UXSP-Based YUM Repository Generation

Written by: **Doug Rosser, (drosser@us.ibm.com)**
Ram Pai, (linuxram@us.ibm.com)
Adrian X. Rodriguez, and
Adam DiCarlo
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I.   Introduction

UpdateXpress System Packs facilitate the download and install of drivers and firmware for a given IBM® system. They allow customers to apply co-requisite and dependent code components together and provide a convenient methodology for keeping systems up to date. However, the UpdateXpress System Pack installer is required to install the packs. This can be a significant limitation to system administrators consolidated on standard distribution-supported tools like YUM and YaST for software management.

This white paper explains how to configure and create an UpdateXpress System Pack YUM Repository that can be used by standard distribution tools like YUM and YaST. It also explains the steps to apply device driver and firmware updates on a target client system using common update mechanisms such as up2date, YUM and YaST.

It is very important that all the steps outlined in this document are carefully followed to ensure the repository is built correctly and can later be used to update the target client machines.

This white paper is written for use across all kernel versions including RHEL3, RHEL4, RHEL5, SLES9, and SLES10.

This product is provided as a pilot to facilitate feedback. It is not officially supported by IBM. Please send email to Ram Pai(linuxram@us.ibm.com) or Doug Rosser(drosser@us.ibm.com) for any queries, suggestions, and bug reports.

A. Notes:
The repository server can be any machine type running any approved Linux distribution. We have validated repository creation on RHEL3, RHEL4, RHEL5, SLES9, and SLES10.

In order for the repository to function properly, please use the latest code. (See Section III, Software Components.)

B.   Technical Limitations:
The YaST tool on SUSE Linux Enterprise Server 9 (SLES9) does not support YUM repositories. Furthermore, the YaST tool on SLES9 only supports one online YaST repository source at a time, and that source almost always needs to be used for retrieving updates from Novell. Thus, we have not implemented SLES9 compatible repositories in our solution; instead, we recommend using YUM on SLES9 target client machines as a work-around for retrieving driver and firmware updates from the UpdateXpress System Pack repositories generated by our tools.

The solution for creating the RPM repositories has some manual steps. For example, the UpdateXpress System Packs and the UpdateXpress System Pack Installer must be manually downloaded from http://www.ibm.com/support and made available on the repository server. Similarly, all of the supported Linux Distribution Partner (LDP) kernels must be downloaded and made available for the build step

II. Overview

A. Scope
This document explains how to set up YUM repositories using UpdateXpress System Packs. It also explains the steps used to update the target client system using the contents of these YUM repositories.

B. Goals
The UpdateXpress System Packs packaging architecture is not compatible with community tools and standards used by IBM's Linux Distribution Partners (LDPs). This work is designed to integrate UpdateXpress System Packs with LDP tools to provide a higher level of customer satisfaction and become a key differentiator for IBM in the Linux marketplace by offering a "one command" method for updating drivers and firmware.

C. Methodology
Each UpdateXpress System Pack is packaged as a tarball of files organized by machine type and the Linux distribution for which it applies. The key idea we have added is the ability to provide all the drivers and the firmware available to the customer through distribution tools like YUM, YaST and up2date.

Creating and using the UpdateXpress System Pack repository is a two step process:

Step 1: Generate the YUM repository using the UpdateXpress System Packs and kernels, and host the repository on a local server.

Step 2: Update all target client systems using the contents of the repository created in Step 1.

A Perl script named *uxspunpack* generates a YUM repository segregating the contents of the UpdateXpress System Pack payload into individual RPMs with the following steps:

1. Extracts all of the driver RPMs and generating any missing driver RPMs for specific kernels.
2. Packages the UpdateXpress System Pack installer in its own individual RPM.
3. Packages the firmware blobs contained in the UpdateXpress System Packs as individual firmware RPMs.
4. Generates an empty RPM called a Control RPM for each version of the kernel.
5. Populates all the above RPMs into a YUM repository. Note that the Control RPM captures RPM dependencies on all the driver, firmware and uxlite (UpdateXpress System Pack installer) RPMs.

You can then install all of the needed drivers and firmware for this target client system by downloading the corresponding Control RPM through YUM, YaST, or up2date.

III. Software Components

Below is a list of the basic software components used to create the repository

uxspunpack, yum-arch, createrepo, perl, rpm

The *uxspunpack* tool is packaged in an *ibm-uxspunpack-tools* RPM supplied by IBM. This RPM contains all the tools not listed above that are required by *uxspunpack* (for instance **abiextract-repo**, **kexport_extract-repo**, **and ibm-driver-tool-repo.pl)**.

IV. Control RPM Overview

A Control RPM is built by the *uxspunpack* tool for every supported IBM Machine Type, Linux distribution, and kernel flavor combination supported by the kernels and UpdateXpress System Packs used during the repository build process. A Control RPM does not contain any files itself; rather, it holds several RPM dependencies that cause the delivery of all necessary driver and firmware RPMs to the target client machine.

When the Control RPM installation is initiated, the individual driver and firmware RPMs are downloaded and installed in the appropriate order to ensure that the system is updated properly. This dependency resolution is provided by the LDP tools: YUM, YaST, or up2date. Firmware RPMs are deposited to a location where they can be flashed to devices.

The system administrator does not even need to remember the name of the Control RPM for a certain target client system, much less the names of all of that system's driver and firmware RPMs; instead, our *setup-uxsp-client* script automatically determines the name of, and installs, the appropriate Control RPM.

For reference, here is the format used by the tools to name Control RPMs:

1. The IBM Machine Type of the system (four digits)

2. The distribution's acronym (for example, "sles10," "rhel5,"and so on)

3. The version of the kernel it is built for

4. The "flavor" of the kernel it is built for (for example, "default," "smp," and so on)

5. The version of the UpdateXpress System Pack used

6. The machine architecture (for example, " i386", "x86_64" and so on)

An example control rpm name is IBM-7141-rhel4-2.6.9-78.EL-smp-UXSP-1.11-1.i386.rpm

V.   Installing Prerequisites on the Build Host

The following packages are required on the build machine:

- *python-elementtree*
- *python-sqlite*
- *python-urlgrabber*
- *libxml2-python*
- *rpm-python*
- *sqlite-3*
- *yum*
- *createrepo*
- *rpmbuild*

Most of the above packages are either already installed on your system or are available as RPMs on your distribution media. However, in order to facilitate a quick, simple setup process, we have included two scripts that automate installing these dependencies – one script for the build host and one script for target client machines :

- *setup-uxsp-server*
- *setup-uxsp-client*

On SLES distributions, the *setup-uxsp-server* script uses YaST to install packages that are present on the distribution media (you will be prompted to insert your installation discs when necessary) and then downloads other packages from the Internet, which are installed using RPM.

On RHEL distributions, the *setup-uxsp-server* script downloads all necessary packages which are not installed by the operating system installer by default and uses RPM to install them, as this method is simpler than attempting to install from distribution media on RHEL systems. Note also that yum-arch is required to create repositories usable to RHEL3, RHEL4, or SLES9 target client machines. On RHEL4 and RHEL5 build machines, our script installs yum-arch from a standalone RPM; on other distributions, there is no standalone yum-arch RPM available, so our script installs a version of YUM which includes yum-arch.

The *setup-uxsp-client* script's main purpose is to tell a target client system's package manager to use the build host's UXSP YUM repository, and to retrieve and install the initial updates from that repository. However, the script also downloads and installs a few dependency packages depending on the distribution in use. For example, on SLES9, the *setup-uxsp-client* script will install YUM, which is needed to install updates from the UXSP YUM repository, as noted in the introduction.

Both scripts will prompt for permission before installing any packages that must be downloaded from the Internet.

VI. Creating the Repository

The following assumptions have been made:

1. You have access to all of the kernels running on the target client systems and have downloaded them.

2. You have downloaded the latest UpdateXpress System Packs for all of your target client systems.
3. You have downloaded the UpdateXpress System Pack Installer tool for your target client systems.

(For help with meeting these requirements, see the appendixes at the end of this document.)

Prior to creating the repository, consider that the length of time repository generation will take depends on the host machine used and the number of UpdateXpress System Packs and distribution kernels. Repository creation can range anywhere from ten minutes to several hours. Check the log files periodically to be sure that the system is still building RPMs.

Follow the directions outlined below to create a repository that can either then be copied to another server for hosting or hosted locally.

1. Download and install the *ibm-uxspunpack-tools* RPM. This action installs the following tools into the */usr/local/bin* directory:
    a. uxspunpack
    b. unzip-all-uxsps
    c. setup-uxsp-client
    d. setup-uxsp-server
    e. uxsp-setup-includes
    f. uxsp_xml_proc.pm
    g. abiextract-repo
    h. ibm-driver-tool-repo.pl
    i. kexport_extract-repo
    j. check_module_abi-repo
    k. url-database
    l. check_url-database
2. Add that directory to your path: export PATH=/usr/local/bin:$PATH
3. Run setup-uxsp-server script, which will install needed dependency packages (or report so if none are needed). If you elect not to let the tool automatically install required dependencies, you must manually install the packages it listed.
    NOTE: The tool may fail to automatically install the required dependency packages, if the URL captured in url-database file are stale. The tool check_url-database can help locate the stale url in the url-database file. Contact the authors for the latest url-database file or you may try to manually locate and install the listed packages.
4. Before continuing, make sure that setup-uxsp-server reports "uxspunpack is runnable."
    NOTE: If perl version is 5.8.0 or below, uxspunpack fails silently.
    Setup-uxsp-server will about that. Upgrade your perl version or
    export LANG=en_US.ISO8859-1 before invoking uxspunpack.
5. In a working directory (hereafter referred to as workingdir), create a *kernel* directory and a *uxsp* directory, each with subdirectories for each Linux distribution needed. For example:
    mkdir -p kernel/rhel3 kernel/rhel4 kernel/rhel5 kernel/sles9 kernel/sles10
    mkdir -p uxsp/rhel3 uxsp/rhel4 uxsp/rhel5 uxsp/sles9 uxsp/sles10
6. For each distribution needed, download the kernel RPMs for each kernel supported by IBM and place them into the appropriate *kernel/<distro>* directories.
7. For each distribution needed, download all UpdateXpress System Packs (newest versions only) for every target client machine into the appropriate *uxsp/<distro>* directories.
8. If you used the Download Director to retrieve UpdateXpress System Packs from the IBM Web site then skip to the next step. Otherwise, if you used the FTP download option, you will have received a ZIP file for each UpdateXpress System Pack. Place the zip files in uxsp/<distro>

directory. To unzip all of those files at once, run `unzip-all-uxsps` in each uxsp/<distro> directory. *unzip-all-uxsps* is a convenience script we have provided which will run `unzip -o` on every zip file in every *uxsp/<distro>* directory.

> **Note:** The `-o` parameter is needed to force overwriting existing files, because some files with the same exact name and content are present in more than one UpdateXpress System Pack.

9. For each distribution needed, download its UpdateXpress System Pack Installer and place it into the appropriate *uxsp/<distro>* directory.

10. Optionally, if you would like to build the repository from a non-root shell, you may do so by following these steps:

    a. Log in as the user you want to use and create some directories:
        `mkdir -p ~/rpm/{BUILD,RPMS,SOURCES,SPECS,SRPMS}`

    b. Create a file called *.rpmmacros* in your home directory containing these two lines:
        `%_topdir  /home/<username>/rpm`
        `%_tmppath /home/<username>/rpm/tmp`
        Replace <username> with your actual username and use only explicit paths (do not use ~ to abbreviate your home directory).

11. The directory structure should now look like this:

    ```
    <workingdir>/uxsp/rhel3/<contents of all UpdateXpress System Packs for all targeted systems>
    <workingdir>/uxsp/rhel4/<contents of all UpdateXpress System Packs for all targeted systems>
    <workingdir>/uxsp/rhel5/<contents of all UpdateXpress System Packs for all targeted systems>
    <workingdir>/uxsp/sles9/<contents of all UpdateXpress System Packs for all targeted systems>
    <workingdir>/uxsp/sles10/<contents of all UpdateXpress System Packs for all targeted systems>
    ```

12. From the *<workingdir>*, execute the following command:

    `uxspunpack`

    This will:

    a. Generate driver RPMs for all kernels that have identical ABIs to UpdateXpress System Pack supported kernels
    b. Generate firmware RPMs and Control RPMs

    The output is sent to a directory called *<workingdir>/repo* containing a directory structure following the *machine type/distribution* format. The *setup-uxsp-client* script and the *url-database* file is placed into *<workingdir>/repo* so that client machines can easily retrieve and use it to automatically start applying updates. Finally, YUM repository metadata is generated automatically with the *createrepo* command. The Control RPM will be named following this format: *IBM-machinetype-distrorelease-kernelversion-kernelflavor-uxsp-uxspversion-arch.rpm*.

13. If you need to add or remove UpdateXpress System Packs or kernels, or otherwise wish to rebuild the repository, you must first delete the repository and temporary build space; that can be done by executing this command from **<workingdir>**:
    `rm -rf repo temp_extract`

VII. Hosting the Repository

Copy the contents of the *repo* directory to */var/www/html* on the repository server; alternatively, you could configure your Web server to point to the location of the *repo* directory.

> **Note: Please make sure that firewalls are configured correctly to allow access from the client machine to the repository host.**

VIII. Client Setup

A. SUSE Linux Enterprise Server Setup

Below are the requirements and instructions for configuring a SLES client machine to view and install the appropriate Control RPM.

1. Optional: To automatically apply firmware updates during system pack installation, export the environment variable *INSTALL_IBM_FIRMWARE* before installing the Control RPM:
   linux:~ # **export INSTALL_IBM_FIRMWARE=true**

   We recommend not to export INSTALL_IBM_FIRMWARE.

2. Run wget http://<server>/setup-uxsp-client where *<server>* is the IP address of the machine hosting the UpdateXpress System Pack YUM repository

3. Run wget http://<server>/url-database . This file contains URLs pointing to the rpms containing the necessary tools needed by setup-uxsp-client. Make sure that this file resides in the same directory as setup-uxsp-client.

4. Make the script executable: chmod u+x setup-uxsp-client

5. Run the script: ./setup-uxsp-client -s <server>
   This script updates YUM's (SLES9) or YaST's (SLES10) configuration by adding the UpdateXpress System Pack YUM repository to the repository list, and installs the appropriate Control RPM. (On SLES9 script if necessary will prompt to confirm installing YUM and YUM's supporting RPMs.) The output from this operation is shown below. The target client machine used did not have YUM installed at the time of invoking the *setup-uxsp-client script*, so the script downloaded and installed YUM after obtaining permission.

   (SLES10 output is not shown here.)

```
linux:~ # wget http://elm3a75/~bikko/small/setup-uxsp-client -nv
05:54:29 URL:http://elm3a75/%7Ebikko/small/setup-uxsp-client [14959/14959] -> "setup-uxsp-client" [1]
linux:~ # chmod u+x ./setup-uxsp-client
linux:~ # ./setup-uxsp-client -s elm3a75/~bikko/small -m 7141

Repository determined to be at http://elm3a75/~bikko/small/7141/sles9/i386
The following packages are REQUIRED to install UXSP updates on this machine:
   python-urlgrabber yum

You can try to get these packages from your SLES9 installation media or from
Novell Support.

ALTERNATIVELY, you can let this script download and install these packages for
you now, from unofficial sources online. Here are the URLs to be downloaded:

  http://download.opensuse.org/repositories/home:/linuxram/SLES_9/i586/python-urlgrabber-3.1.0-4.1.i586.rpm
  http://download.opensuse.org/repositories/home:/linuxram/SLES_9/noarch/yum-2.0.8-1.1.noarch.rpm

Download and install these packages now [y/N]? y

05:55:11 URL:http://ftp5.gwdg.de/pub/opensuse/repositories/home:/linuxram/SLES_9/i586/python-
urlgrabber-3.1.0-4.1.i586.rpm [84142/84142] -> "uxsp-client-setup-temp/python-urlgrabber-3.1.0-4.1.i586.rpm" [1]
warning: uxsp-client-setup-temp/python-urlgrabber-3.1.0-4.1.i586.rpm: V3 DSA signature: NOKEY, key ID dfbb98a5
Preparing...          ########################################### [100%]
```

```
  1:python-urlgrabber    ########################################### [100%]
05:55:23 URL:http://widehat.opensuse.org/repositories/home:/linuxram/SLES_9/noarch/yum-2.0.8-1.1.noarch.rpm
[103223/103223] -> "uxsp-client-setup-temp/yum-2.0.8-1.1.noarch.rpm" [1]
warning: uxsp-client-setup-temp/yum-2.0.8-1.1.noarch.rpm: V3 DSA signature: NOKEY, key ID dfbb98a5
Preparing...              ########################################### [100%]
  1:yum                   ########################################### [100%]


Adding repository to /etc/yum.conf
Gathering header information file(s) from server(s)
Server: IBM UpdateXpress System Pack Repository
Finding updated packages
Downloading needed headers
7141-sles9-brcm_fw_nic_2. 100% |=========================| 1.1 kB    00:00
7141-sles9-ibm_fw_bmc_a3b 100% |=========================| 1.1 kB    00:00
7141-sles9-ibm_fw_fpga_a3 100% |=========================| 1.1 kB    00:00
7141-sles9-ibm_fw_sraidmr 100% |=========================| 1.2 kB    00:00
IBM-7141-sles9-2.6.5-7.30 100% |=========================| 1.0 kB    00:00
brcm-bnx2-default-0-1.7.1 100% |=========================| 1.6 kB    00:00
IBM-7141-sles9-2.6.5-7.30 100% |=========================| 992 B     00:00
7141-sles9-ibm_fw_bios_a3 100% |=========================| 1.1 kB    00:00
7141-sles9-ibm_fw_rsa2_a3 100% |=========================| 1.1 kB    00:00
7141-sles9-ibm_fw_sraidmr 100% |=========================| 1.2 kB    00:00
7141-sles9-ibm_fw_mptsas_ 100% |=========================| 1.2 kB    00:00
Resolving dependencies
.Dependencies resolved
I will do the following:
[install: IBM-7141-sles9-2.6.5-7.308-default-UXSP 1.11-1.i386]
I will install/upgrade these to satisfy the dependencies:
[deps: brcm-bnx2-default 1.7.1c_2.6.5_7.308-0.i586]
[deps: 7141-sles9-ibm_fw_bmc_a3bt31b_linux_i386 2.32-1.noarch]
[deps: 7141-sles9-ibm_fw_fpga_a3ud18b_linux_i386 1.18B-1.noarch]
[deps: 7141-sles9-ibm_fw_sraidmr_10k-8.0.1-0029_linux_32-64 8.0.1_0029-1.noarch]
[deps: lsi-mptlinux-default 3.12.26.00_2.6.5_7.308-0.i586]
[deps: 7141-sles9-brcm_fw_nic_2.0.6_linux_32-64 2.0.6-1.noarch]
[deps: brcm-tg3-default 3.81c_2.6.5_7.308-0.i586]
[deps: 7141-sles9-ibm_fw_bios_a3e129a_linux_i386 1.03-1.noarch]
[deps: 7141-sles9-ibm_fw_rsa2_a3ep20a_linux_i386 1.01-1.noarch]
[deps: 7141-sles9-ibm_fw_sraidmr_10M-8.0.1-0029_linux_32-64 8.0.1_0029-1.noarch]
[deps: 7141-sles9-ibm_fw_mptsas_x3950m2-2.32_linux_32-64 2.32-1.noarch]
Is this ok [y/N]: y
Downloading Packages
Getting brcm-bnx2-default-1.7.1c_2.6.5_7.308-0.i586.rpm
brcm-bnx2-default-1.7.1c_ 100% |=========================| 139 kB    00:02
Getting 7141-sles9-ibm_fw_bmc_a3bt31b_linux_i386-2.32-1.noarch.rpm
7141-sles9-ibm_fw_bmc_a3b 100% |=========================| 1.4 MB    00:08
Getting 7141-sles9-ibm_fw_fpga_a3ud18b_linux_i386-1.18B-1.noarch.rpm
7141-sles9-ibm_fw_fpga_a3 100% |=========================| 1.5 MB    00:09
Getting 7141-sles9-ibm_fw_sraidmr_10k-8.0.1-0029_linux_32-64-8.0.1_0029-1.noarch.rpm
7141-sles9-ibm_fw_sraidmr 100% |=========================| 4.2 MB    00:23
Getting lsi-mptlinux-default-3.12.26.00_2.6.5_7.308-0.i586.rpm
lsi-mptlinux-default-3.12 100% |=========================| 114 kB    00:00
Getting IBM-7141-sles9-2.6.5-7.308-default-UXSP-1.11-1.i386.rpm
IBM-7141-sles9-2.6.5-7.30 100% |=========================| 2.1 kB    00:00
Getting 7141-sles9-brcm_fw_nic_2.0.6_linux_32-64-2.0.6-1.noarch.rpm
7141-sles9-brcm_fw_nic_2. 100% |=========================| 5.4 MB    00:21
Getting brcm-tg3-default-3.81c_2.6.5_7.308-0.i586.rpm
brcm-tg3-default-3.81c_2. 100% |=========================| 59 kB     00:01
Getting 7141-sles9-ibm_fw_bios_a3e129a_linux_i386-1.03-1.noarch.rpm
7141-sles9-ibm_fw_bios_a3 100% |=========================| 1.0 MB    00:06
Getting 7141-sles9-ibm_fw_rsa2_a3ep20a_linux_i386-1.01-1.noarch.rpm
7141-sles9-ibm_fw_rsa2_a3 100% |=========================| 1.8 MB    00:08
Getting 7141-sles9-ibm_fw_sraidmr_10M-8.0.1-0029_linux_32-64-8.0.1_0029-1.noarch.rpm
7141-sles9-ibm_fw_sraidmr 100% |=========================| 4.2 MB    00:27
Getting 7141-sles9-ibm_fw_mptsas_x3950m2-2.32_linux_32-64-2.32-1.noarch.rpm
7141-sles9-ibm_fw_mptsas_ 100% |=========================| 1.4 MB    00:07
```

```
Running test transaction:
Test transaction complete, Success!
7141-sles9-ibm_fw_mptsas_x3950m2-2.32_linux_32-64 100 % done 1/13
7141-sles9-ibm_fw_sraidmr_10M-8.0.1-0029_linux_32-64 100 % done 2/13
7141-sles9-ibm_fw_rsa2_a3ep20a_linux_i386 100 % done 3/13
7141-sles9-ibm_fw_bios_a3e129a_linux_i386 100 % done 4/13
brcm-tg3-default 100 % done 5/13
2.6.5-7.308-default
7141-sles9-brcm_fw_nic_2.0.6_linux_32-64 100 % done 6/13
lsi-mptlinux-default 100 % done 7/13
2.6.5-7.308-default
Root device:        /dev/hda3 (mounted on / as reiserfs)
Module list:        reiserfs mptbase mptctl mptfc mptlan mptsas mptscsih mptspi

Kernel image:       /boot/vmlinuz-2.6.5-7.308-default
Initrd image:       /boot/initrd-2.6.5-7.308-default.ibm
Shared libs:        lib/ld-2.3.3.so lib/libblkid.so.1.0 lib/libc.so.6 lib/libpthread.so.0 lib/libselinux.so.1 lib/libuuid.so.1.2
Modules: kernel/drivers/scsi/scsi_mod.ko kernel/drivers/scsi/sd_mod.ko kernel/fs/reiserfs/reiserfs.ko updates/mptbase.ko
updates/mptctl.ko updates/mptscsih.ko updates/mptfc.ko updates/mptlan.ko updates/mptsas.ko updates/mptspi.ko

Including: udev
Bootsplash:         SuSE-SLES (800x600)
7141-sles9-ibm_fw_sraidmr_10k-8.0.1-0029_linux_32-64 100 % done 8/13
7141-sles9-ibm_fw_fpga_a3ud18b_linux_i386 100 % done 9/13
7141-sles9-ibm_fw_bmc_a3bt31b_linux_i386 100 % done 10/13
brcm-bnx2-default 100 % done 11/13
2.6.5-7.308-default
IBM-7141-sles9-2.6.5-7.308-default-UXSP 100 % done 12/13
Completing update for brcm-tg3-default  - 13/13
Installed:  IBM-7141-sles9-2.6.5-7.308-default-UXSP 1.11-1.i386
Dep Installed:  brcm-bnx2-default 1.7.1c_2.6.5_7.308-0.i586 7141-sles9-ibm_fw_bmc_a3bt31b_linux_i386 2.32-1.noarch
7141-sles9-ibm_fw_fpga_a3ud18b_linux_i386 1.18B-1.noarch 7141-sles9-ibm_fw_sraidmr_10k-8.0.1-0029_linux_32-64
8.0.1_0029-1.noarch lsi-mptlinux-default 3.12.26.00_2.6.5_7.308-0.i586 7141-sles9-brcm_fw_nic_2.0.6_linux_32-64
2.0.6-1.noarch brcm-tg3-default 3.81c_2.6.5_7.308-0.i586 7141-sles9-ibm_fw_bios_a3e129a_linux_i386 1.03-1.noarch
7141-sles9-ibm_fw_rsa2_a3ep20a_linux_i386 1.01-1.noarch 7141-sles9-ibm_fw_sraidmr_10M-8.0.1-0029_linux_32-64
8.0.1_0029-1.noarch 7141-sles9-ibm_fw_mptsas_x3950m2-2.32_linux_32-64 2.32-1.noarch

Transaction(s) Complete
```

Note: Although a repository can be created for SLES9, the SLES9 version of YaST does not allow viewing YUM repositories created by *uxspunpack*. As mentioned in the introduction section, YUM must be used on SLES9 clients. This is why *setup-uxsp-client* will ask for permission to install YUM and supporting RPMs if YUM is not already installed.

Note: setup-uxsp-client consults the *url-database* file to procure the URL location of the yum rpm. If the URL is stale, *setup-uxsp-client* may fail to install the yum rpm. In such cases contact the authors of this whitepaper for the latest url-database file, or try to find and install a working yum rpm from the web.

6. While installing the Control RPM in step 5 above, if *INSTALL_IBM_FIRMWARE* is not set to *true*, the firmware will not be flashed to the hardware, even though the firmware will be installed into the */usr/local/ibm/uxsp* directory. To manually flash the firmware to the hardware, run the following command, changing *install.sh.rhel4* appropriately to match the RHEL version in use:

```
install.sh.rhel4 update -l /usr/local/ibm/UXSP -u -F
```

B. Red Hat Enterprise Linux Client Configuration

Below are the requirements and instructions for configuring a RHEL target client system to view and install the appropriate Control RPM.

1. If the server has a Red Hat Network (RHN) support agreement, skip to the next step. Otherwise, you will need to stop the machine from attempting to update with RHN and performing one of the following actions, depending on your version of Red Hat:

   - On RHEL3 or RHEL4, inside */etc/sysconfig/rhn/sources*, comment out the line "up2date default".

   - On RHEL5, inside */etc/yum/pluginconf.d/rhnplugin.conf*, change "enabled = 1" to "enabled = 0".

2. Optional: To automatically flash firmware updates during system pack installation, export the environment variable *INSTALL_IBM_FIRMWARE* before installing the Control RPM:
   [root@elm3a204 ~]# **export INSTALL_IBM_FIRMWARE=true**

   We recommend not to export INSTALL_IBM_FIRMWARE.

3. Run wget http://<server>/setup-uxsp-client where *<server>* is the IP address of the machine hosting the UpdateXpress System Pack YUM repository.

4. Make the script executable: chmod u+x setup-uxsp-client

5. Run the script: ./setup-uxsp-client -s <server>
   This script installs any RPMs required for using the system, it updates YUM's (RHEL5) or up2date's (RHEL3 or RHEL4) configuration by adding the UpdateXpress System Pack YUM repository to the repository list, and finally installs the appropriate Control RPM. The output shown below is the output from a Control RPM installation done during testing:

```
[root@ddctest27 ~]# chmod u+x ./setup-uxsp-client
[root@ddctest27 ~]# ./setup-uxsp-client -s elm3a75.beaverton.ibm.com/~bikko/troy/ -m 8850
Repository determined to be at http://elm3a75.beaverton.ibm.com/~bikko/troy//8850/rhel5/x86_64
Already configured to use a different UXSP repository. Reconfigure [y/N]? y
Adding repository to /etc/yum/repos.d/ibm-uxsp.repo
Loading "security" plugin
ibm-uxsp              100% |=========================| 951 B    00:00
primary.xml.gz        100% |=========================| 1.9 kB   00:00
ibm-uxsp  : #############################################  8/8
Setting up Install Process
Parsing package install arguments
Resolving Dependencies
--> Running transaction check
---> Package IBM-8850-rhel5-2.6.18-92.el5-default-UXSP.x86_64 0:1.30-1 set to be updated
--> Processing Dependency: IBM-UXSP-Installer-rhel5 = 201-0 for package: IBM-8850-rhel5-2.6.18-92.el5-default-UXSP
--> Processing Dependency: 8850-rhel5-qlgc_fw_fc_4g-mb1.46_linux-bc_32-64 = 1.46-1 for package: IBM-8850-
rhel5-2.6.18-92.el5-default-UXSP
--> Processing Dependency: 8850-rhel5-ibm_fw_bios_bke127a_linux_amd32 = 1.27-1 for package: IBM-8850-
rhel5-2.6.18-92.el5-default-UXSP
--> Processing Dependency: 8850-rhel5-ibm_fw_diag_bkyt36a_linux_i386 = 1.13-1 for package: IBM-8850-
rhel5-2.6.18-92.el5-default-UXSP
--> Processing Dependency: 8850-rhel5-ibm_fw_bmc_bkbt29a_linux_i386 = 2.20-1 for package: IBM-8850-
rhel5-2.6.18-92.el5-default-UXSP
--> Processing Dependency: 8850-rhel5-brcm_fw_nic_2.0.7_linux_32-64 = 2.0.7-1 for package: IBM-8850-
rhel5-2.6.18-92.el5-default-UXSP
--> Running transaction check
---> Package 8850-rhel5-brcm_fw_nic_2.0.7_linux_32-64.noarch 0:2.0.7-1 set to be updated
---> Package 8850-rhel5-qlgc_fw_fc_4g-mb1.46_linux-bc_32-64.noarch 0:1.46-1 set to be updated
```

```
---> Package IBM-UXSP-Installer-rhel5.noarch 0:201-0 set to be updated
---> Package 8850-rhel5-ibm_fw_bios_bke127a_linux_amd32.noarch 0:1.27-1 set to be updated
---> Package 8850-rhel5-ibm_fw_diag_bkyt36a_linux_i386.noarch 0:1.13-1 set to be updated
---> Package 8850-rhel5-ibm_fw_bmc_bkbt29a_linux_i386.noarch 0:2.20-1 set to be updated
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================
 Package              Arch      Version      Repository      Size
================================================================================
Installing:
 IBM-8850-rhel5-2.6.18-92.el5-default-UXSP  x86_64   1.30-1    ibm-uxsp       1.8 k
Installing for dependencies:
 8850-rhel5-brcm_fw_nic_2.0.7_linux_32-64  noarch    2.0.7-1    ibm-uxsp      5.5 M
 8850-rhel5-ibm_fw_bios_bke127a_linux_amd32  noarch    1.27-1    ibm-uxsp      1.1 M
 8850-rhel5-ibm_fw_bmc_bkbt29a_linux_i386  noarch    2.20-1    ibm-uxsp      1.1 M
 8850-rhel5-ibm_fw_diag_bkyt36a_linux_i386  noarch    1.13-1    ibm-uxsp      2.6 M
 8850-rhel5-qlgc_fw_fc_4g-mb1.46_linux-bc_32-64  noarch  1.46-1   ibm-uxsp    6.8 M
 IBM-UXSP-Installer-rhel5  noarch    201-0        ibm-uxsp          21 M

Transaction Summary
================================================================================
Install     7 Package(s)
Update      0 Package(s)
Remove      0 Package(s)

Total download size: 38 M
Is this ok [y/N]: y
Downloading Packages:
(1/7): 8850-rhel5-ibm_fw_ 100% |=========================| 1.1 MB    00:02
(2/7): 8850-rhel5-ibm_fw_ 100% |=========================| 2.6 MB    00:06
(3/7): 8850-rhel5-ibm_fw_ 100% |=========================| 1.1 MB    00:02
(4/7): IBM-UXSP-Installer 100% |=========================| 21 MB     00:49
(5/7): 8850-rhel5-qlgc_fw 100% |=========================| 6.8 MB    00:15
(6/7): IBM-8850-rhel5-2.6 100% |=========================| 1.8 kB    00:00
(7/7): 8850-rhel5-brcm_fw 100% |=========================| 5.5 MB    00:13
Running rpm_check_debug
Running Transaction Test
Finished Transaction Test
Transaction Test Succeeded
Running Transaction
  Installing: 8850-rhel5-ibm_fw_bmc_bkbt29 ######################### [1/7]
  Installing: 8850-rhel5-ibm_fw_diag_bkyt3 ######################### [2/7]
  Installing: 8850-rhel5-ibm_fw_bios_bke12 ######################### [3/7]
  Installing: IBM-UXSP-Installer-rhel5     ######################### [4/7]
  Installing: 8850-rhel5-qlgc_fw_fc_4g-mb1 ######################### [5/7]
  Installing: 8850-rhel5-brcm_fw_nic_2.0.7 ######################### [6/7]
  Installing: IBM-8850-rhel5-2.6.18-92.el5 ######################### [7/7]

Installed: IBM-8850-rhel5-2.6.18-92.el5-default-UXSP.x86_64 0:1.30-1
Dependency Installed: 8850-rhel5-brcm_fw_nic_2.0.7_linux_32-64.noarch 0:2.0.7-1 8850-rhel5-
ibm_fw_bios_bke127a_linux_amd32.noarch 0:1.27-1 8850-rhel5-ibm_fw_bmc_bkbt29a_linux_i386.noarch 0:2.20-1 8850-
rhel5-ibm_fw_diag_bkyt36a_linux_i386.noarch 0:1.13-1 8850-rhel5-qlgc_fw_fc_4g-mb1.46_linux-bc_32-64.noarch
0:1.46-1 IBM-UXSP-Installer-rhel5.noarch 0:201-0
Complete!
```

6. While installing the Control RPM in step 5 above, if *INSTALL_IBM_FIRMWARE* is not set to *true*, the firmware will not be flashed to the hardware, even though the firmware will be installed into the */usr/local/ibm/uxsp* directory. To manually flash the firmware to the hardware, run the following command, changing *install.sh.rhel4* appropriately to match the RHEL version in use:

    `install.sh.rhel4 update -l /usr/local/ibm/UXSP -u -F`

Appendix I. Obtaining Kernels

A. Downloading kernels from Red Hat:
- Open http://rhn.redhat.com in a Web browser.
- Log in using your Red Hat Network credentials
- Click *Channels* on the top navigation bar
- If you're using the latest version of RHEL, skip to the next step. Otherwise, select your version and select your machine architecture under *Filter by Product Channel* and click *Filter*
- From the channel list, click on your machine's architecture. You should be taken to a page called, for example, *Red Hat Enterprise Linux (v. 5 for 64-bit x86_64)*
- Click *Packages*
- Type "kernel-2" into the Filter by Package box and press Go. Now, all kernel RPMs should be displayed. (Note: If you are using a non-default kernel version, you may wish to filter by, for example, "kernel-xen" instead.)
- Select all of them (up to 25 at a time), and click *Download Packages*
- Click *Download Selected Packages Now*. You will receive a file named *rhn-packages.tar*
- Untar the file into the appropriate kernel RPM directory created earlier (for example, *<workingdir>/kernel/rhel4*)
- Click *Unselect All* to clear the old selections and then repeat the previous three steps until all desired kernels are obtained

B. Downloading kernels from Novell:
- Open http://support.novell.com/linux/psdb in a Web browser
- Under Download Patches, click *by product*
- Click on the appropriate product name (for example, *SUSE Linux Enterprise Server*)
- Click on the needed version (for example, *SUSE Linux Enterprise Server 10 Service Pack 1 for AMD64 and EM64T (x86_64)*)
- Locate the first time the word "kernel" appears on the page (using the browser's Find feature is recommended) and click on it
- Click the appropriate link (for example, *SUSE Linux Enterprise Server 10 SP1 for AMD64 and EM64T (x86_64)*)
- You should see the contents of the selected kernel update package (including several *kernel-*.rpm* files)
- Click *proceed to download*
- If prompted, log in using your Novell Partner credentials
- Click the *download* button that corresponds with the specific kernel RPM needed
- Go back to the "by product" page and repeat this process until all desired kernels are obtained

Appendix II.Obtaining UpdateXpress System Packs

Follow these steps to download UpdateXpress System Packs from IBM.

- Open http://www.ibm.com/support in a Web browser.
- Under Search all of support, type in "IBM UpdateXpress matrix" and click the magnifying glass icon.
- Click on the first search result, *IBM UpdateXpress matrix – Servers*.
- Alternatively, if unable to find the UpdateXpress matrix using search, use the following URL to go directly to the page: http://www-304.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-XPRESS
- Each operating system is listed in a table with the date of the latest addition or revision of its UpdateXpress System Pack library. Click on the date next to the operating system needed.
- Each system type is listed in a table with the latest version number of its UpdateXpress System Pack. Click on the version number next to the IBM system type for which a system pack is needed. (You can also download the entire set of available system packs for the selected distribution on this page. In these instructions, however, we assume you will download an individual system pack.)
- Click *Download system pack*. You should be taken to a *Terms and Conditions* page.
- Choose your download mechanism and package type and click *I Agree* if you agree to the terms and conditions shown. If you selected the "Zip file" package type, you should be taken to a page which will cause your browser to automatically download the file. We recommend placing the ZIP file (or non-zipped files, if using a different download mechanism) directly into the appropriate directory (*<workingdir>/uxsp/<distro>*)
- Repeat these steps as necessary to obtain all of the desired UpdateXpress System Packs for all of your machine type and Linux distribution combinations.

Appendix III.Obtaining UpdateXpress System Pack Installers

Follow these steps to download UpdateXpress System Pack Installers from IBM.

- Open the *IBM UpdateXpress matrix* page in a Web browser (see Appendix II).
- Each operating system is listed in a table with the date of the latest addition or revision of its UpdateXpress System Pack library. Click on the date next to the operating system for which an installer is needed.
- Click *Get the latest UpdateXpress System Pack Installer.*
- You will be prompted to sign in with your IBM ID in order to download the installer. If you do not have an IBM ID, create one by clicking *Register here* and following the instructions.
- Click the *Download using http* tab at the top of the table of available files, then click the Download now link next to, for example, *UpdateXpress System Pack Installer for SUSE Linux Enterprise Server 10 Edition / install201.sles10.*
- Alternatively, to use IBM Download Director (Java and Java browser plug in required):
- Scroll down to, for example, *UpdateXpress System Pack Installer for Red Hat Enterprise Linux 5 Edition / install201.rhel5*.
- Check the box.
- Click Download now.
- Save the installer to the appropriate directory (*<workingdir>/uxsp/<distro>*).

Appendix IV.Trouble Shooting

1. **setup-uxsp-server or setup-uxsp-client fail with the following message**

    unable to download <url>
    Please check your firewall and/or internet connection

    Possible causes:
    - machine may not be able to access the internet. Fix your internet connection
    - the URL is stale. Run *check_url-database –u url-database* to locate the stale URL. Contact the authors for the latest url-database file.

2. **setup-uxsp-server or setup-uxsp-client fail with the following message**

    WARNING PACKAGE URL MISMATCH

    Possible cause:
    - Some url for a required package is not listed in the url-database file. Run *check_url-database –u url-database* to locate the stale URL. Contact the authors for the latest url-database file

3. On SLES10, setup-uxsp-client hung or errors out.

    Possible cause:
    - YAST may not be configured correctly. If any of the configuration files in /var/lib/zypp/db/sources are incorrect, then setup-uxsp-client may hang or error out. Fix the configuration files in /var/lib/zypp/db/sources

4. On RHEL, setup-uxsp-client exits with the following error:

    There was an SSL error:……………………….A common cause of this error is the system time being incorrect.
    Verify that the time on this system is correct.

    Possible cause:
    - Your system is not registered with RedHat Network. Either register your system with RHN or remove the 'up2date default' entry in /etc/sysconfig/rhn/sources file.

5. uxsp-setup-client fails with the following message:

    package IBM-<machine>-<distro>-<kernelversion>-<kernelflavor>-UXSP not found

    Possible cause:
    - <kernelversion>-<kernelflavor> kernel rpm missing in kernel/<distro> directory on the build host, while generating the repository.

6. uxspunpack fails silently if installed perl version is 5.8.0 or below.

> Solution
> - Upgrade perl, or export LANG=en_US.ISO8859-1

Appendix V.Support

These tools are not supported through the standard IBM support channel. Please send your issues, comments and suggestion to the Ram Pai(linuxram@us.ibm.com) or Doug Rosser (drosser@us.ibm.com).

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