Joyent   Installing SDC 7   Edit   Share   Add   Tools

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When you install SmartDataCenter for the first time, the configuration program prompts
you for values to configure your system. This page will help you enter the information for
the guided configuration.

At a Glance
Instructions for installing Smart Data Centre 7

In this page:

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Overview of SmartDataCenter 7

Preparation

Prior to installing SDC you must perform the following tasks.

Networks

1. Configure and an untagged internal VLAN with sufficient capacity to provide 1 IP address for every server you plan to install now and in the future.
   This is known as the 'admin' VLAN.
   Typically this will be a /24 subnet using 10.x.x.x or 192.x.x.x IP addresses. If you are likely to go over 250 servers at any time then use a /23 or larger. IP Addresses are also allocated to internals VM's from this VLAN. The minimum size you can use is /26 but to cater for any future changes to SDC we recommend /24.
   a. The VLAN must be untagged from the Top of Rack switch to the Server
   b. The VLAN must be dedicated to SDC and not have any external devices other than switches/routers
2. Configure an 'external' VLAN for external (internet) access.
   This VLAN can be small and just have sufficient IP's for the SDC Core Services and Headnode. Equally it can be a large VLAN used by both SDC and end user VM's
   Note that the headnode must have internet access in order to be able to access VM Images and upload support information to Joyent. Customer VM's will also need internet access in order to be able to install software packages.
   a. This VLAN can be tagged
   b. The VLAN must be dedicated to SDC and not have any external devices other than switches/routers
3. Ensure the Headnode will have access to the following which MUST be accessible during the installation. Do NOT attempt to install if they are not accessible
   a. An NTP Server via the External VLAN
   b. One or more DNS Servers via the External

Installer Inputs

Before you start you should have the following information ready:

- A name for your SDC installation (Data Center).
  - lower case letter, numbers, underscore and dash (no spaces or uppercase)
- Passwords for Head Node root user and SDC Admin user
- The MAC address of each network interface including details of which interface is on which VLAN
- The configuration details of the 'admin' vlan
  - IP Address to be used for the Head Node
  - Netmask
  - Gateway IP Address (if any)
- The configuration details of the 'external' vlan
  - IP Address to be used for the Head Node
  - Netmask
  - Gateway IP Address
  - Start and end IP address
- IP Address of the NTP Server
- IP Addresses of the DNS server(s)
- Domain name for the DC. Note that this is just the domain name, e.g. joyent.us. The DC name and other items will be prepended to this to generate internal DNS names for SDC.
- Email address to receive support emails

At the end of the interactive configuration, you will have a chance to review your entries. You will also have the opportunity to review and edit the full configuration.

Creating the USB Key

The first step in installation is to create a USB key with the SDC installation software on it.

We recommend using good quality USB Keys that are at least 8GB in size. You will need 2 keys (one for backup)

This key should be created using the appropriate instructions on this page.

Creating a USB Key From a Release Tarball

Once you have created the key insert both keys into internal ports into the server designated as the Head Node.

BIOS and RAID Settings

Make the following BIOS Configuration changes.

- Console Redirection - Disabled after boot
- Enable VT-x (Processor Virtualisation)
- Disables c-states
- Set the boot order as follows
  - Head Node - USB Key Only
  - Compute Nodes - PXE boot only
    - NOTE: You may have to enable PXE boot on the Admin VLAN Nic card
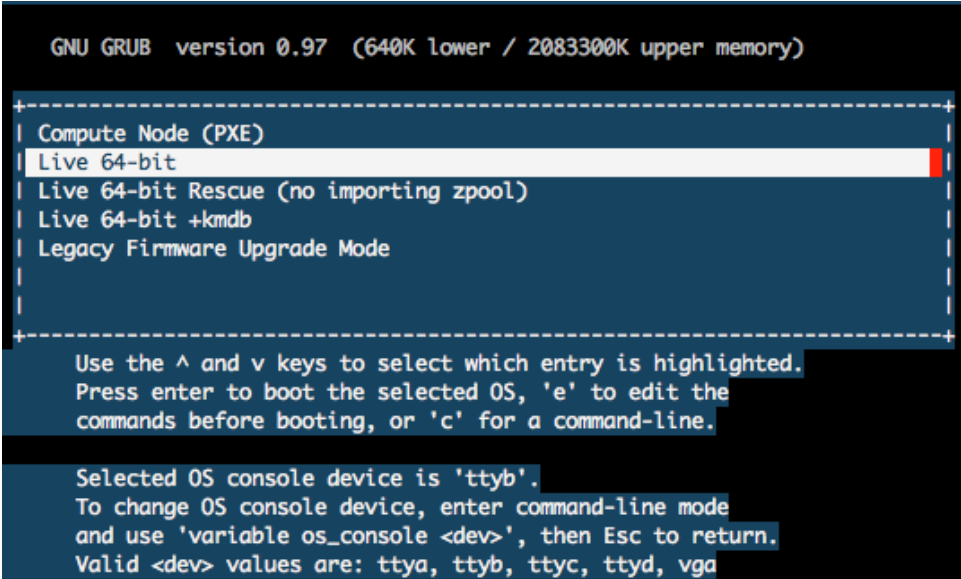
RAID Configuration

- If possible do not use h/w raid. Initialise all the discs. SDC will lay down a ZFS Zpool across all available discs
- If hardware Raid is present enable pass through
  - If pass though cannot be enable configure a single RAID10 or RAID5 volume across all the discs and initialise

Installing SDC

Initial Boot

Boot the Head Node from the USB Key.

At the Grub Menu select 'Live 64 Bit' and boot

```
  GNU GRUB  version 0.97  (640K lower / 2083300K upper memory)

 +--------------------------------------------------------------------+
 | Compute Node (PXE)                                                 |
 | Live 64-bit                                                       ▐|
 | Live 64-bit Rescue (no importing zpool)                            |
 | Live 64-bit +kmdb                                                  |
 | Legacy Firmware Upgrade Mode                                       |
 |                                                                    |
 |                                                                    |
 |                                                                    |
 +--------------------------------------------------------------------+

      Use the ^ and v keys to select which entry is highlighted.
      Press enter to boot the selected OS, 'e' to edit the
      commands before booting, or 'c' for a command-line.

      Selected OS console device is 'ttyb'.
      To change OS console device, enter command-line mode
      and use 'variable os_console <dev>', then Esc to return.
      Valid <dev> values are: ttya, ttyb, ttyc, ttyd, vga
```

SDC Installer

The SDC Installer configuration program asks you a series of questions.

```
Smart Data Center (SDC) Setup
 Copyright 2013, Joyent, Inc. http://wiki.joyent.com/sdcinstall
-----------------------------------------------------------------------
You must answer the following questions to configure the headnode.
You will have a chance to review and correct your answers, as well as a
chance to edit the final configuration, before it is applied.

At the prompts, if you type ^C you will be placed into a shell. When you
exit the shell the configuration process will resume from where it was
interrupted.

Press [enter] to continue
```

If a default is available, it will appear in [brackets].

Company and Datacenter Details

```
 Smart Data Center (SDC) Setup
 Datacenter Information                       http://wiki.joyent.com/sdcinstall
-----------------------------------------------------------------------
The following questions will be used to configure your headnode identity.
This identity information is used to uniquely identify your headnode as well
as help with management of distributed systems.

Enter the company name: Joyent Inc.
Enter a name for this datacenter: mxpc
Enter the City and State for this datacenter: Milano, IT
```

Entry	Description	Example
company name	The name of your company. Do not use single quotes or special characters.	Acme, Inc. Massive Dynamics Communications Division
datacenter name	The name of your datacenter. Do not use spaces or uppercase. This describes the collection of systems that will be handled by the head node.	region-1 acmecorp
City and State	The location of your datacenter. This information is used only to identify the location.	San Francisco, CA Mexico, DF

| | Building 7 |

Network Configuration

```
 Smart Data Center (SDC) Setup
 Networking                                    http://wiki.joyent.com/sdcinstall
 ----------------------------------------------------------------------------
 Several applications will be made available on these networks using IP
 addresses which are automatically incremented based on the headnode IP.
 In order to determine what IP addresses have been assigned to SDC, you can
 either review the configuration prior to its application, or you can run
 'sdc-role list' after the install.


 Press [enter] to continue
```

SmartDataCenter uses Logical Networks to model the actual networks configured in your routers and switches. Logical Networks include the subnet, gateway, DNS servers and VLAN ids.

During the configuration, you will associate one of the head node NICs with the administrative network (also called the admin network) and the other NIC with the external network. In most cases the external network is connected to the Internet. In order to configure head node correctly, you will need to know which NIC is connected to each network.

Admin Network

The admin network is a private network used by the datacenter to communicate with the various SmartDataCenter applications and with the compute nodes.

During configuration, you'll assign an IP address on this private network to the head node. This is the address of the global zone on the head node. The configuration program then allocates a number of consecutive addresses for the additional VM's in the head node. See the Overview and Core Services sections to learn more about the additional VM's and what they're used for.

> ℹ️ If you specify 10.0.3.7 as the IP address of the head node, the configuration program allocates the address 10.0.3.8 upwards for additional VM's.

```
 Smart Data Center (SDC) Setup
 Networking - Admin                            http://wiki.joyent.com/sdcinstall
 ----------------------------------------------------------------------------
 The admin network is used for management traffic and other information that
 flows between the Compute Nodes and the Headnode in an SDC cluster. This
 network will be used to automatically provision new compute nodes and there are
 several application zones which are assigned sequential IP addresses on this
 network. It is important that this network be used exclusively for SDC
 management. Note that DHCP traffic will be present on this network following
 the installation and that this network is connected in VLAN ACCESS mode only.

 Number Link     MAC Address        State    Network
 1      bnx0     78:2b:cb:0a:77:e1  up       -
 2      bnx2     78:2b:cb:0a:77:e5  down     -
 3      bnx1     78:2b:cb:0a:77:e3  down     -
 4      bnx3     78:2b:cb:0a:77:e7  down     -
 5      igb0     00:1b:21:91:a5:e0  unknown -
 6      igb2     00:1b:21:91:95:20  unknown -
 7      igb1     00:1b:21:91:a5:e1  unknown -
 8      igb3     00:1b:21:91:95:21  unknown -
 Enter the number of the NIC for the 'admin' interface: 1
 (admin) headnode IP address: 10.0.3.7
 (admin) headnode netmask [255.255.255.0]:
 (admin) Zone's starting IP address [10.0.3.8]:
```

Entry	Description	Example
number of NIC for the 'admin' interface	The number of the NIC in the list of NICs. Each NIC is identified by its MAC address and its interface number.	Choose the number of the NIC that is connected to the private network.
(admin) head	The IP address of the global zone of the head node. Since the configuration	`10.0.0.2`

node IP address	program allocates the next 11 addresses, be sure to choose an initial address that allows for this.	
(admin) head node netmask	The netmask that describes the address space of the admin network.	255.255.255.0

External Network

The installer asks if you want to add an External network at this stage. It is recommended that you do and it is mandatory if the DNS and NTP servers you configure later are accessible via that network.

The provision-able IP address range is the range of IP addresses that will be automatically provided to VM's in this SDC installation.

```
 Smart Data Center (SDC) Setup
 Networking - External                     http://wiki.joyent.com/sdcinstall
 -------------------------------------------------------------------------
 The external network is used by the headnode and its applications to connect to
 external networks. That is, it can be used to communicate with either the
 Internet, an intranet, or any other WAN. This is optional when your system does
 not need access to an external network, or where you want to connect to an
 external network later.

 Add external network now? [Y/n]:
 Number Link     MAC Address        State    Network
 1      bnx0     78:2b:cb:0a:77:e1  up       'admin'
 2      bnx2     78:2b:cb:0a:77:e5  down     -
 3      bnx1     78:2b:cb:0a:77:e3  down     -
 4      bnx3     78:2b:cb:0a:77:e7  down     -
 5      igb0     00:1b:21:91:a5:e0  unknown  -
 6      igb2     00:1b:21:91:95:20  unknown  -
 7      igb1     00:1b:21:91:a5:e1  unknown  -
 8      igb3     00:1b:21:91:95:21  unknown  -
 Enter the number of the NIC for the 'external' interface: 5
 (external) headnode IP address: 151.1.224.130
 (external) headnode netmask [255.255.255.0]: 255.255.255.192
 (external) gateway IP address: 151.1.224.129
 (external) VLAN ID [press enter for none]: 102
 Starting provisionable IP address [151.1.224.131]:
   Ending provisionable IP address [151.1.224.190]:
```

Entry	Description	Example
number of NIC for the 'external' interface	The number of the NIC in the list of NICs. Each NIC is identified by its MAC address and its interface number.	Choose the number of the NIC that is connected to the external network.
(external) headnode IP address	The IP address of the head node on the external network.	10.88.88.40
(external) headnode netmask	The netmask that describes the address space of the external network.	255.255.255.0
(external) VLAN ID [press enter for none]:	If your external network uses VLANs, provided its number here.	Press [enter] for no VLAN, otherwise and integer from 1 to 4095
Starting provisionable IP address []:	The first available IP address to assign to a newly provisioned machine. This address must be in the network defined by the external network IP address and the external netmask.	10.88.88.50
Ending provisionable IP address []:	The last available IP address to assign to a newly provisioned machine. This address mus be in the network defined by the external network IP address and the external netmask.	10.88.88.240

Gateways and DNS Servers

The default gateway determines which network the head node zones use to connect to outside networks.

```
 Smart Data Center (SDC) Setup
 Networking - Continued                          http://wiki.joyent.com/sdcinstall
 --------------------------------------------------------------------------------
The default gateway will determine which router will be used to connect to
other networks. This will almost certainly be the router connected to your
'External' network. Use 'none' if you have no gateway.

Enter the default gateway IP [151.1.224.129]:

The DNS servers set here will be used to provide name resolution abilities to
the SDC cluster itself. These will also be default DNS servers for zones
provisioned on the 'external' network.

Enter the Primary DNS server IP [8.8.8.8]:
Checking connectivity...OK
Enter the Secondary DNS server IP [8.8.4.4]:
Checking connectivity...OK
Enter the headnode domain name: joyent.us
Default DNS search domain: joyent.com

By default the headnode acts as an NTP server for the admin network. You can
set the headnode to be an NTP client to synchronize to another NTP server.
Enter an NTP server IP address or hostname [132.246.11.228]: 151.1.135.200
Checking connectivity...OK
```

> ℹ Note the connectivity tests performed during this stage. The DNS and NTP servers MUST be accessible.

Entry	Description	Example
the default gateway IP	The IP address of the gateway. In most cases it's an address of a router on your external network.	`10.88.88.2`
Primary and Secondary DNS server IP	The IP addresses of the DNS servers. The defaults give the addresses of Google Public DNS. You can use these or your own DNS servers.	
head node domain name	The domain name of the head node. This value is used for the default support email address and for CAPI email address.	`example.com`
default DNS search domain	The default domain name to add to DNS searches.	`example.com`
NTP server address or host name	The address of an NTP server or accept the default.	See the NTP Pool Project for information on selecting an NTP server close to your head node.

Admin and Root Accounts

The `root` account is typically used to log in to the head node or compute node console. The `admin` account is usually used to access web applications such as the Operations Portal.

```
 Smart Data Center (SDC) Setup
 Account Information                             http://wiki.joyent.com/sdcinstall
 --------------------------------------------------------------------------------
There are two primary accounts for managing a Smart Data Center.  These are
'admin', and 'root'. Each account can have a unique password. Most of the
interaction you will have with SDC will be using the 'admin' user, unless
otherwise specified.  In addition, SDC has the ability to send notification
emails to a specific address. Each of these values will be configured below.


Enter root password:
Confirm password:
Enter admin password:
Confirm password:
Administrator email goes to [root@localhost]:
Support email should appear from [support@joyent.us]:
```

Entry	Description	Example

root password	The password used to access the `root` account on the head node and compute nodes.	swordfish
admin password	The password used to access the `admin` account.	your_dogs_name
Administrator email goes to	The address that receives administrator mail.	admin@example.com
Support email should appear from	The "From" address for mail generated by SDC.	support@example.com

Summary and Final Edit

After the configuration program runs, it gives a summary of all the entries you made and asks you to confirm that they are correct.

```
 Smart Data Center (SDC) Setup
 Verify Configuration                      http://wiki.joyent.com/sdcinstall
------------------------------------------------------------------------------
Company name: Joyent Inc.
Datacenter Name: mxpc, Location: Milano, IT
Email Admin Address: root@localhost, From: support@joyent.us
Domain name: joyent.us, Gateway IP address: 151.1.224.129
    Net           MAC        IP addr.        Netmask      Gateway VLAN
  Admin 78:2b:cb:0a:77:e1      10.0.3.7   255.255.255.0         none none
External 00:1b:21:91:a5:e0  151.1.224.130 255.255.255.192  151.1.224.129  102

Admin net zone IP addresses start at: 10.0.3.8
Provisionable IP range: 151.1.224.131 - 151.1.224.190
DNS Servers: (8.8.8.8, 8.8.4.4), Search Domain: joyent.com
NTP server: 151.1.135.200

Is this correct? [y]:


Your configuration is about to be applied.
Would you like to edit the final configuration file? [n]:
```

Entry	Description
Is this correct?	If you answer 'no', the installer configuration program runs again, using your previous entries as defaults. If you answer 'yes' you'll get the following question.
Would you like to edit the final configuration file?	If you answer 'no', the configuration program ends and head node setup begins. If you answer 'yes', the configuration program is loaded into a `vi` editor.

Setup and Reboots

After you answer "n" to the last question you will see the following.

```
The headnode will now finish configuration and reboot. Please wait...
2014-02-17T15:26:28.853517+00:00 headnode rsyslogd3: No files configured to be monitored [try http:
2014-02-17T15:26:28.855293+00:00 headnode genunix: [ID 540533 kern.notice] #015SunOS Release 5.11 V
2014-02-17T15:26:28.855307+00:00 headnode genunix: [ID 588371 kern.notice] Copyright (c) 2010-2014,
2014-02-17T15:26:28.855517+00:00 headnode acpica: [ID 361365 kern.notice] ACPI: RSDP f11a0 00024 (v
2014-02-17T15:26:28.855522+00:00 headnode acpica: [ID 135650 kern.notice] ACPI: XSDT f12a4 0009C (v
2014-02-17T15:26:28.855528+00:00 headnode acpica: [ID 473354 kern.notice] ACPI: FACP 7f3b3f9c 000F4
2014-02-17T15:26:28.855534+00:00 headnode acpica: [ID 836996 kern.notice] ACPI: DSDT 7f38f000 03D72
2014-02-17T15:26:28.855540+00:00 headnode acpica: [ID 871577 kern.notice] ACPI: FACS 7f3b6000 00040
2014-02-17T15:26:28.855546+00:00 headnode acpica: [ID 233916 kern.notice] ACPI: APIC 7f3b3478 0015E
2014-02-17T15:26:28.855552+00:00 headnode acpica: [ID 218462 kern.notice] ACPI: SPCR 7f3b35d8 00050
2014-02-17T15:26:28.855558+00:00 headnode acpica: [ID 358574 kern.notice] ACPI: HPET 7f3b362c 00038
2014-02-17T15:26:28.855564+00:00 headnode acpica: [ID 558911 kern.notice] ACPI: DMAR 7f3b3668 001C0
2014-02-17T15:26:28.855570+00:00 headnode acpica: [ID 848976 kern.notice] ACPI: MCFG 7f3b38c4 0003C
2014-02-17T15:26:28.855580+00:00 headnode acpica: [ID 423410 kern.notice] ACPI: WD__ 7f3b3904 00134
2014-02-17T15:26:28.855587+00:00 headnode acpica: [ID 819069 kern.notice] ACPI: SLIC 7f3b3a3c 00024
2014-02-17T15:26:28.855594+00:00 headnode acpica: [ID 340909 kern.notice] ACPI: ERST 7f392ef4 00270
2014-02-17T15:26:28.855600+00:00 headnode acpica: [ID 652589 kern.notice] ACPI: HEST 7f393164 003A8
2014-02-17T15:26:28.855612+00:00 headnode acpica: [ID 301466 kern.notice] ACPI: BERT 7f392d74 00030
2014-02-17T15:26:28.855624+00:00 headnode acpica: [ID 500178 kern.notice] ACPI: EINJ 7f392da4 00150
2014-02-17T15:26:28.855636+00:00 headnode acpica: [ID 404043 kern.notice] ACPI: SRAT 7f3b3bc0 00370
2014-02-17T15:26:28.855644+00:00 headnode acpica: [ID 777293 kern.notice] ACPI: TCPA 7f3b3f34 00064
2014-02-17T15:26:28.855660+00:00 headnode acpica: [ID 797947 kern.notice] ACPI: SSDT 7f3b7000 03E04
2014-02-17T15:26:28+00:00 headnode savecore: [ID 467324 auth.error] open(""): No such file or direc
2014-02-17T15:26:28+00:00 headnode savecore: [ID 467324 auth.error] open(""): No such file or direc

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          _____    _____
         _____     _____            .                       .
         __         __          | .-. .   . .-. :--. |-
         _____     _____        ;|   ||   |(.-' |   | |
          ____     ____       `--'  `-' `;-| `-' ' ' `-'
             _____                     /  ; Joyent Live Image v0.147+
                                     `-'   build: 20140212T195911Z


headnode ttyb login:
creating pool: zones                                    done
adding volume: dump                                     done
adding volume: config                                   done
adding volume: usbkey                                   done
adding volume: cores                                    done
adding volume: opt                                      done
adding volume: var                                      done
adding volume: swap                                     done
```

The ...headnode acpica... messages are hardware dependent and may not appear on your systems.

There will be a pause of several minutes at this point as data is read off the USB key.

The Head Node will then reboot and commences set up of the SDC software and services. This process takes between 10 and 20 minutes and you will see output similar to this.

```
SunOS Release 5.11 Version joyent_20140212T195911Z 64-bit
Copyright (c) 2010-2014, Joyent Inc. All rights reserved.


            _____
        ____  ____
       _____  _____                 .                    .
      __   _____   __        | .-. .  . .-. :--. |-
      _____  _____             ;|    ||  |(.-' |   | |
       ____  ____         `--'  `-' `;-| `-' '  ' `-'
        _____                   /  ; Joyent Live Image v0.147+
                                `-'   build: 20140212T195911Z
            --> Welcome to SDC7! This message was not approved. <--
preparing for setup...                               done (41s)
installing agents-master-20140212t230941z-g77ec6fd.sh...  done (101s)
importing: assets-zfs-master-20140206t194437z-g1dc8d46    done (58s)
creating zone assets...                              done (11s)
importing: sapi-zfs-master-20140206t200202z-g56a7eec      done (4s)
creating zone sapi...                                done (11s)
importing: binder-zfs-master-20140206t230454z-gd954fc2    done (7s)
creating zone binder...                              done (14s)
importing: manatee-zfs-master-20140206t222942z-gdd0afa6   done (8s)
creating zone manatee...                             done (18s)


...snip...


creating zone fwapi...                               done (14s)
importing: vmapi-zfs-master-20140212t001019z-gedd83f7     done (4s)
creating zone vmapi...                               done (14s)
importing: ca-zfs-master-20140206t194052z-gd39e0d0        done (5s)
creating zone ca...                                  done (22s)
importing: adminui-zfs-master-20140212t171315z-g5fd1444   done (4s)
creating zone adminui...                             done (21s)
completing setup...                                  done (84s)


==> Setup complete (in 723 seconds). Press [enter] to get login prompt.
```

Where to Go Next

After you press Enter to the above prompt you will be able to login to the Head Node global zone to commence the post installation set up tasks.

Please go to Post Installation Configuration to add external IP's to VM's, set up CloudAPI and perform other tasks to complete the initial set up of SDC.

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