ SAMBA share that has to be used respectively on 30 Servers; a simple windows file copy coupled with multiple DVD copies can be used to deploy the servers successfully in minimal time. The key is the availability of space (~10-25GB) on the same or a different NFS/ SAMBA share.

The admin must log into every individual server's DRAC IP and make the corresponding boot using the Virtual CD option mounted with each one of the replicated ISO files. It is recommended at any point of time, the best approach is to make a single ISO mounted for a single server; otherwise, it might cause network latency.



Figure 3. Mid- Sized Lab – Optimization representation for 1:N



Case 3 – Large-sized Labs

Consider a lab having 60 Servers across multiple generations and the lab admin needs to:

1. Deploy 30 servers with RHEL 5.7x32 (including hardware configuration and firmware update)
2. Deploy 60 Servers with SLES 11 SP2 (including hardware configuration and firmware update)

Procedure

The Lab admin / End user can follow the optimized procedure shown below using a SBUU DVD to complete the setup.

Repeat Steps 1 to 10 as outlined in case 1.

Action item

Given the situation that the admin has 2 custom SBUU ISO files on a NFS/ SAMBA share that has to be used respectively on 60 Servers, the PXE boot support should be implemented for speedy and efficient deployment.

Firstly, the lab admin needs to place RHEL 5.7x32 Custom ISO file in the PXE server and follow the procedure shown below on all servers that need to be deployed.

1. Go to system setup [F2] on the system.
2. Under “Integrated Devices” enable all the NICS needed as “Enabled with PXE”.
3. Boot up the system with PXE boot.

Repeat the above process for all the servers needing RHEL 5.7x32 OS installation. Then replace the PXE server with the SBUU custom ISO file made for installation of SLES 11 SP2 and repeat step 1 to step 3 for the intended servers.

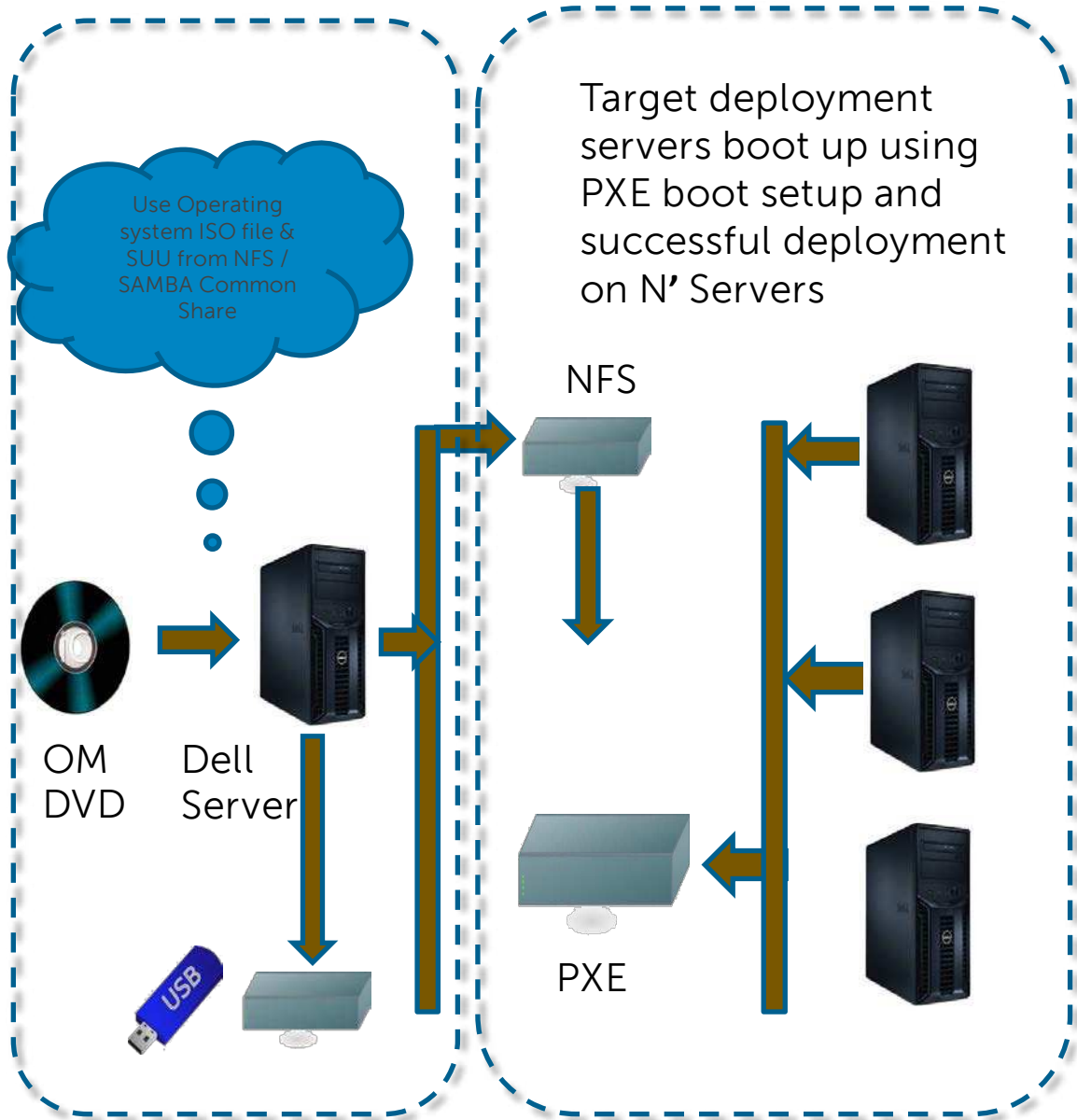
Tip:

The key is that to complete one operating system installation using PXE support for entire n number of servers and then carry on the next operating system to avoid confusion in OS installation on the respective servers.

DELL's Deployment Tool kit (DTK) is another alternate tool that can also be utilized for such repetitive deployments.



Figure 4. Large-Sized Lab - Optimized 1:N



Export Configs to
USB / NFS

PXE Server enabled
with the custom
SBUU bootable
image file



Time Saving quotient

Manual deployment time

This includes the time involved in popping the OS DVD in each and every intended server and going through the entire deployment exercise step by step.

SBUU deployment time

This includes popping the SBUU DVD once in any DELL server, generating a custom DVD and utilizing the same for the unattended installation on all the target servers.

Figure 5. 1:1 - SBUU Deployment Time Vs. Manual Deployment Time:

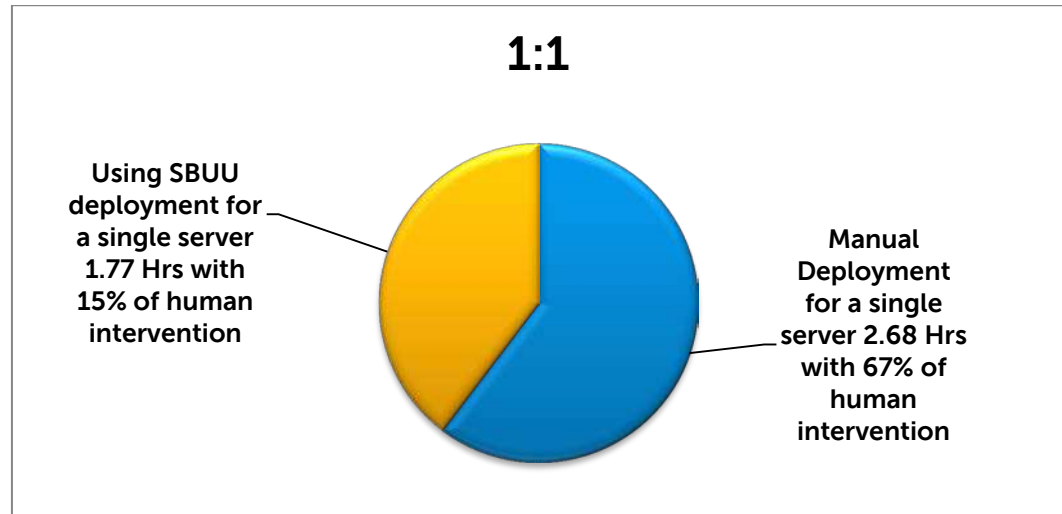


Table 1. 1:1 - Time Stamp Manual Vs. SBUU Deployment

Area	Manual Server Setup		Using SBUU Server Setup [1:1]	
	Attended Time (in Minutes)	Unattended Time (in Minutes)	Attended Time (in Minutes)	Unattended Time (in Minutes)
SBUU boot	N/A	N/A	0	5
Raid Configuration	3	1	1	2
Firmware update*	60	20	2	20
BIOS Configs	10	1	5	5
iDRAC Configs	5	1	3	3
Server OS Installation	30	30	5	55
Create Bootable ISO Image for 1:N support	N/A	N/A	N/A	N/A
Sub Total Time (in Minutes)	108	53	16	90
Total Time (in Minutes)	161		106	
Total Time (in Hrs.)	2.68 Hrs.		1.77 Hrs.	

Note : *Firmware Update without SBUU support is under the assumption that the user uses <http://support.us.dell.com> for the DUPs/ EXE/ BIN files -> Manually download them -> Install them on the target server.

Figure 6. 1:N - SBUU Deployment Time Vs. Manual Deployment Time

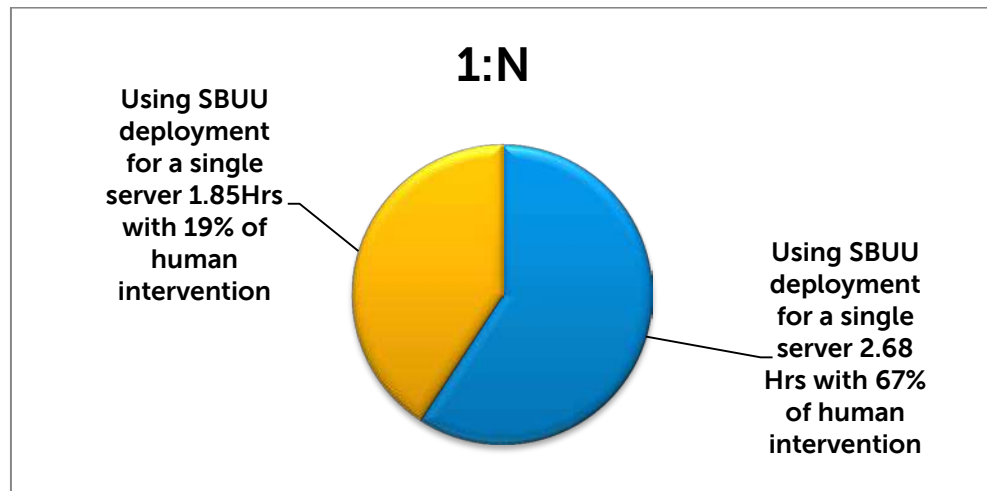


Table 2. 1:N - Time Stamp Manual Vs. SBUU Deployment

Area	Manual Server Setup		Using SBUU Server Setup	
	Attended Time (In Minutes)	Unattended Time (in Minutes)	Attended Time (in Minutes)	Unattended Time (in Minutes)
SBUU boot	N/A	N/A	0	5
Selecting the server list for 1:N	N/A	N/A	5	0
Raid Configuration	3	1	1	2
Firmware update*	60	20	2	20
BIOS Configs	10	1	5	5
iDRAC Configs	5	1	3	3
Server OS Installation	30	30	5	55
Export Configuration / Bootable ISO Creation**	N/A	N/A	0	10
Sub Total Time (in Minutes)	108	53	21	90
Total Time (in Minutes)	161		111	
Total Time (in Hrs.)	2.68 Hrs.		1.85 Hrs.	

Note:**Bootable ISO image creation time implies a one time 25 minutes explicit usage in order to create a bootable ISO file in any USB/ NFS/ SAMBA Share while Export configuration is saving the current settings on a share and importing the same on target servers based on need.



Case Study: Deploying 5 Servers - SBUU Real Time Deployment vs. Manual Deployment Time

Figure 7. 1:N –Case Study - Manual deployment Vs. SBUU Deployment

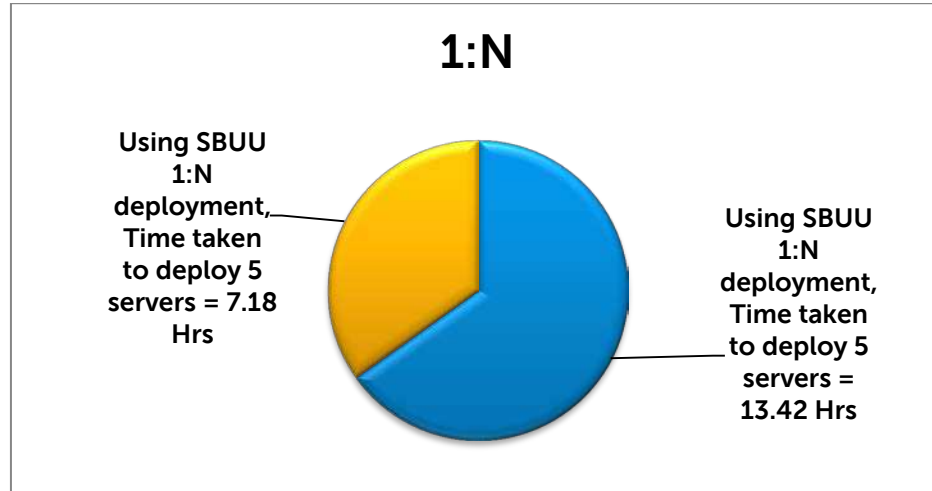


Table 3. 1:N –Case Study - Time Stamp Manual vs. SBUU Deployment

Case with 5 deployable Servers	Manual Server Setup (in Minutes)	Using SBUU Server Setup (in Minutes)
Server 1	161	111
Server 2*	161	80
Server 3*	161	80
Server 4*	161	80
Server 5*	161	80
Total Setup Time for 5 Servers deployment (in minutes)	805	431
Total Time (in Hrs.)	13.42 Hrs. with 67% human intervention on the whole	7.18 Hrs. with 19% human intervention on the whole

Note: For Servers 2 to 5 the custom ISO can be used; it saves time (almost to half man hours).



Summary

1. Dell server deployment using SBUU for both 1:1 and 1: N saves half the time or man hours that are actually needed. It also includes only 19% of human intervention.
2. SBUU along with the support from SJU is a one-stop shop for firmware update, hardware configurations along with OS installation.

Learn more

Visit http://support.dell.com/support/edocs/software/smsbu/1_2/en/index.htm for more information on System Build and update utility (SBUU).

