YaST® and AutoYaST Make The Difference

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Agenda

- What is YaST?
- Secret Modules and Unknown Features
- What is AutoYaST?
- Create an Installation Server
- Create an AutoYaST profile
- Edit and customize a profile
- PXE/DHCP: Diskless Installation
- Upgrade SLES 11 to SLES 12
- Questions and Answers
What is YaST?
YaST

Network Services

- Authentication Client
- Authentication Server
- DHCP Server
- DNS Server
- FTP Server
- Hostnames
- HTTP Server
- iSCSI Initiator
- iSNS Server
- Mail Server
- Network Services (xinetd)
- NFS Client
- NFS Server
- NIS Client
- NIS Server
- NTP Configuration
- OpenLDAP MirrorMode
- Proxy
- Remote Administration (VNC)
- Samba Server
- Squid
- TFTP Server
- Wake-on-LAN
- Windows Domain Membership
Security Center and Hardening Module
Security Center and Hardening

yast2 security
Security Center and Hardening (cont'd)
Debugging
Debugging

- Turn on debugging messages:
  Y2DEBUG=1 yast2 network
- Read YaST log file:
  tail -f /var/log/YaST2/y2log
Feature: Hotkeys
Hotkeys

- Ctrl + Shift + Alt + X  Run xterm
- Shift + F7  Debug level
- Print  Screenshot
- Shift + F8  Save logs
- Ctrl + Shift + Alt + M  Start/stop macro recorder
- Ctrl + Shift + Alt + P  Play macro
- Ctrl + Shift + Alt + S  Style sheet editor
Feature: Themes
Themes in YaST2 Qt

- Support for CSS-like stylesheets
- Customize installation
- For visually impaired users

- Default is style.qss or installation.qss in /usr/share/YaST2/theme/current/wizard/
- $Y2STYLE contains name of stylesheet
- Y2STYLE=installation.qss yast2 disk --qt
Themes in YaST2 Qt (cont'd)

![Expert Partitioner Interface]

### Available Storage on linux-dy7g

<table>
<thead>
<tr>
<th>Device</th>
<th>Size</th>
<th>F</th>
<th>Enc</th>
<th>Type</th>
<th>FS Type</th>
<th>Label</th>
<th>Mount Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/vda</td>
<td>8.00 GiB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/dev/vda1</td>
<td>995.00 MiB</td>
<td></td>
<td></td>
<td>Linux swap</td>
<td>Swap</td>
<td></td>
<td>swap</td>
</tr>
<tr>
<td>/dev/vda2</td>
<td>7.03 GiB</td>
<td></td>
<td></td>
<td>Linux native</td>
<td>Ext3</td>
<td></td>
<td>/</td>
</tr>
<tr>
<td>tmpfs</td>
<td>497.74 MiB</td>
<td></td>
<td></td>
<td>TMPFS</td>
<td>TmpFS</td>
<td></td>
<td>/dev/shm</td>
</tr>
<tr>
<td>tmpfs</td>
<td>497.74 MiB</td>
<td></td>
<td></td>
<td>TMPFS</td>
<td>TmpFS</td>
<td></td>
<td>/run</td>
</tr>
<tr>
<td>tmpfs</td>
<td>497.74 MiB</td>
<td></td>
<td></td>
<td>TMPFS</td>
<td>TmpFS</td>
<td></td>
<td>/sys/fs/cgroup</td>
</tr>
</tbody>
</table>
Themes in YaST2 Qt (cont'd)

```css
{background-color: #262626;
border: 1px inset #161616;
selection-background-color: #28ae73;
selection-color: #2d2d2d;
border-radius: 4px;
}

YQGenericDetailsView,
YQDescriptionDialog,
YQPkgDescriptionView { color: #eee; background-color: #262626; }

YQPkgPatternCategoryItem { background-color: #2d2d2d; color: #eee; }

QListWidget {
color: #eee;
background-color: #2d2d2d;
}

Apply  Auto Apply
Load File  Close
```
Themes in YaST2 Qt (cont'd)
Themes in YaST2 ncurses

- File: /etc/sysconfig/yast2
- Variable: Y2NCURSES_COLOR_THEME="mono"
- Also “braille” available for visually impaired
Themes in YaST2 ncurses (cont'd)

- File: /etc/sysconfig/yast2
- Variable: Y2NCURSES_COLOR_THEME="mono"
- Also “braille” available for visually impaired
Feature: Driver Update
Driver Update

- Replace packages in your installation system

- File on a web server contains a list of rpm packages

- Example file on http://foo.bar/list:

  ```
  dud=http://foo.bar/bash.rpm
  dud=http://foo.bar/yast2.rpm
  ```
Driver Update (cont'd)

Boot from Hard Disk
Installation
Upgrade
Rescue System
Check Installation Media
Memory Test

Boot Options info=http://foo.bar/list

F1 Help F2 Language English (US)  F3 Video Mode Default  F4 Source DVD  F5 Kernel Default  F6 Driver No
Driver Update (cont'd)

http://w3.suse.de/~tgoettlicher/dud/libyui-qt6-2.46.5-22.1.x86_64.rpm: File not signed.
   If you really trust your repository, you may continue in an insecure mode.

http://w3.suse.de/~tgoettlicher/dud/libyui-qt6-2.46.5-22.1.x86_64.rpm: adding to installation system
Loading Installation System (1/5) - 100%
Loading Installation System (2/5) - 100%
Loading Installation System (3/5) - 100%
Loading Installation System (4/5) - 100%
Loading Installation System (5/5) - 100%
Feature: Boot Loader Speaker
Boot Loader Speaker

- Press F9 at the boot screen
- Reads menu entries to you
- If you do not have a monitor
- For visually impaired users
Feature: Remote Installation
Remote Installation

• Install SUSE® Linux Enterprise remotely over the network

• Configure settings at the boot prompt:
  - Network:
    hostip=192.168.1.1/24
  - Installation source:
    install=ftp://192.168.1.100/pub/suse
    install=http://192.168.1.100/suse
Remote Installation (cont'd)

• Installation via:
  - VNC (Virtual Network Computing)
    vnc=1
    vncpassword=susecon2014
  - SSH (Secure Shell)
    ssh=1
    sshpassword=susecon2014
Remote Installation (cont'd)

Boot Options: vnc=1 vncpassword=susecon2014

F1 Help    F2 Language English (US)   F3 Video Mode Default   F4 Source DVD   F5 Kernel Default   F6 Driver No
Remote Installation (cont'd)

- Connect to host via `vncviewer hostip :1`

```
starting VNC server...
A log file will be written to: /var/log/YaST2/vncserver.log ...

***
*** You can connect to <host>, display :1 now with vncviewer
*** Or use a Java capable browser on http://<host>:5801/
***

(When YaST2 is finished, close your VNC viewer and return to this window.)

Active interfaces:

eth0    Link encap:Ethernet  HWaddr 52:54:00:9B:04:A5
        inet addr:192.168.122.75  Bcast:192.168.122.255  Mask:255.255.255.0
--
lo      Link encap:Local Loopback
        inet addr:127.0.0.1  Mask:255.0.0.0

*** Starting YaST2 ***
```
Feature: Macro Recorder
Macro Recorder

• Recorder and player for user interaction
• Records logical actions like
  - OK button pressed
  - Username field contains “tux”
• Macros from text interface work in graphical interface and vice versa
• Automation for QA testers and power users
Macro Recorder (cont'd)

- Alt + Ctrl + Shift + M starts recording

- Alt + Ctrl + Shift + M again stops recording
Macro Recorder (cont'd)

- Play a recorded macro:
  Alt + Ctrl + Shift + P

- Run macros from the command line:
  /usr/lib/YaST2/bin/y2base modulename qt
  --macro macro.ycp

- Macros are not a substitution for AutoYaST
What is AutoYaST?
AutoYaST

- **AutoYaST** is the SUSE® Linux Enterprise automated installation method that leverages standard installation processes with predefined rules and responses to create reproduceable OS builds
- **Caution**: Can reduce the time to provision a new SUSE Linux Enterprise machine to less than 10 minutes
When to Use AutoYaST

- Linux is your primary OS or you need deployment on demand
- Dealing with a wide range of machines
- Constantly changing hardware or a wide variety of hardware
- Constantly changing software requirements
- Only installing a few machines at a time
- Staff has varying Linux expertise
When to Use Imaging

- Need to support multiple operating systems
- Have a large number of identical systems to support
- Limited applications to support or you are using an application deployment system (i.e., thin images and SUSE® Studio)
- Limited number of hardware platforms
- Few images are needed
SUSE® Manager

• Best of both worlds with support for AutoYaST, multicast and integrated support for SUSE Studio images.
Create an Installation Server
Installation Server

Server Specs

- **Disk Space**
  - 5GB plus enough disk space to hold the Linux distributions you will use

- **Processor/RAM**
  - Any modern system with 512MB of RAM or greater

- **Apache installed**
  - Can use FTP, NFS, HTTP or Samba for installation.
  - HTTP is easiest to use and URLs can be manipulated via apache. Windows and other OSs can be used if you already have an existing web server
Best Practices

• When setting up, turn off your firewall
• YaST : Security and Users : Firewall
• Can be re-enabled after configuration and setup
  - Be mindful of these ports: HTTP 80, TFTP 69, DHCPD 547
YaST installs and configures Apache and copies the source media to the system
Verify the Installation Source

Index of /install/sles11sp2/x86_64/DVD1

<table>
<thead>
<tr>
<th>Name</th>
<th>Last modified</th>
<th>Size</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent Directory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>boot/</td>
<td>15-Feb-2012 18:09</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>docu/</td>
<td>15-Feb-2012 17:48</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>media.1/</td>
<td>15-Feb-2012 18:09</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>suse/</td>
<td>15-Feb-2012 17:48</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>ARCHIVES.gz</td>
<td>15-Feb-2012 18:08</td>
<td>5.5M</td>
<td></td>
</tr>
<tr>
<td>COPYING</td>
<td>15-Feb-2012 09:37</td>
<td>20K</td>
<td></td>
</tr>
<tr>
<td>COPYING.de</td>
<td>15-Feb-2012 09:37</td>
<td>28K</td>
<td></td>
</tr>
<tr>
<td>COPYRIGHT</td>
<td>15-Feb-2012 09:37</td>
<td>4.0K</td>
<td></td>
</tr>
<tr>
<td>COPYRIGHT.de</td>
<td>15-Feb-2012 09:37</td>
<td>4.0K</td>
<td></td>
</tr>
<tr>
<td>ChangeLog</td>
<td>15-Feb-2012 18:04</td>
<td>11M</td>
<td></td>
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<tr>
<td>INDEX.gz</td>
<td>15-Feb-2012 18:08</td>
<td>36K</td>
<td></td>
</tr>
<tr>
<td>NEWS</td>
<td>15-Feb-2012 09:37</td>
<td>200K</td>
<td></td>
</tr>
<tr>
<td>README</td>
<td>26-Oct-2011 05:20</td>
<td>4.4K</td>
<td></td>
</tr>
</tbody>
</table>

You can browse to the installation source to verify that it is visible on the network. Make sure to include the trailing slash (“/”)

Start an Installation

Use SUSE® Linux Enterprise 11 DVD1

Boot Options: install=http://<server>/<source_path>
Additional Boot Options

• If there is no DHCP on your network, you can use:
  - hostip=<ip address> netmask=<mask>
  - ie: hostip=172.17.2.1 netmask=255.255.255.0
  - use gateway=<gateway> if the Installation server is on a different subnet
Network Setup and Install Demo:
Create an AutoYaST Profile
Clone an Existing Machine
YaST:Miscellaneous:Autoinstallation

Tools: Create Reference Profile,
File: Save to export system configuration to an AutoYaST profile
AutoYaST Profile

• Plain text, XML
• Can be customized using:
  - YaST Autoinstallation Module
  - Text Editor (vi, emacs, kate, etc.)

• Experiment with the Autoinstallation module and view the changes made in the XML
AutoYaST Profile
Things I like to edit

• <Software>
  - Just use patterns, individual packages typically not needed

• <Interface>
  - Remove <name> (and <netmask> if dhcp) tags
  - Change <device>eth-id-<MAC></device> to
    <device>eth0</device>, <device>eth1</device>, etc.
  - Recommend to define all interfaces if system has more than one NIC

• <Partition>
  - Change <size> to fixed size for swap and other partitions (ie 2GB) and “auto” to span the remainder of the disk

• Scan XML and remove machine specific syntax
Sample AutoYaST Profile
Simplest Possible Profile for SUSE® Linux Enterprise Server 11

<?xml version="1.0"?>
<!DOCTYPE profile SYSTEM "/usr/share/autoinstall/dtd/profile.dtd">
<profile xmlns="http://www.suse.com/1.0/yast2ns"
xmlns:config="http://www.suse.com/1.0/configns">
  <partitioning config:type="list">
    <drive>
      <use>all</use>
    </drive>
  </partitioning>
  <users config:type="list">
    <user>
      <encrypted config:type="boolean">false</encrypted>
      <user_password>myrootpassword</user_password>
      <username>root</username>
    </user>
  </users>
</profile>
Start an Installation

Use SLE 11 DVD1

Boot Options:

install=http://<server>/<source_path>
autoyast=http://<server>/<path_to_profile>
Automated Installation Demo:
Diskless Installation
Preboot Execution Environment (PXE)

Part of the firmware of most modern network cards, PXE leverages DHCP (Dynamic Host Configuration Protocol) to find an available PXE server to download a network bootstrap program (NBP) to the computer's RAM using TFTP (Trivial File Transfer Protocol). Once in RAM, the NBP can execute and download installation or other software, removing the need for installation media.
PXE Server Setup

• Ensure the following rpms are installed:
  – Syslinux, dhcp-server, tftp, xinetd

• Create the tftpboot directory structure and copy the NBP (pxelinux.0) to the /tftpboot
  – mkdir -p /tftpboot/pxelinux.cfg cp /usr/share/syslinux/pxelinux.0 /tftpboot
PXE Server Setup (continued)

• Copy the Linux kernel and initrd (initial ramdisk) from the source media (or installation directory):
  - From the source directory...
    - cp boot/x86_64/loader/linux /tftpboot/sle11sp2_64bit_linux
    - cp boot/x86_64/loader/initrd /tftpboot/sle11sp2_64bit_initrd

• If you're hosting multiple architecture sources (i386, x86-64, etc), you'll need to have unique names for each copied linux and initrd file
PXE Server Setup (continued)

- Create a *default* file in the `/tftpboot/pxelinux.cfg` directory. Sample contents below:

  ```
  prompt 1
  timeout 0
  display pxelinux.cfg/boot.msg
  label 1
  kernel sles11_sp2_64bit_linux
  append initrd=sles11_sp2_64bit_initrd splash=verbose
  install=http://squid/install/sles11sp2/x86_64/DVD1/

  label 2
  kernel sles10_sp4_64bit_linux
  append initrd=sles10_sp4_64bit_initrd splash=verbose
  install=http://squid/install/sles10sp4/x86_64/DVD1/
  #(the "append" line is all one line)
  ```
PXE Server Setup (continued)

- Create a `boot.msg` file in the `/tftpboot/pxelinux.cfg` directory. Sample contents below:

```
--------------------------------|
|                                |
| PXE Boot Menu List            |
|                                |
| 1. SLES 11 SP2 (64-bit)       |
| 2. SLES 10 SP4 (64-bit) + auto |
--------------------------------|
```

- Do not use any tabs in the `boot.msg` file (spaces only)
Configure TFTP
YaST:Network Services:TFTP Server

Select Enable and choose /tftpboot as the Boot Image Directory
DHCP Server Setup

- DHCP Server YaST module available. For ease of configuration we'll edit the the dhcpd.conf file directly

```
option domain-name "local.com";
option domain-name-servers 172.17.2.2;
option routers 172.17.2.2;
default-lease-time 14400;
ddns-update-style none;
allow booting;
allow bootp;
subnet 172.17.2.0 netmask 255.255.255.0 {
  range 172.17.2.100 172.17.2.200;
  max-lease-time 172800;
  next-server 172.17.2.70;
  filename "pxelinux.0";
```
DHCP Server Setup (continued)

• Start the DHCPD daemon and configure it to start when the system is rebooted (run from the terminal)
  ~ # rcdhcpd start
  ~ # chkconfig dhcpd on
Start a Diskless Installation

Select Network Boot from the BIOS
Upgrade SLES® 11 to SLES® 12
Upgrade SLES® 11 to SLES® 12

• Boot options:
  autoupgrade=1
  autoyast2=http://example/autoinst.xml

• Sections in autoinst.xml
  - upgrade
  - software
  - network
  - backup
Upgrade SLES® 11 to SLES® 12

<upgrade>
  <only_installed_packages config:type="boolean">
    false
  </only_installed_packages>
  <stop_on_solver_conflict config:type="boolean">
    true
  </stop_on_solver_conflict>
</upgrade>

<software>
  <packages config:type="list">
    <package>autoyast2-installation</package>
  </packages>
  <patterns config:type="list">
    <pattern>base</pattern>
  </patterns>
  <remove-packages config:type="list"/>
  <remove-patterns config:type="list"/>
</software>
Upgrade SLES® 11 to SLES® 12

<networking>
  <keep_install_network config:type="boolean">true</keep_install_network>
  <startImmediately config:type="boolean">true</startImmediately>
</networking>

<backup>
  <sysconfig config:type="boolean">true</sysconfig>
  <modified config:type="boolean">true</modified>
  <removeOld config:type="boolean">false</removeOld>
</backup>
Upgrade SLES® 11 to SLES® 12
Upgrade SLES® 11 to SLES® 12
Additional Resources

- Setup Guide for Auto-installation Environment:
  http://www.novell.com/coolsolutions/feature/19280.html

- The most up-to-date AutoYaST documentation:
  http://www.suse.de/~ug/

- Mailing list for AutoYaST, subscribe here:
  http://en.opensuse.org/Communicate
  opensuse-autoinstall@opensuse.org
Session References

FUT7702 – Advanced Systems Management with Machinery

TUT7577 – Securing Your System: Hardening and Tweaking SUSE Linux Enterprise Server 12
Questions?

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