Kognitio Standalone Software Installation

Installation Run through

Kognitio Platform Prerequisites

- x86 (Intel/AMD) processor based servers
  - Blades, Rack-mount, Standalone
  - The more nodes the better
    - The more CPUs and cores the better
    - The more RAM (minimum of 4GB per node) and disks the better
    - Balanced configuration across set of nodes to be used
- Linux OS
  - Red Hat Enterprise Linux 5 or later
  - SUSE Enterprise Server 10 or later
  - Other distributions may work but are not officially supported, e.g. openSUSE, Fedora, CentOS, Ubuntu
- TCP/IP switched network
  - Ideally Gigabit Ethernet
  - Multiple NICs per node is ideal (Kognitio will exploit bandwidth)
  - Each numbered NIC linked to separate switch is best, e.g. all eth0 ports to switch1, all eth1 ports to switch2 etc.

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Kognitio – The 64-bit question?

- Kognitio is a 32-bit application, but from version 8 it can only run on 64-bit Linux distributions
  - is able to use large amounts of RAM per node by dividing memory into chunks – RAM Stores
  - The maximum size of a RAM Store is approximately 4GB
- Kognitio has certain dependencies on 32-bit libraries and other code. This support forum topic gives more information on what is required, and how to install for various Linux distributions.

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Kognitio – Platform review

- Server environment
  - number and type of nodes
    - Are they generally balanced in configuration?
  - Disk and RAM resources v data and query requirements
    - Kognitio recommend a ratio of 1 unit of RAM to 4 units of disk
  - AP – separate node for data staging, backup etc.
- Disk Configuration
  - Protect Linux partition with hardware RAID if possible
  - Kognitio Disk Resources, either
    - Disk Partitions – preferred if free partition disk space available
    - Database Files – if all available disk storage taken up by Linux file system(s)
  - Kognitio has option of software RAID to protect database storage
- Network Configuration
  - Ports balanced across nodes e.g. each node has 2 NICs
  - Switching
  - Isolated network for larger configurations
    - Kognitio puts lots of traffic onto network
    - Use one network interface per node for LAN traffic – for user connections

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Kognitio and Disk Storage

- Options in order of preference
  - Kognitio Partition (type 0x60) on each available disk drive
    - Partition size must be common across all disks and nodes
    - Prefer one Kognitio partition per disk
    - Choose a partition size slightly smaller than available free space in case future (replacement) disks are slightly smaller than current disks
  - Database file(s) i.e. regular Linux file in file system
  - Database Sparse file(s) – As above but grows dynamically
    - No formatting cost so quick to create
    - Ensure enough free space available for specified size

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Installation Prerequisites

- Each node has minimal Linux installed
  - Base level, text only install is all that is required
  - Typically use a small Linux partition (e.g. 16GB) so Kognitio can use all remaining free partition space for database storage
- Disable swap on each node
  - swapoff –a
  - Edit /etc/fstab and comment out swap partition
  - Kognitio should be only application running and it will not use swap
- Disable Linux Firewall on each node
- Nodes connected on common secure network
  - Single node install is OK (use ‘lo’ option when prompted for network interfaces)
- Disable SELinux on RedHat Linux

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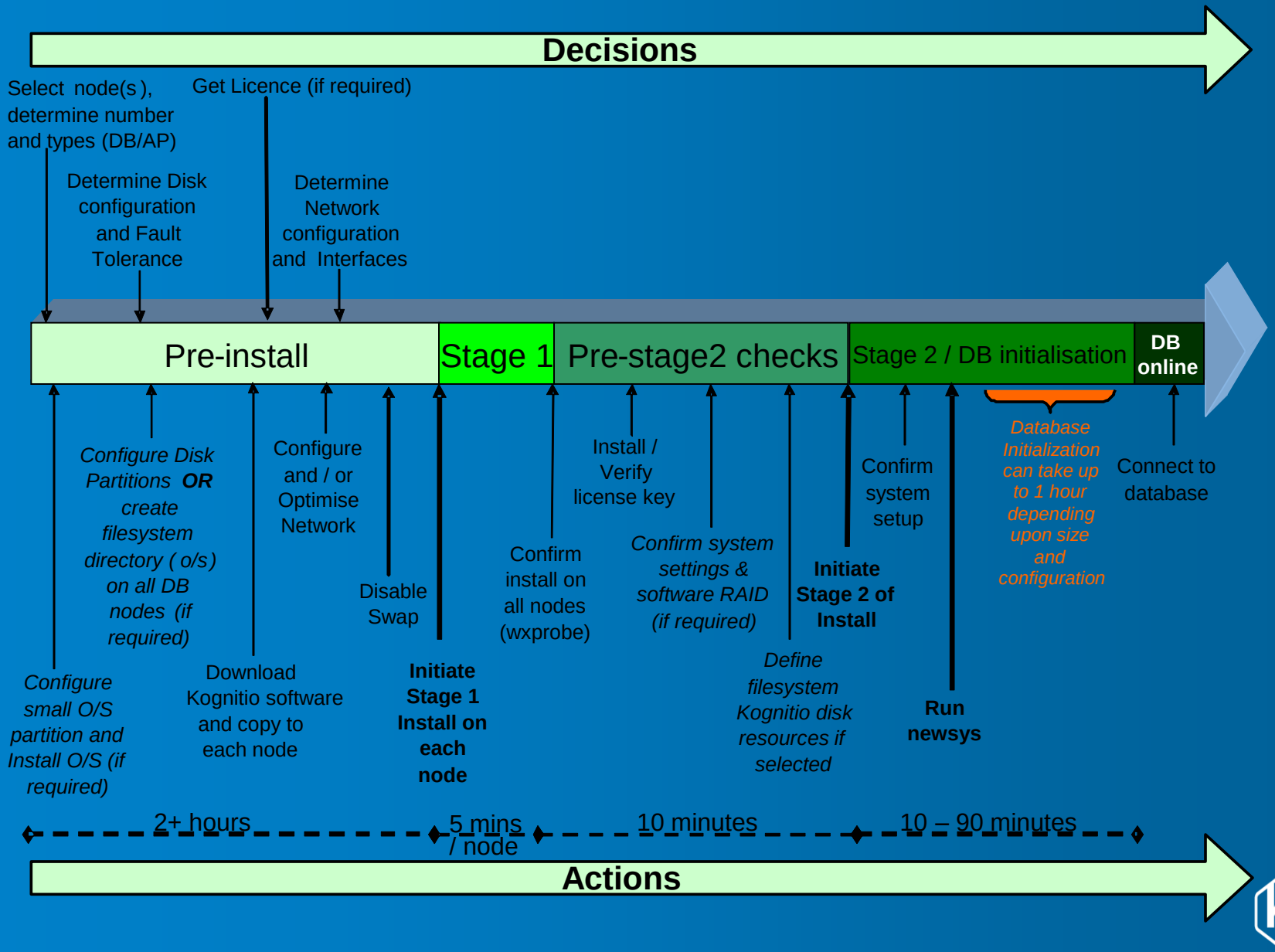
Installation Timeline



Kognitio Installation Notes

- .sfx executable package used for initial installs
- .wxpkg executable package used for upgrades
- The Stage 1 installation process will require root access on all nodes
  - This will create a minimum communications network amongst all the nodes
  - Kognitio Software must be copied to and installed on all nodes
    - Option for installation on node 2…n to be scripted based on install options used for node 1
- The Stage 2 disk initialization phase can be run from any single node in the configuration
  - All configured Kognitio disk partitions will be simultaneously formatted or Kognitio database files created
  - Can take over an hour for larger partition/file sizes
    - Sparse file option will take a few minutes
  - Single database instance created
  - Database system tables built and populated

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Kognitio Installation Notes

- The installation will create three Linux user accounts for managing Kognitio
  - *wxroot* – privileged administration account
  - *wxadmin* – general administration account
  - *wxextern* – default user for external scripts
- Each node named with SYSTEM ID
  - Group identity for Kognitio nodes used for database instance
  - Any Kognitio software license linked to this identity
- SMD (System Management Daemon) process runs on each node and intercommunicates between database nodes with the same SYSTEM ID
  - Activated in Phase 1 of installation on each node
  - Used as a management and monitoring bus
  - Used to synchronize software, configuration files and database logs across database nodes
  - Phase 2 of installation exploits this

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Kognitio Installation Notes

- Nodes in a Kognitio installation can be of two types:
  - *Server* – A ‘full’ database node that participates in all aspects of Kognitio operations
    - Most nodes in a Kognitio instance are of this type
  - *Client* – An ‘AP’ node that is part of a Kognitio instance, but does not directly take part in database storage and query processing
    - Linked via SMD to other nodes
    - Can run database management utilities

Installation Walkthrough

- The following slides walk through a Kognitio installation.
  - In places, reference is made to getting a licence, but for systems with up to 128GB total RAM no licence is required.
  - Periodically the output from the installation process may change slightly, so the screenshots shown are illustrative of what you might expect to see.

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Kognitio Disk Partitions set-up

- Create partition(s) before Kognitio installation
  - Partition type hex ’60’, a.k.a. 0x60
  - The Kognitio installation process will automatically recognize and utilise available type 0x60 partitions
  - Create partition(s) using standard utility like ‘fdisk’
  - This should be done on each free disk on each node before the Type 1 installation

```
root hp-rack1-enc6-8:/tmp # fdisk -l

Disk /dev/cciss/c0d0: 146.8 GB, 146807930880 bytes
255 heads, 32 sectors/track, 35139 cylinders
Units = cylinders of 8160 * 512 = 4177920 bytes

          Device Boot      Start         End      Blocks   Id  System
/dev/cciss/c0d0p1   *           1        1028     4194224   83  Linux
/dev/cciss/c0d0p2            1029        3422     9767520   83  Linux
/dev/cciss/c0d0p3            3423        8210    19535040   60  Unknown
```

Kognitio type 0x60 partition

Kognitio Database Files set-up

- Use when no free partition space is available but there is free space within Linux file system
- Location must be common across nodes
  - Create a common directory on each node after Stage 1 of the installation process
  - This directory need to be setup with the appropriate privileges to ensure that Kognitio can write to this directory
  - File(s) will be created in stage 2 of installation
  - Example below is for directory /data/wx2

Set up filesystem directory with appropriate privileges

```
vm1:/data # pwd
/data
vm1:/data # ls -l
total 1
drwxr-xr-x   3 root    root     72 2009-01-21 16:40 .
drwxr-xr-x  22 root    root    512 2009-01-21 16:40 ..
drwxrwxr-x   2 wxadmin wxadmin  48 2009-01-21 16:40 wx2
vm1:/data # _
```

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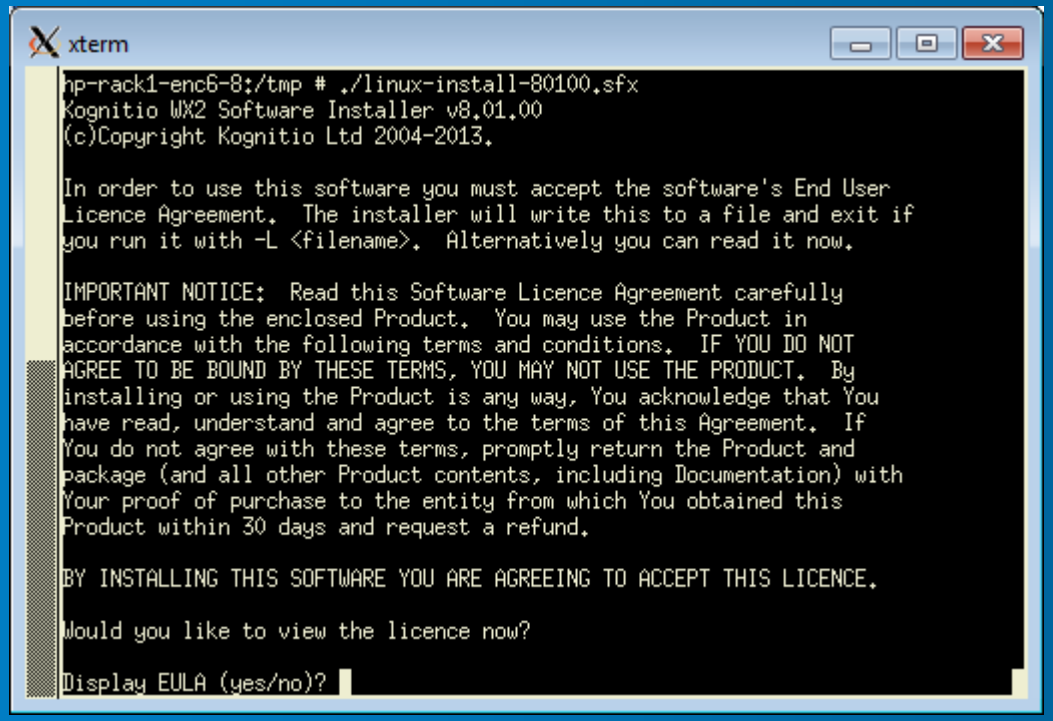
Stage 1: Startup and EULA

- The screen below shows the SFX installer being run, and prompting for the EULA to be displayed:



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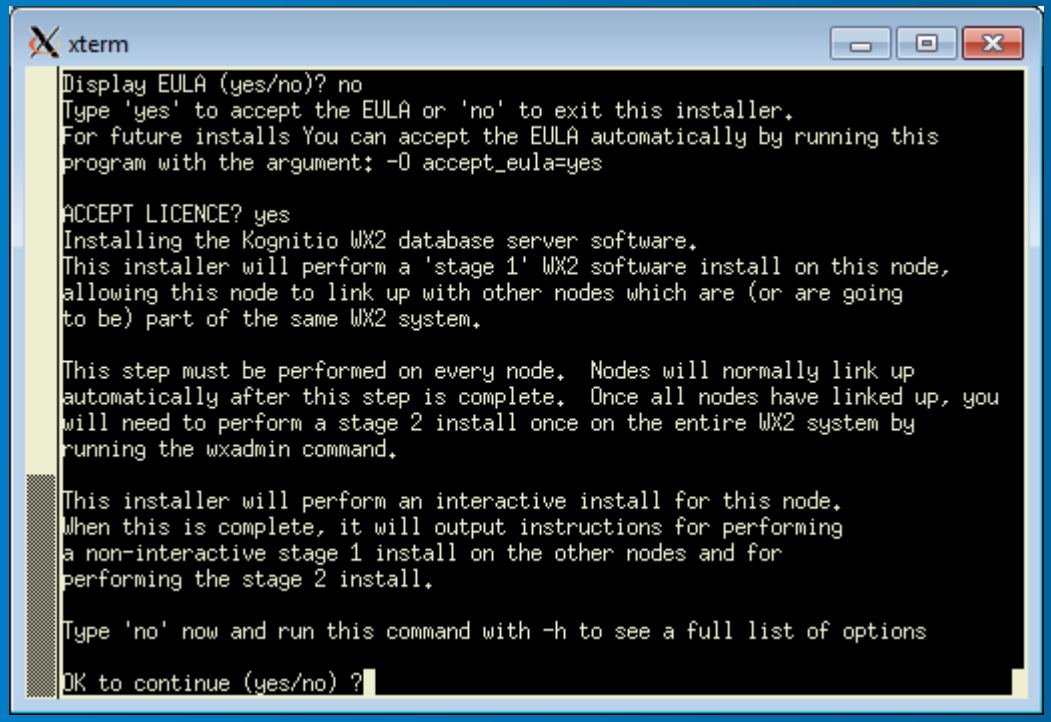
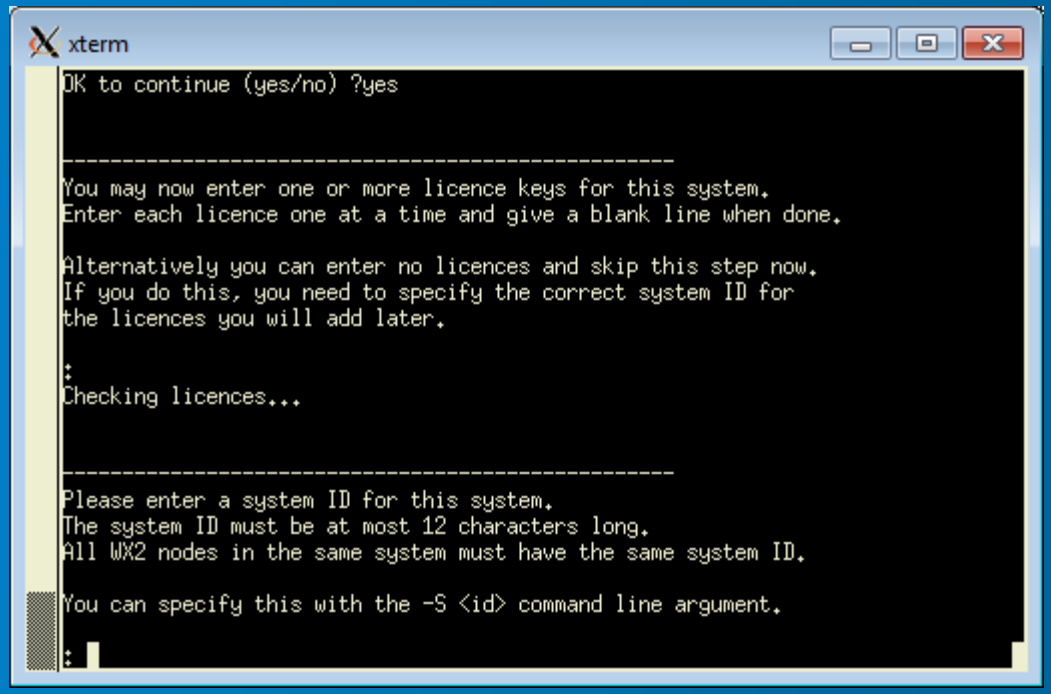
Stage 1: Define Two Install Stages

- The screen below shows the being accepted, followed by a reminder of the two stage install process:



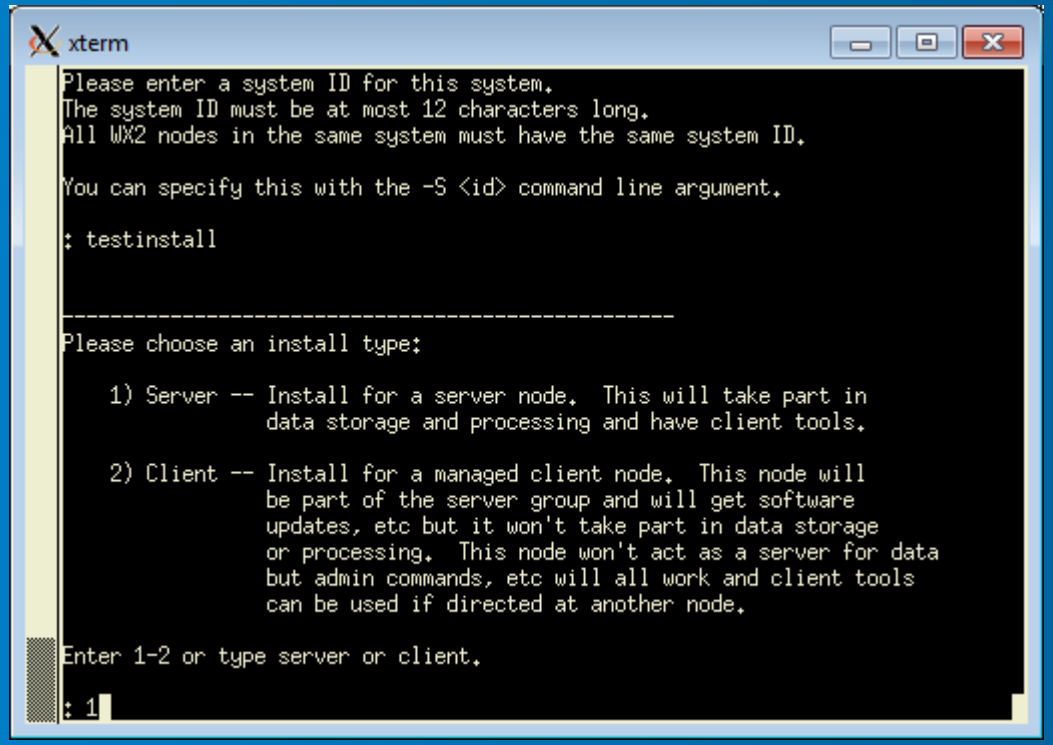
Stage 1: Enter Licence Key String

- A Kognitio instance has a SYSTEM ID (name) identifier which uniquely identifies the instance
  - Licence carries System ID
  - System ID can be manually entered but must match that in the license
  - Or use the implicit free licence for up to 128GB total RAM



Stage 1: Specify system id

- As we did not specify a licence, we now specify system id.
- Then we specify that we want this node to be a server rather than an AP:



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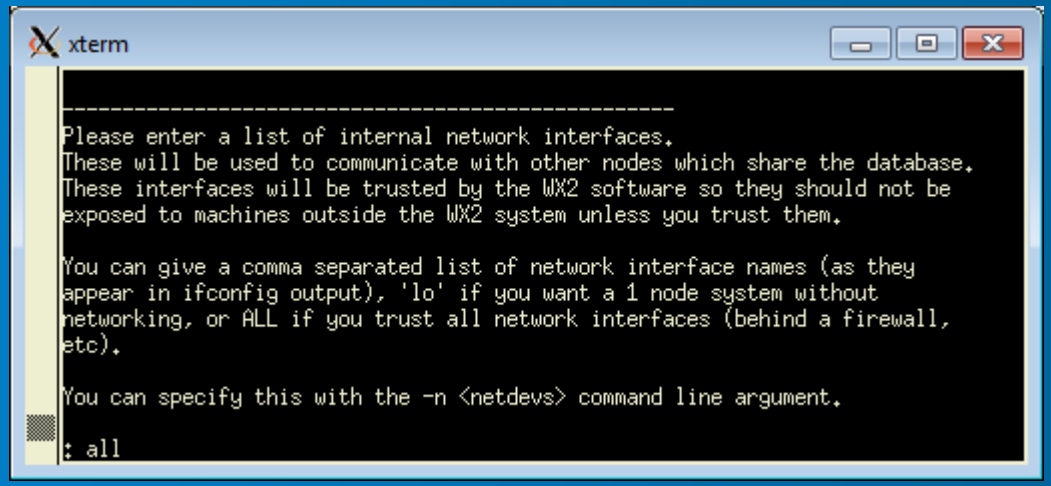
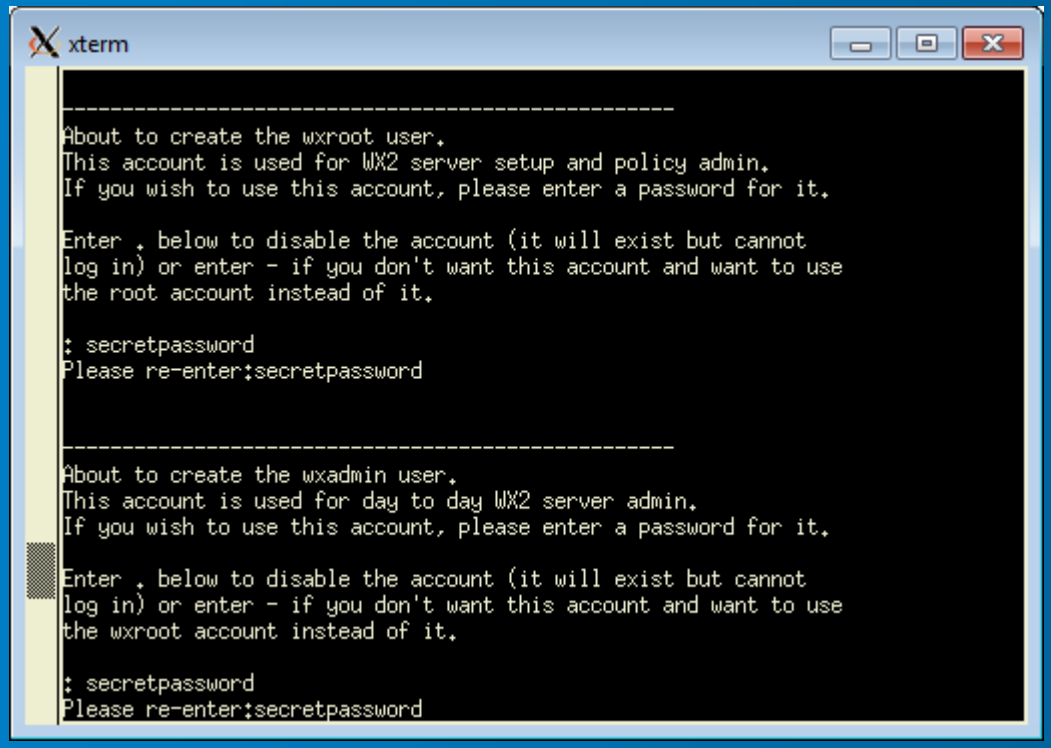
Stage 1: Node Type & Network Interfaces

- Now specify the network interfaces (NICs) to be used for internal Kognitio traffic. Do not include any external interfaces used to allow users to connect to the Kognitio system:



Stage 1: Create Linux Accounts

- Specify the passwords to allow login as the wxroot and wxadmin users mentioned earlier.
- The wxextern user will not have a password as cannot be used to login.



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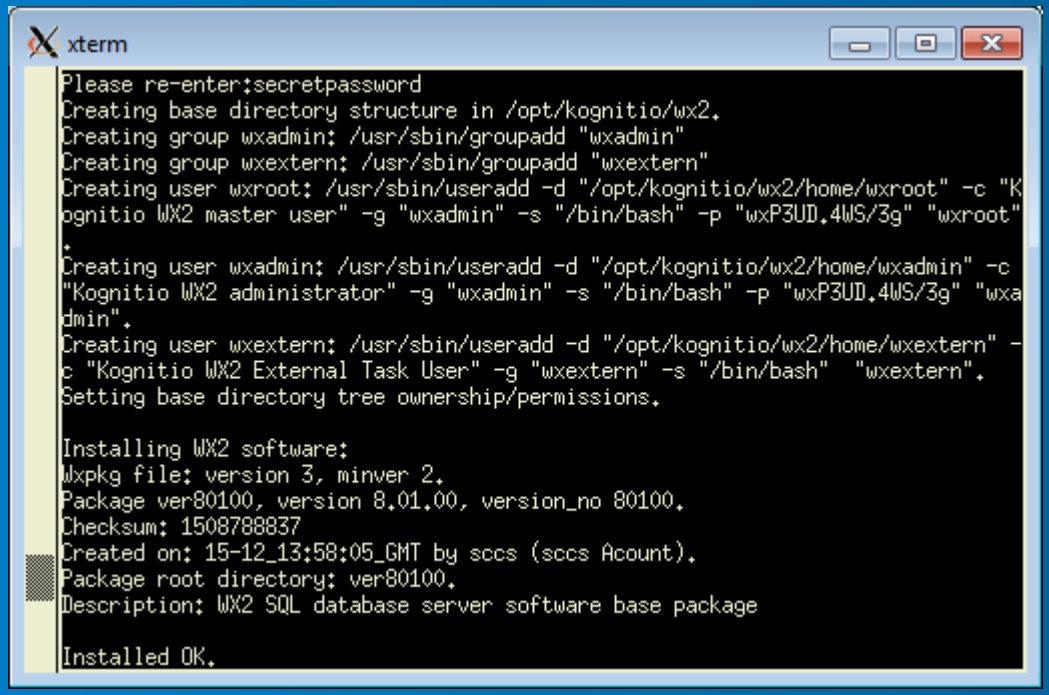
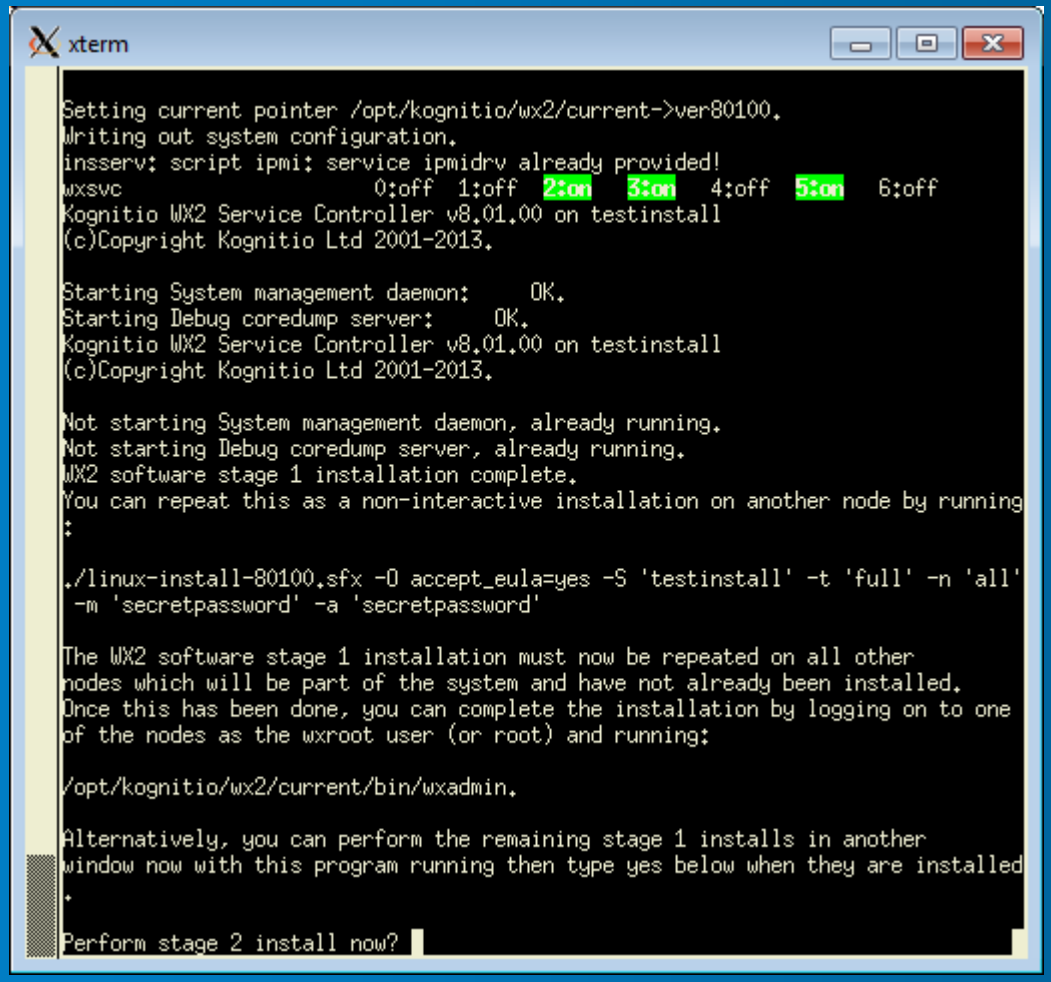
Stage 1: Software Installation

- Stage 1 installation now runs. Below you can see wxadmin, wxextern and wxroot users being created, and server software being installed:



Stage 1: SMD Startup

- Stage 1 install completed by making the installed version current, setting the System Management Daemon (SMD) to auto-start on node restart, and starting it now:



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Stage 1: Repeat on Other Nodes

- The end of the stage 1 install outputs a command line (see previous screenshot), which can be copied and pasted on other nodes rather than using the interactive stage 1 install.
- Ensure that logging in to a node in the system as wxadmin and running “wxprobe –H” shows all nodes.
  - If it shows just the local node, there is a communication issue. Start off by ensuring there are no firewalls preventing communication between nodes.
  - If it shows no nodes, check the output of the phase 1 install on that node for errors.
- If installing on a machine with non-Kognitio processes using significant RAM, use wxviconf to add a [boot options] entry restricting the RAM available to Kognitio – e.g. fixed_pool_size=40 would reserve 40% of RAM for non-Kognitio processes, and so restrict Kognitio to 60% of the node’s RAM.

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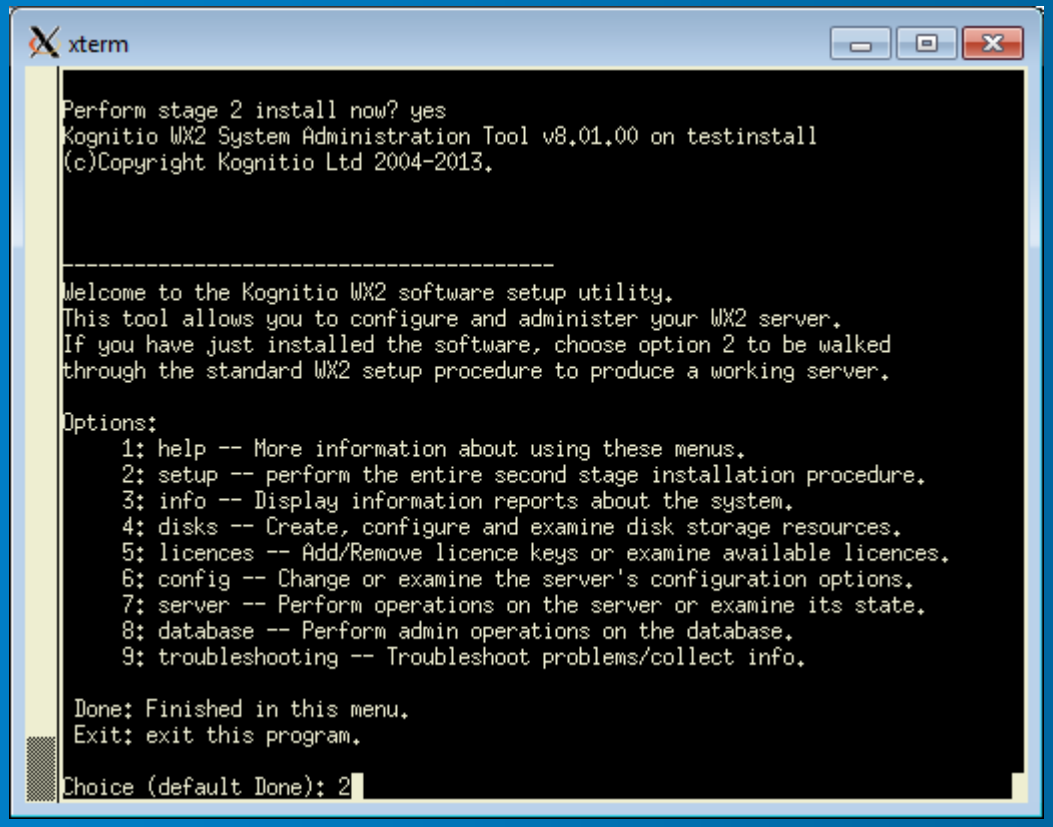
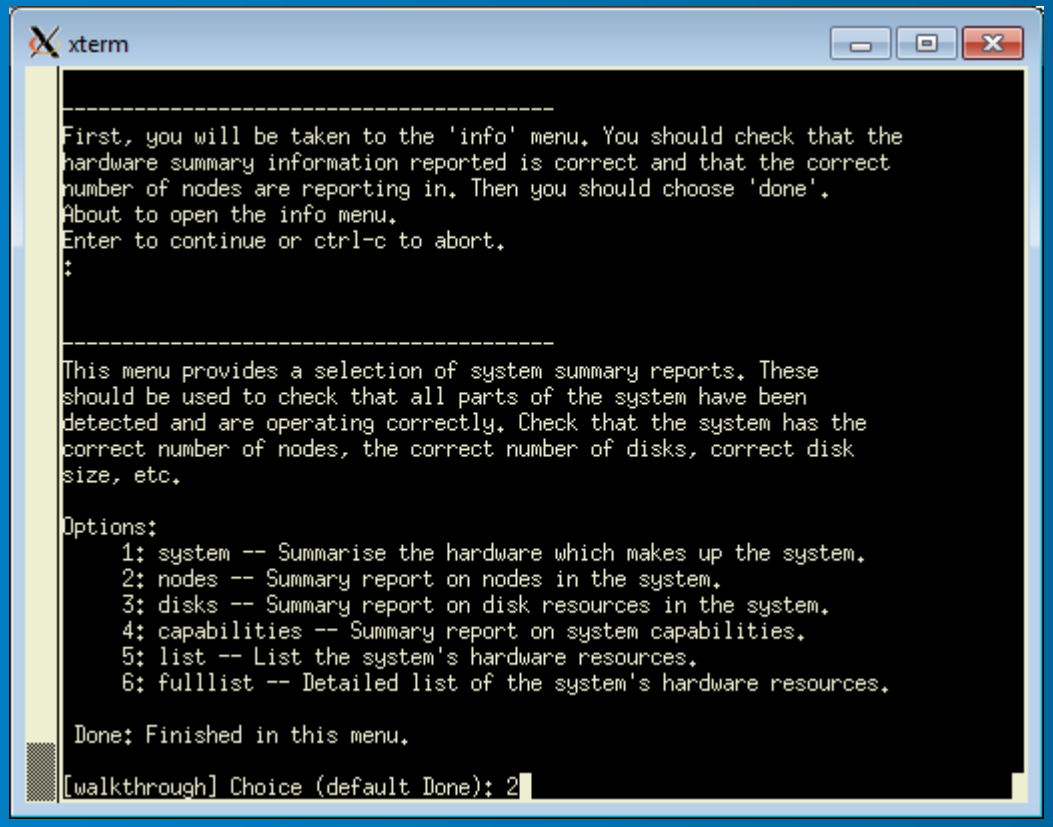
Stage 2: Database Setup

- Once all is well, the stage 2 install can be run at the prompt from the end of the stage 1 install, or by running the “wxadmin” command line tool.
- Stage 2 install begins by specifying option 2 for a full second stage install:



Stage 2: Check Platform as expected

- Choose option 2 to ensure all nodes are present:



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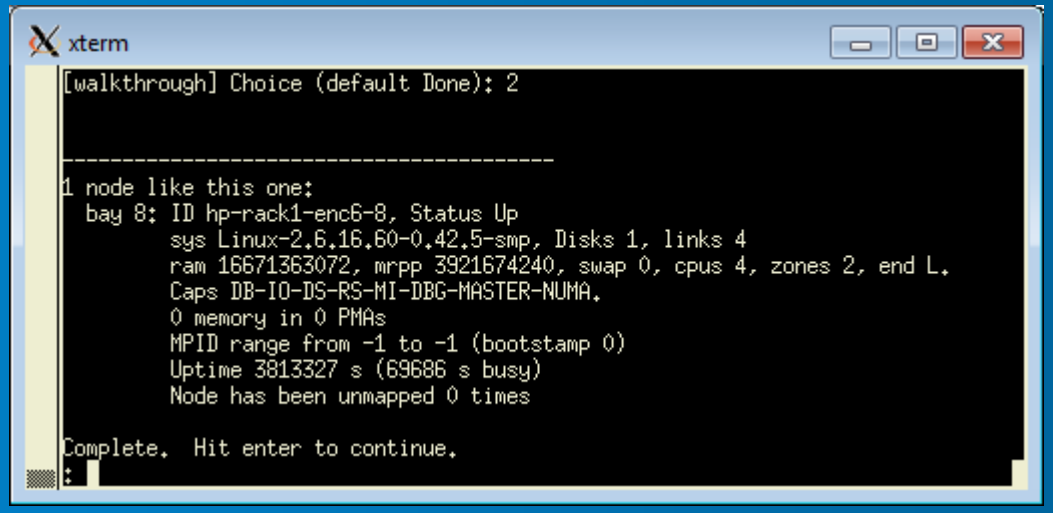
Stage 2: Verify All Nodes are as expected

- Visually check that the nodes presented match your expectation, then hit return:



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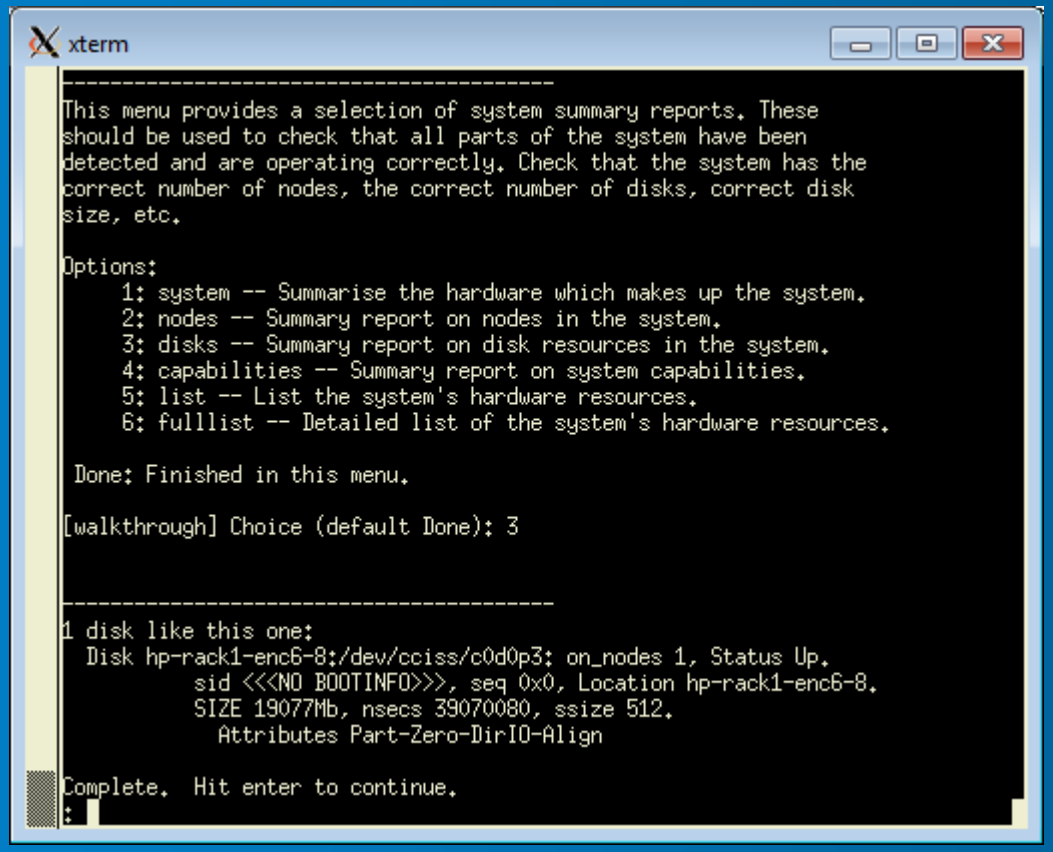
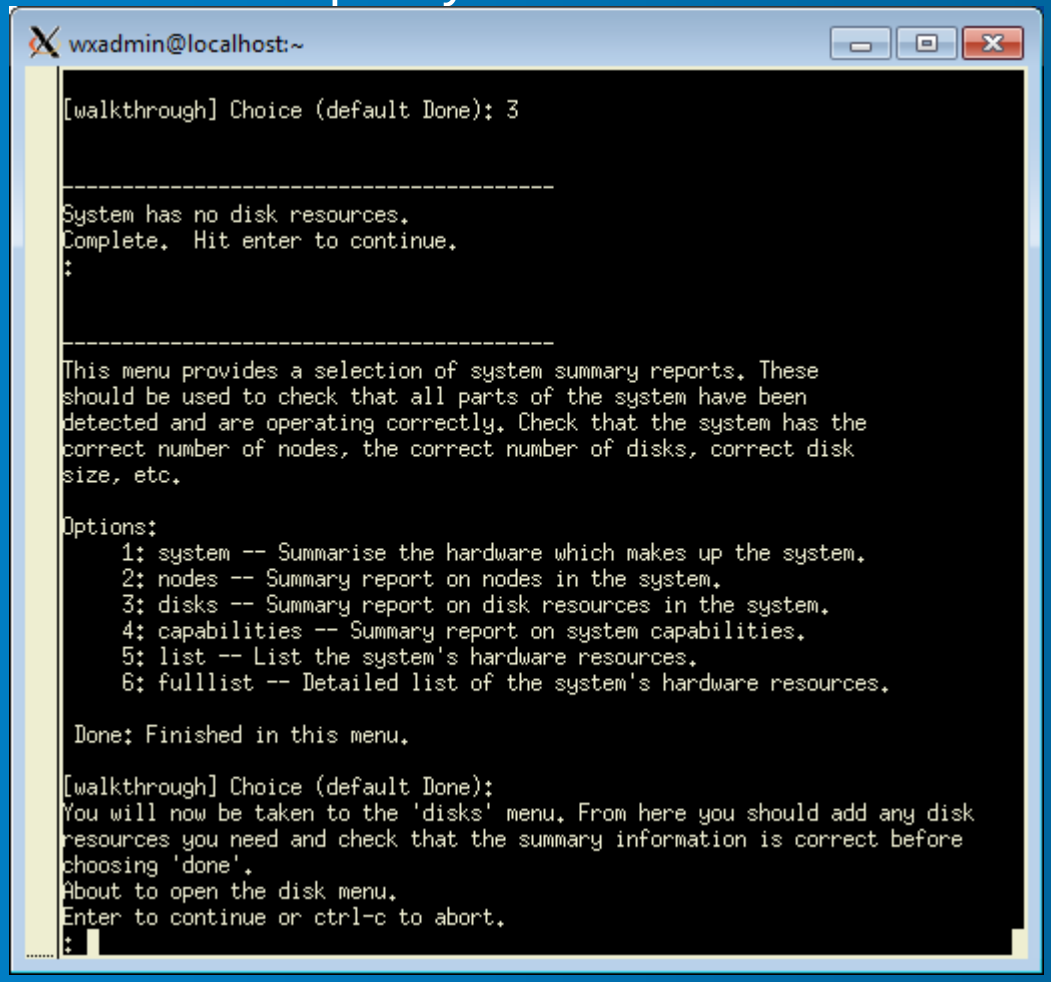
Stage 2: Option 1 - Storage Using Disk Partitions Check All Disks Present

- Select option 3 to check the disks in the system are as expected.
  - Check disk number, size and locations
  - Hit return when all is well:

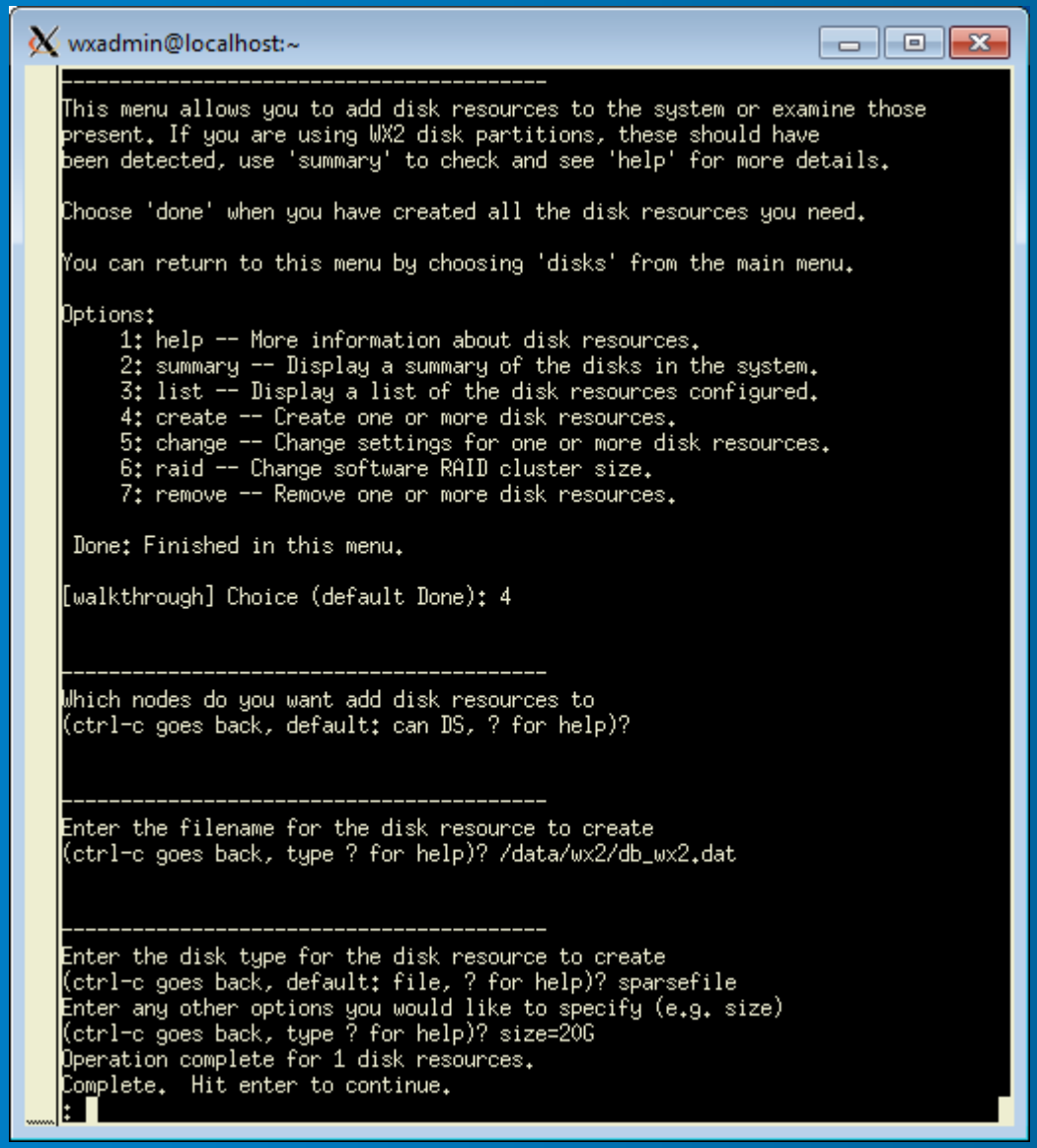


Stage 2: Option 2 - Storage Using File(s)
Set up Disk resources

- If you are going to use files, the disk list will be empty and you will be taken to another menu to specify disk resources:

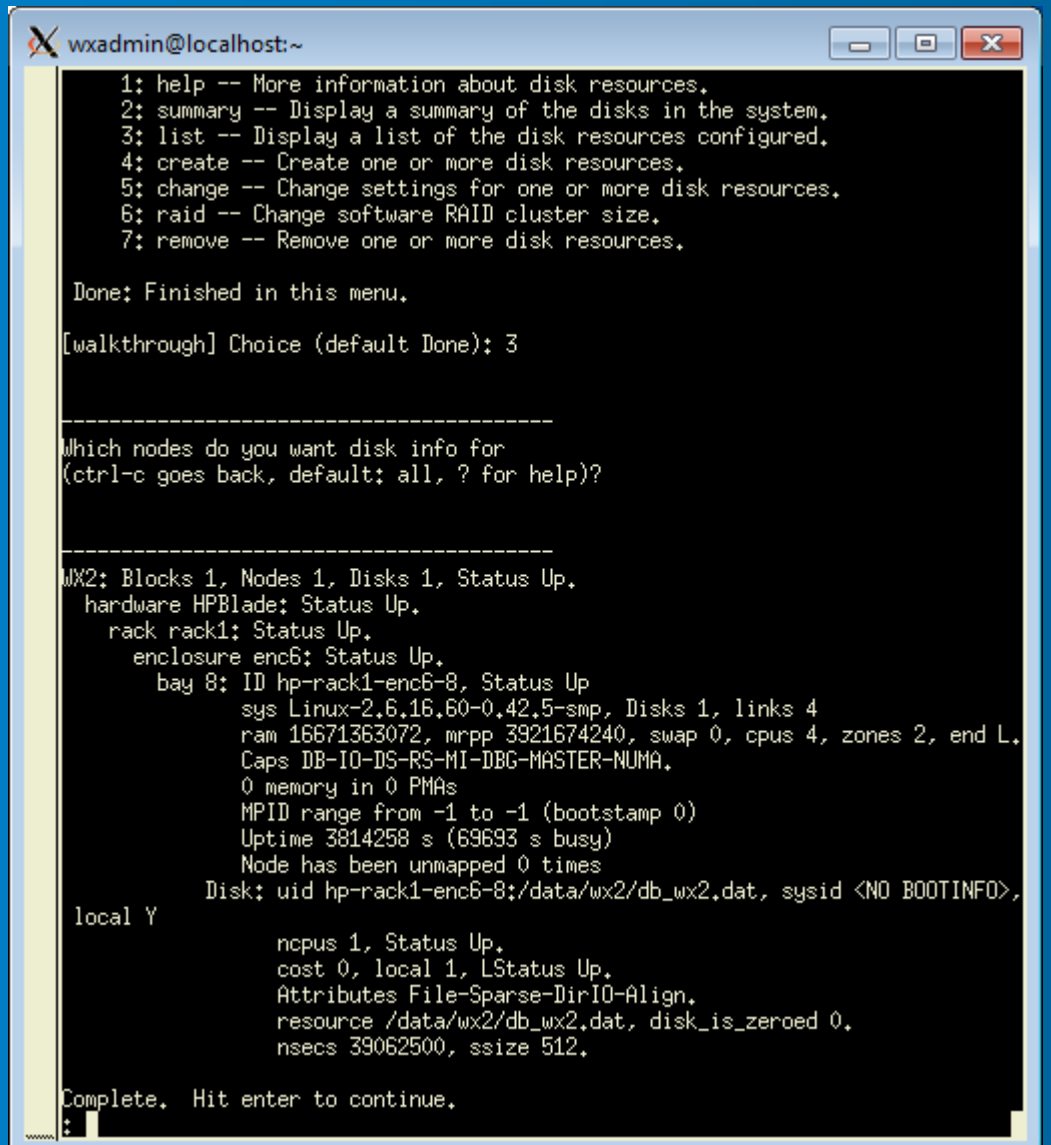


Stage 2: Option 2 - Storage Using File(s)
Set up Disk resources



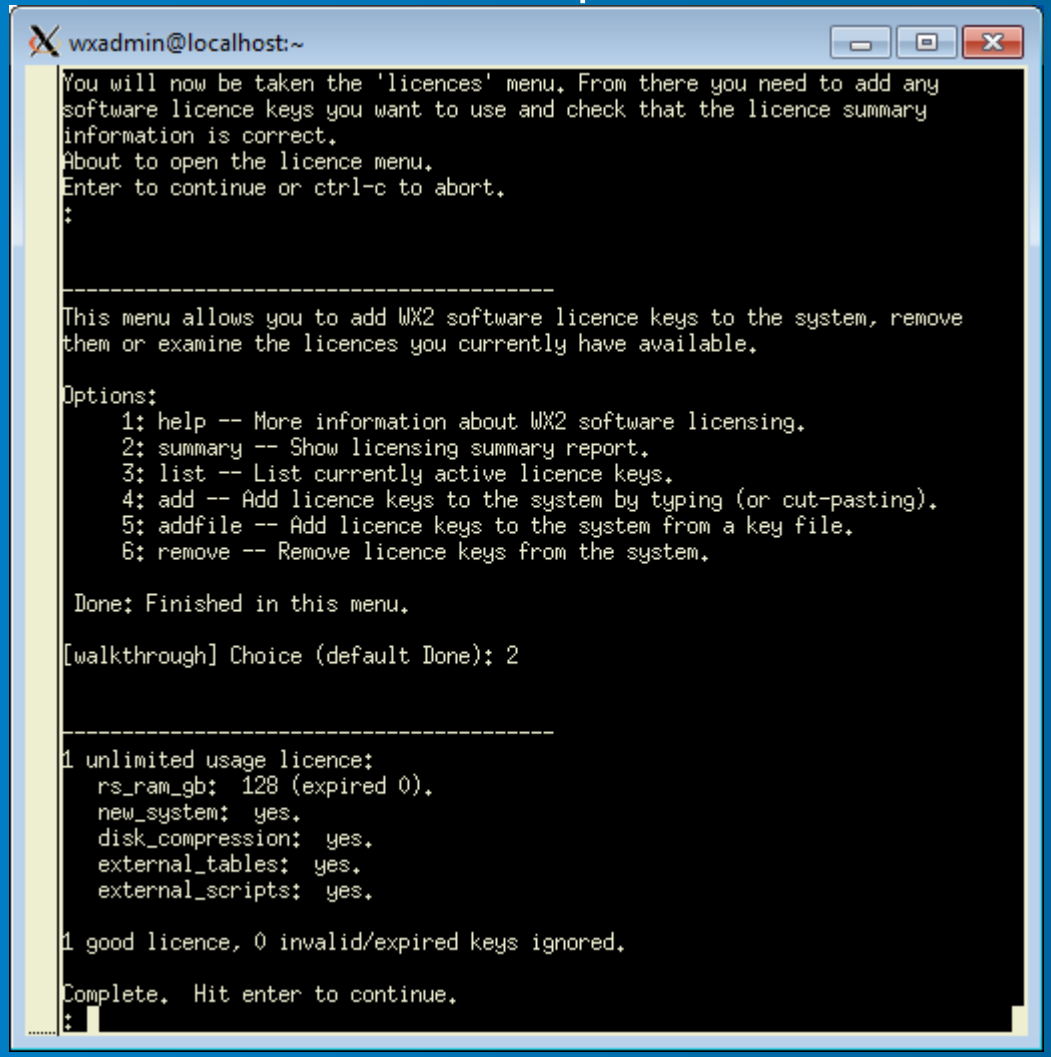
Stage 2: Option 2 - Storage Using File(s) Verify All Disks Present

- After setting up resources, use option 3 to verify they are as expected:



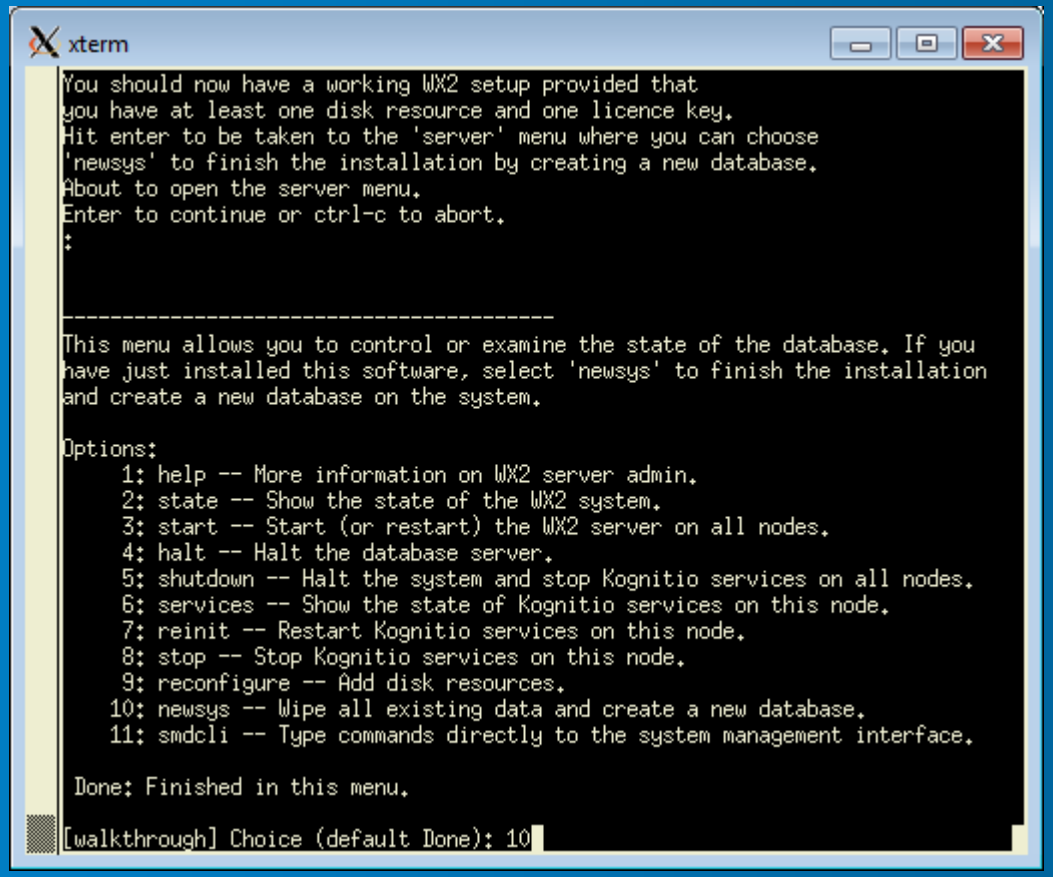
Stage 2: Check All Licences Present

- Review licences – in this case, the implicit free 128GB RAM licence is visible:



Stage 2: Initialize and Build New Database

- Choose option 10 to commission:



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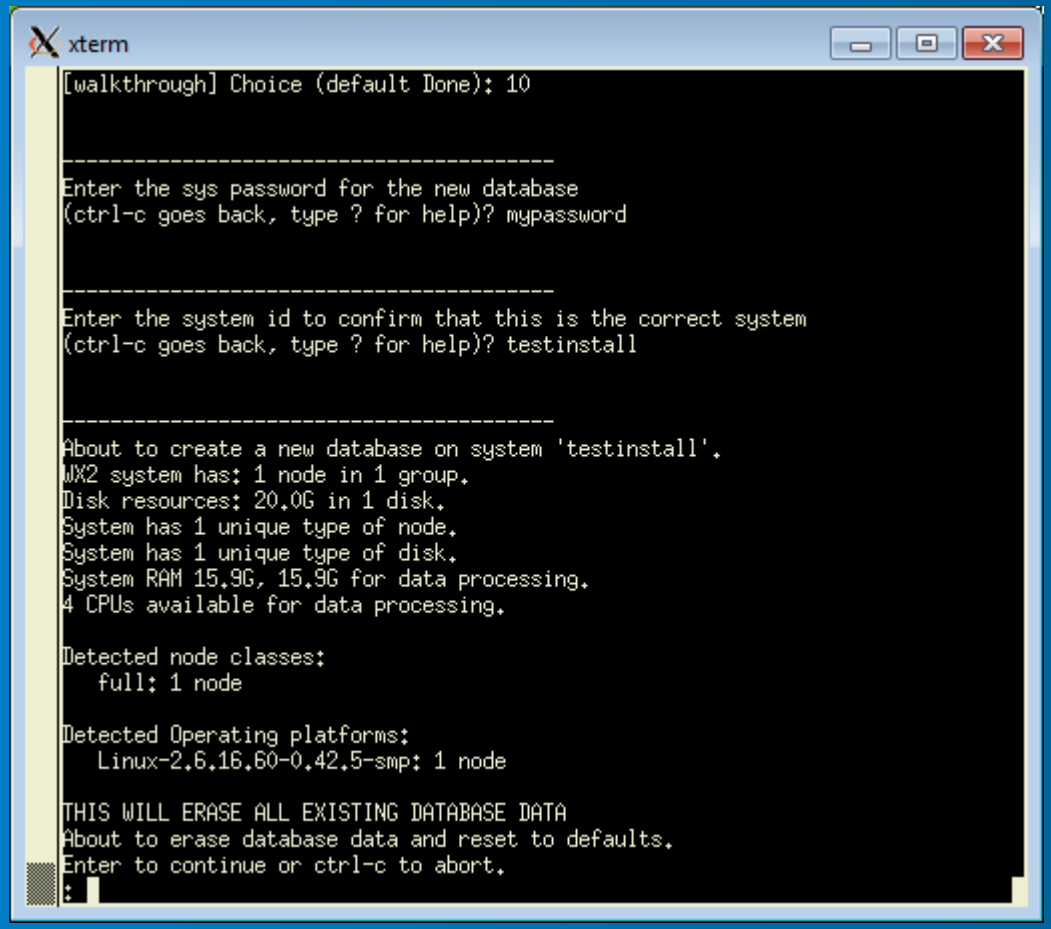
Stage 2: Initialize and Build New Database

- Provide SYS password and system id, then hit enter:



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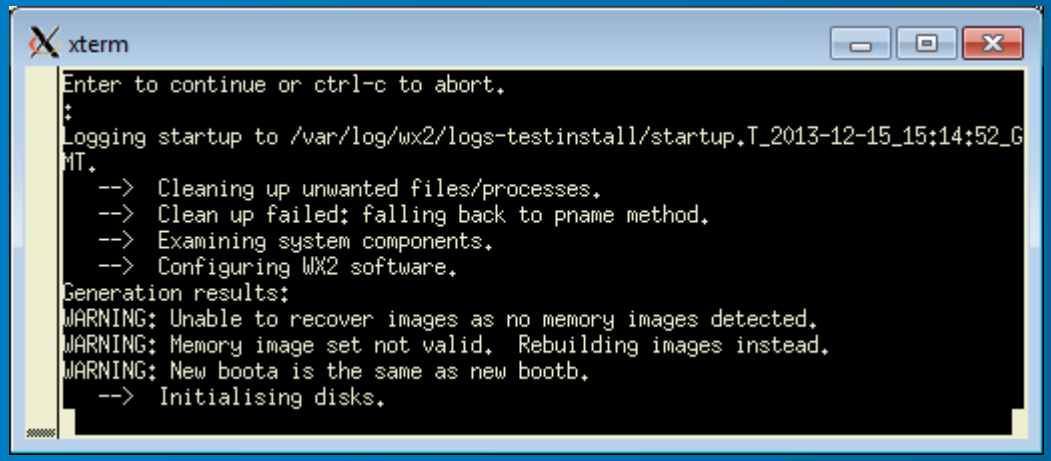
Stage 2: Initialize Disks

- The disk resources in the system will be zeroed early in the commissioning process. This can take some time if sparse files are not in use:



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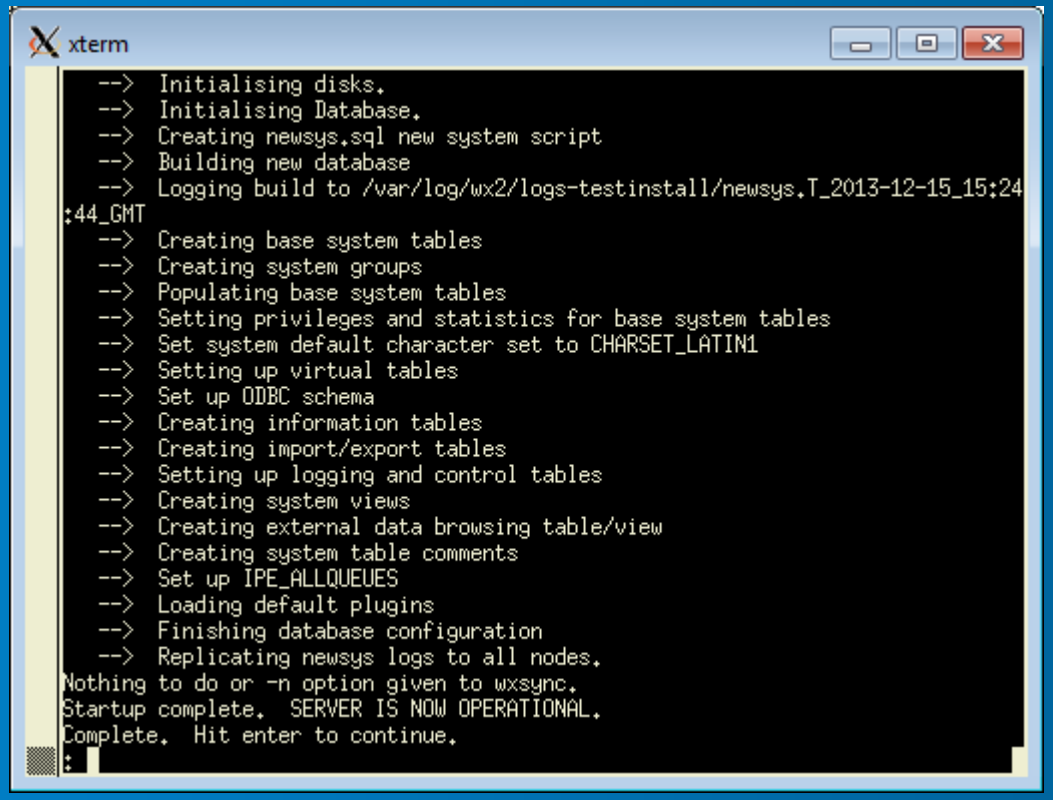
Stage 2: Build Database and Boot

- After the disk resources are initialized, the server software starts and SQL scripts are run to complete initialization:



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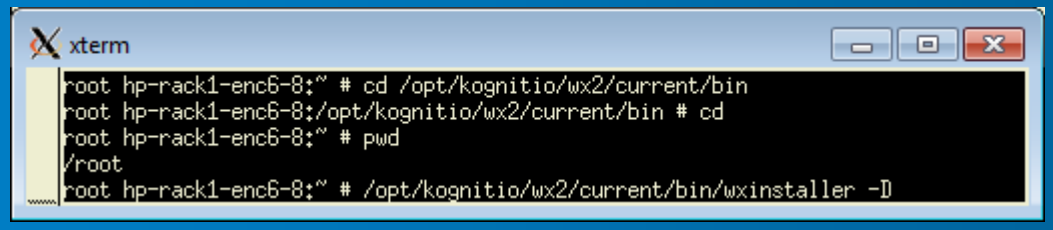
Uninstall

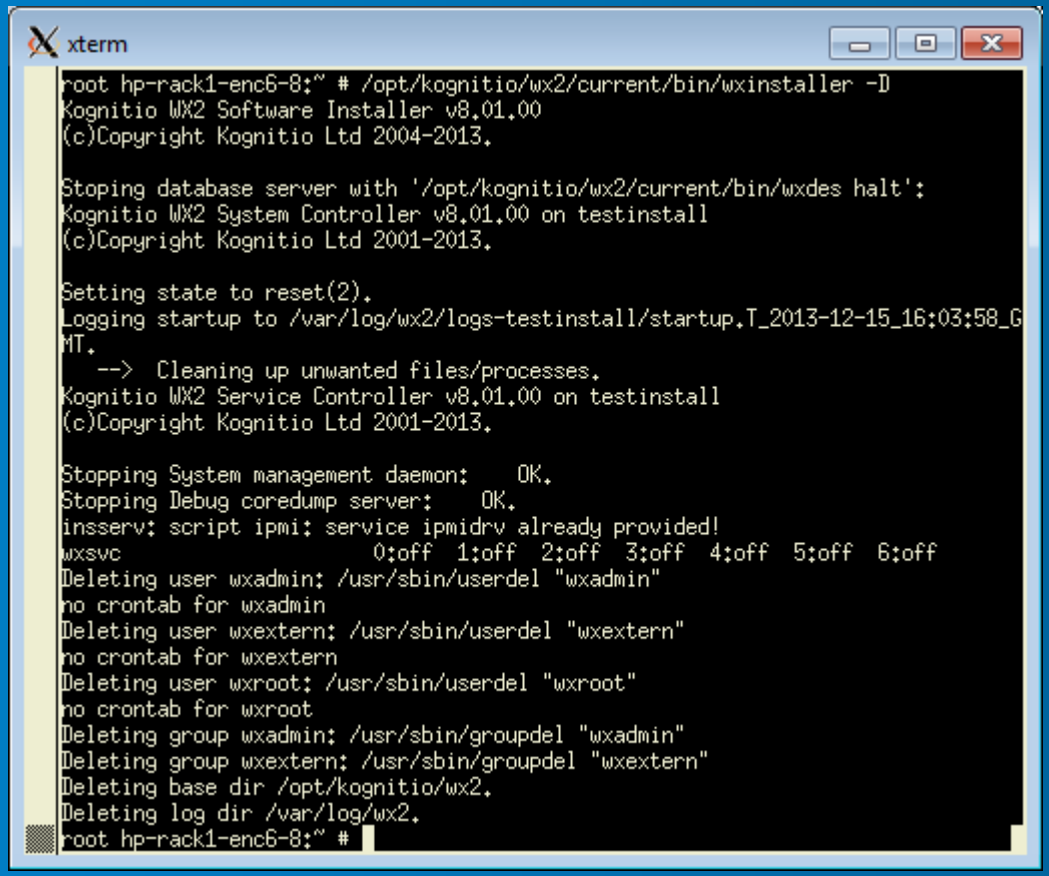
- The following command will completely uninstall Kognitio software on all nodes (as long as SMDs are running and network is integral)
  - This will not remove the database storage itself
    - Partitions / files will need to be manually deleted.
    - /dev/shm/wx2-* files will also need to be manually deleted.
  - As user root run command

    /opt/kognitio/wx2/current/bin/wxinstaller –D



Uninstall

- The uninstall will stop the Kognitio software, remove the Linux users and groups, and uninstall the software:



Upgrade

- For version upgrades:
  - where the version number has changed such as ver80100->ver80200
  - wxserver upgrade using /path/newpackage.wxpkg
- For software patches:
  - where the version number is the same as the existing version, but the patch level changes such as between two 8.2.0 patches ver80200rel171218->ver80200rel180209:
    1. wxserver install <pathname to patch file *.wxpkg>
    2. wxserver set current_version <patch version - e.g. ver80200rel180209>
    3. wxserver smd all restart
    4. wxserver start

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