

Sikuliaq IT Overview



R/V Tech 2011-11-15 New Orleans, La.

John Haverlack

**UAF School of Fisheries and Ocean Sciences
Information Technology Manager**

<https://docs.google.com/present/edit?id=0ARWQikNTI-EwZDM4dHFyaF81M2Ztcjh3bWRj>



Organizational Structures

- **UA** - [University of Alaska](#)
 - **UAS** - University of Alaska Southeast
 - **UAA** - University of Alaska Anchorage
 - **UAF** - [University of Alaska Fairbanks](#)
 - **OIT** - [UA Office of Information Technology](#)
 - **SFOS** - [School of Fisheries and Ocean Sciences](#)
 - **SMC** - [Seward Marine Center](#)
 - **R/V** - [Sikuliaq](#)



Sikuliaq IT Overview


- Project Management
- Data Center
- UA Networks
- Sikuliaq Network
- Ship to Shore Replication
- Virtualization and Mockup
- Configuration Management
- System Reuse
- IT System Access
- Timeline



Project Management

<https://web.sfos.uaf.edu/trac/sikuliaq/wiki>

- Trac
- Wiki
- Tickets
- Subversion


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R/V Sikuliaq
Search

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Welcome to the R/V Sikuliaq Trac Wiki Page.

Wiki Content

- Weekly IT Meetings
- BSR Documents

Recent Activity

Results (1 - 10 of 35)

Ticket	Status	Summary	Owner	Type	Priority	Component	Modified	Created
#35	accepted	R/V Tech IT Overview Presentation	jehaverlack	Action Item	High	SQ IT	29 hours	29 hours
#34	new	Sikuliaq Website Updates		Project	Medium	SQ IT	8 days	8 days
#20	new	System Monitoring	jehaverlack	Project	High	SQ IT	3 weeks	7 weeks
#33	accepted	2011-10-19 UNOLS Planning System Overview Meeting	jehaverlack	Administrative	Medium	SQ IT	3 weeks	3 weeks
#11	accepted	CentOS 6 Installation and Configuration Management Server	jehaverlack	Project	High	SQ IT	5 weeks	7 weeks
#32	new	R2R Common Data Directory Structure	jehaverlack	Project	Medium	SQ IT	6 weeks	6 weeks
#7	accepted	SQ IT Mockup	jehaverlack	Project	Medium	SQ IT	6 weeks	8 weeks
#31	new	Remote access to science system for trouble shooting	sjhartz	Project	Medium	SQ IT	7 weeks	7 weeks
#29	new	UHDAS	jehaverlack	Project	Medium	SQ IT	7 weeks	7 weeks
#30	closed	UHDAS	jehaverlack	Project	Medium	SQ IT	7 weeks	7 weeks

Edit this page Attach file Rename page Delete this version Delete page

Last modified by jehaverlack, 06/27/2011 11:04:50 AM (5 months ago)

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Plain Text

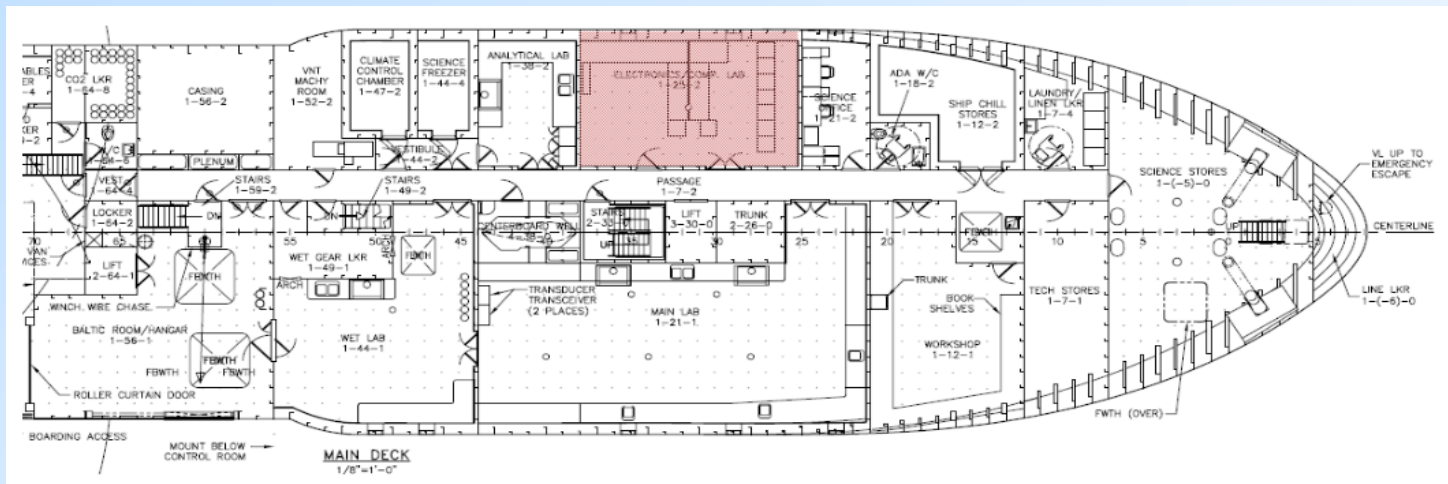
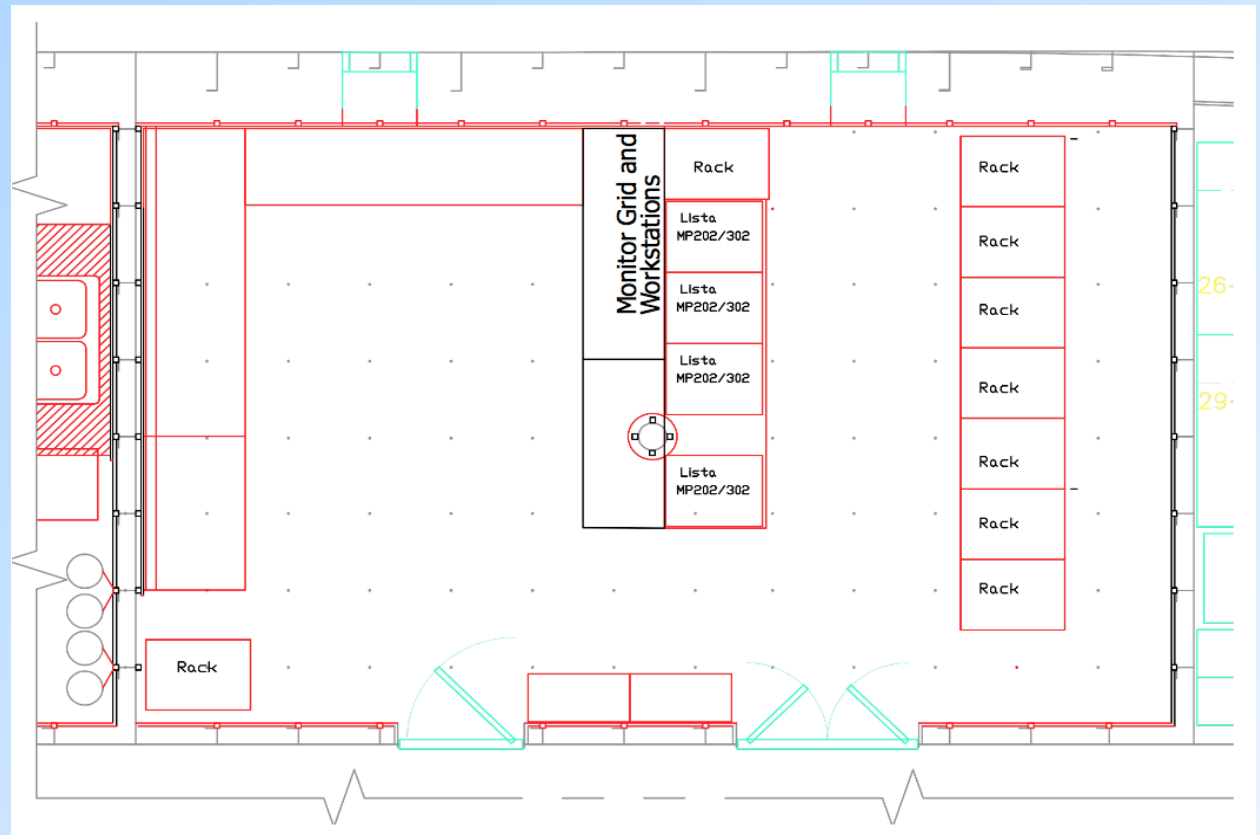

Powered by Trac 0.12
By Edgewall Software.
Visit the Trac open source project at
<http://trac.edgewall.org/>

For SFOS use only.

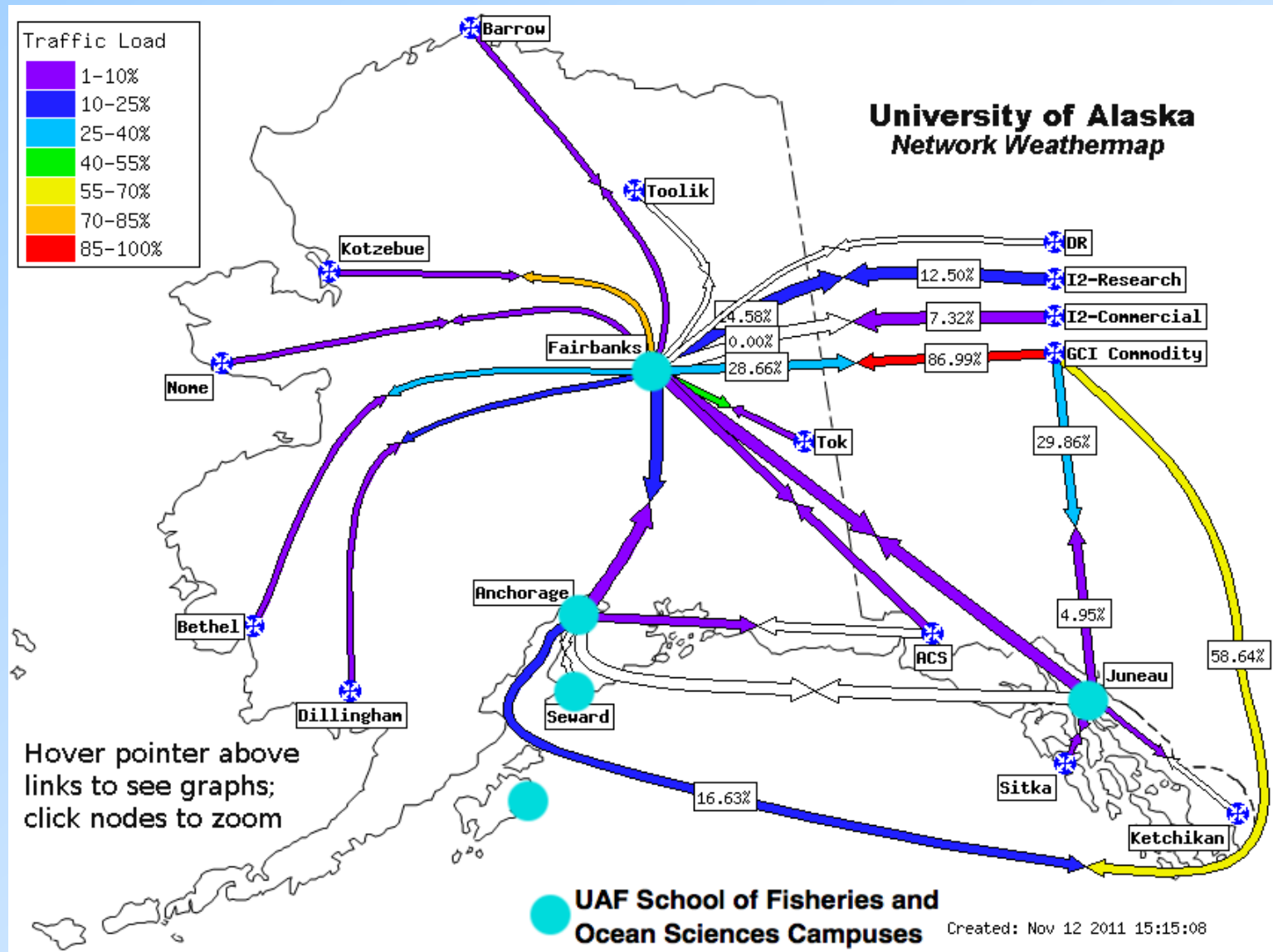


Sikuliaq Data Center

- ~410 Square Feet
- Sonar and ADCP WS
- CTD Control Station
- Underway Data Station
- IT Network and Systems



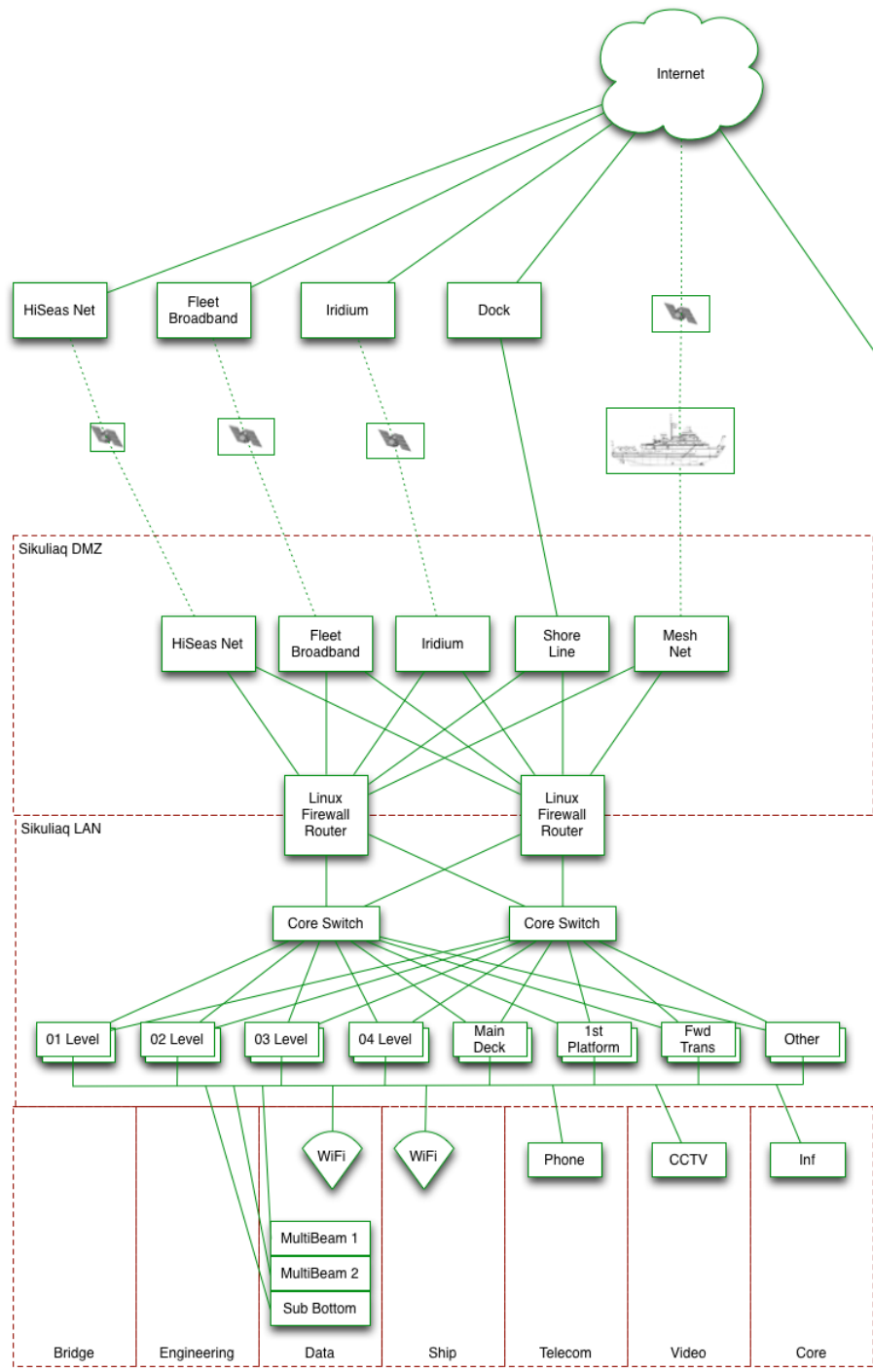
UAF and SFOS Campus Networks



<http://weathermap.sw.alaska.edu/>



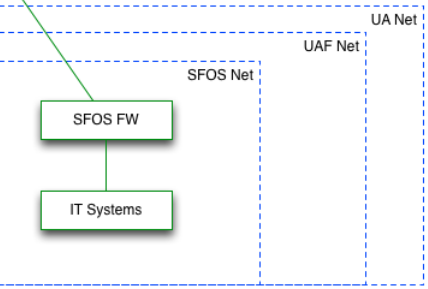
Ship Side Network Topology



**R/V Sikuliaq
Network Overview**

UAF
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School of Fisheries and Ocean Sciences
John Haverlack
2011-11-12



Legend

- Cat 7 / Fiber
- Satellite / WiFi
- - - - - Security Zone Border
- Physical Layer
- - - - - Sikuliaq Zones
- - - - - UA Zones



Ship and Shore Side Replication

Ship to Shore

- Underway Data
- IT System Health Status
- Outreach Updates
- Science Updates
- Logs

Shared

- Configuration Management
- Authentication
- Documentation
- Messaging

Shore to Ship

- News Feeds
- Patch Updates
- File Transfer Requests
- Email Payload



Ship and Shore Side Replication

noSQL (CouchDB)

- Master - Master Replication Ship and Shore
- Eventual Consistency

SQL (MySQL, Postgres SQL)

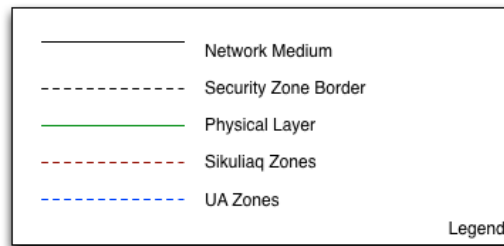
- Master Slave Shore Side Replication
- Possible Journal Log Updates one way Shore to Ship or Ship to Shore

Files

- rsync one way replication with bandwidth throttling
- Revision Control - GIT / Subversion Repository



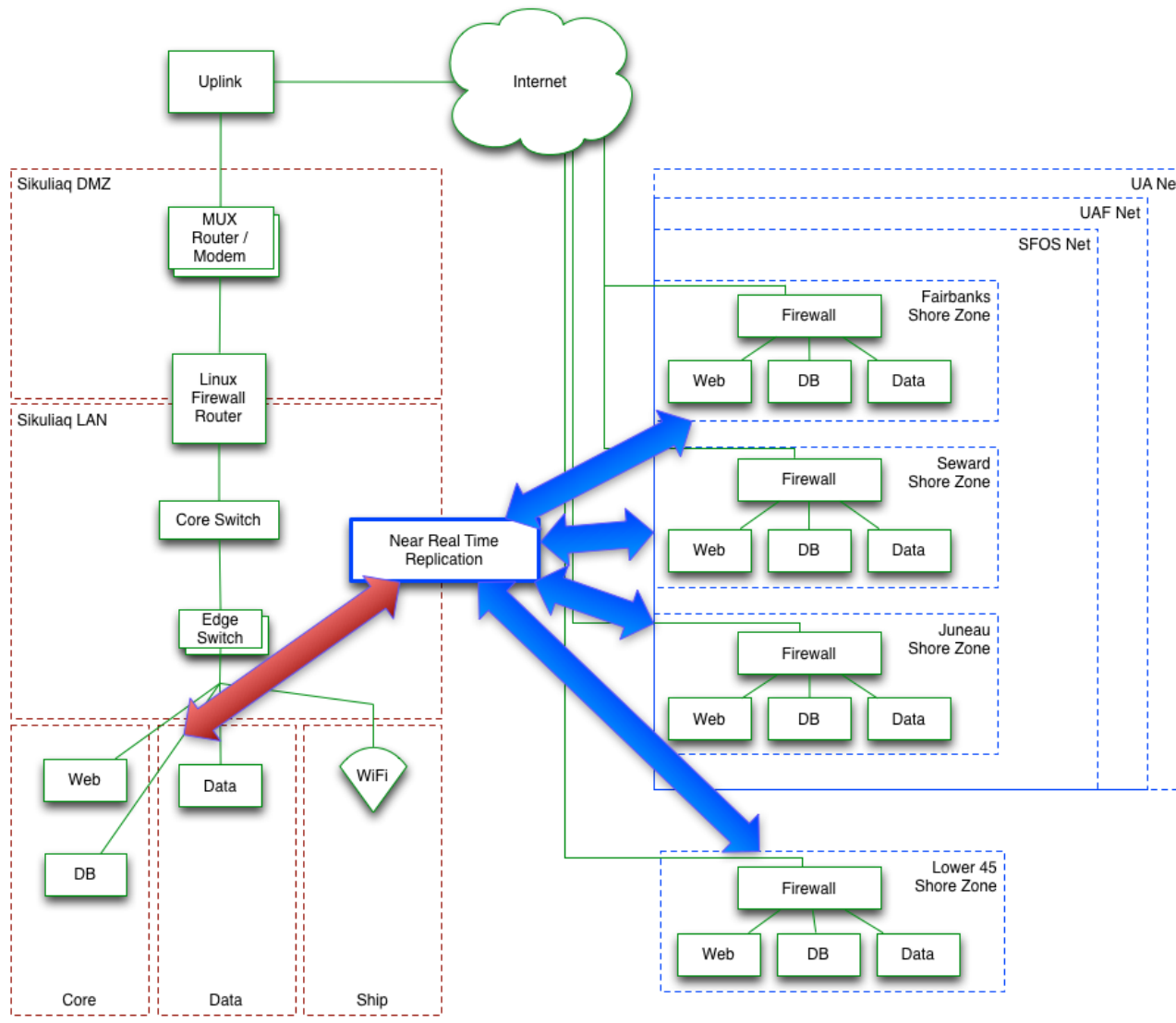
Ship Shore Replication



**R/V Sikuliaq
Ship to Shore
Network Overview**

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2011-11-12



IT System Mockup and Life Cycle Strategy

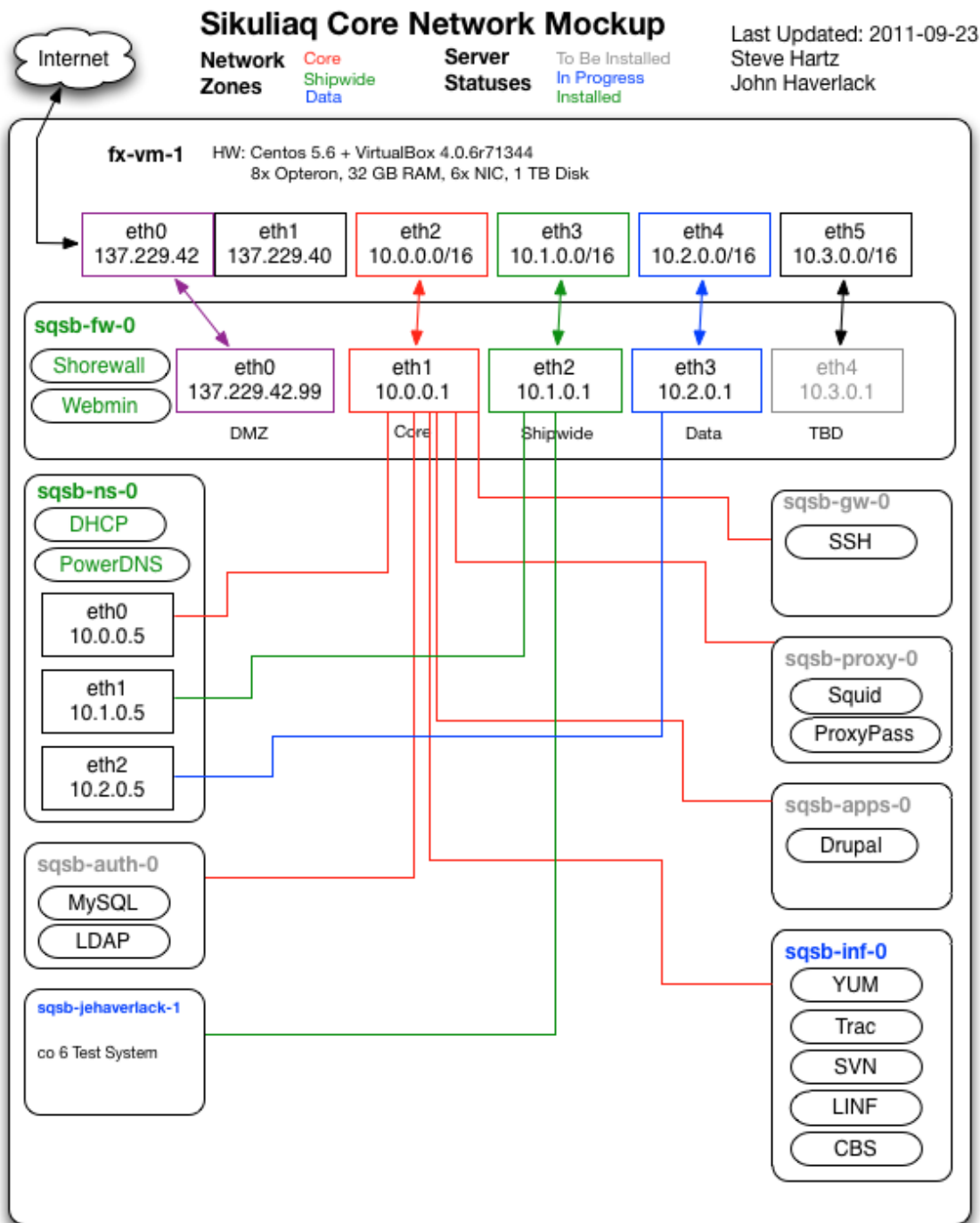
Virtualization + Configuration Management

1. **Mockup** ship and shore side virtualized systems for development and testing prior to ship delivery
2. All systems are **Configuration Managed** for rapid deployment, rebuild or recovery
3. Config Mgmt. provides **environmental consistency** and **hierarchical inheritance** as well as system patch updates
4. **Replicating a complete** ship or shore side **network is quick and easy** to do
5. Production ship systems are no different than mockup systems.
6. New system can be developed and tested shore side in an identical environment to that on the ship and deployed to the ship as a configuration managed profile
7. Adhoc solutions can be rolled in to configuration management and redeployed after the fact



Mockup Network Current Status

- VM Hypervisor
 - VirtualBox + CentOS
 - phpVirtualBox
- Firewall / Router
 - Shorewall
 - IPTables
- DNS - PowerDNS + MySQL
- DHCP - dhcpd + MySQL
- Configuration Management
 - CentOS Linux 6.0
 - YUM + Mirror + Proxy
 - CBS = Puppet + Subversion
 - LINF = Modular Kickstart



Configuration Management

CentOS Linux

OS X

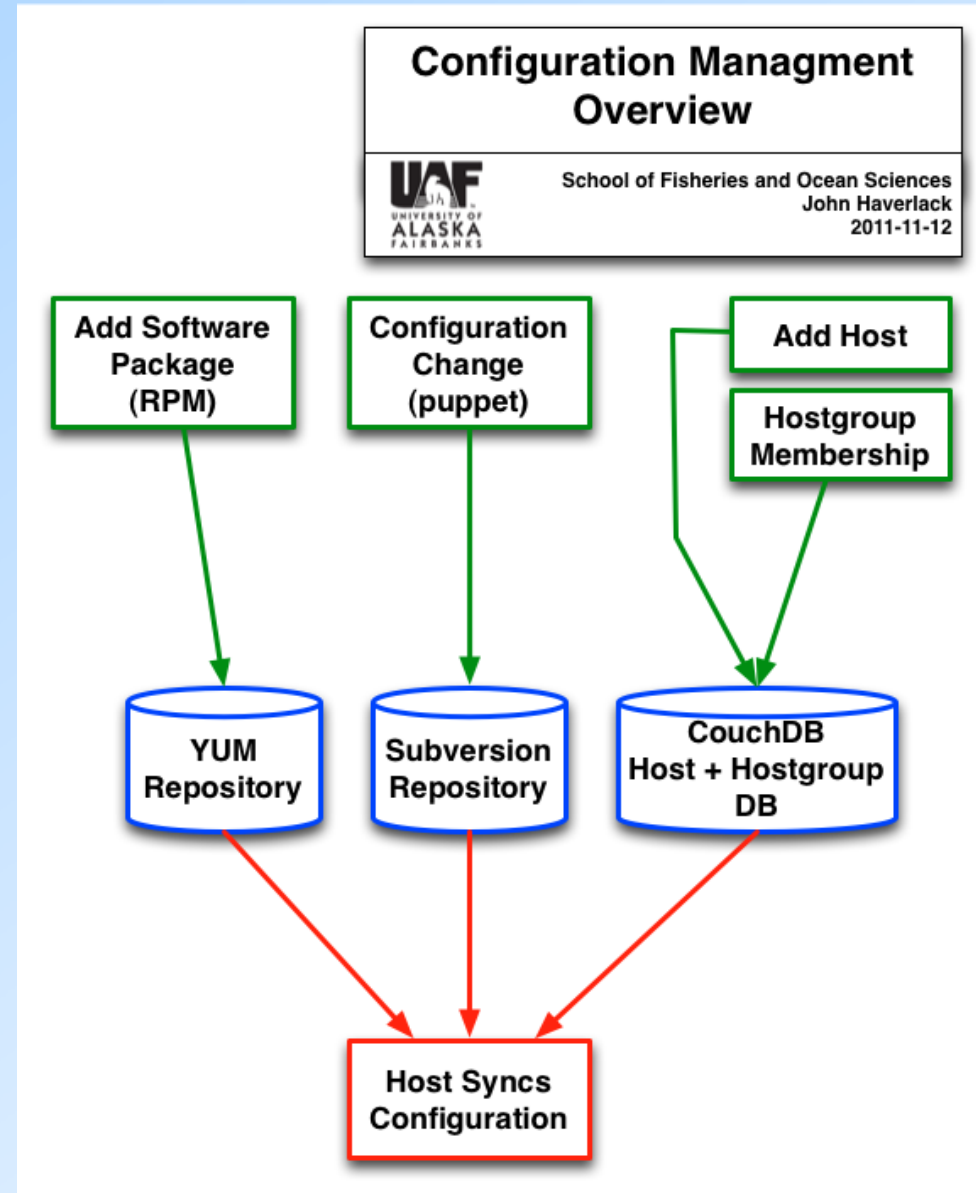
Debian

Ubuntu

Windows

CM applies
to physical and
virtualized systems

Not tied to platform
or OS



System Reuse

- SFOS VirtualBox Infrastructure
- SFOS Configuration Management

- Mockup networks for initial development and testing
- Ship to shore replicated environment for backup and near real time data sharing
- Shoreside sandbox environment for ongoing development
- Access to shoreside simulated ship environment for cruise planning and familiarization

User and staff familiar with one environment are familiar with others



IT System Access

- Limited Bandwidth = SSH + Web UI
 - **VPN** - For Shore Side Access
 - **SSH Gateway** - 2 Factor Auth + Port Forward Shore to Ship
 - **Trac** - Subversion + MySQL + Tickets + Wiki
 - **DNS + DHCP** - Power DNS + Web UI
 - **Authentication** - noSQL + LDAP + Web UI
 - **Firewall / Router** - Shorewall + Webmin
 - **VirtualBox** - phpVirtualBox + vboxdashboard
-
- Need for RDP + VNC should be kept minimal



Shorewall + Webmin

Login: jehaverlack

Module Config

Shorewall Firewall

Shorewall version 4.4.23.3

Search Docs..

- Webmin
 - Backup Configuration Files
 - Change Language and Theme
 - Webmin Actions Log
 - Webmin Configuration
 - Webmin Servers Index
 - Webmin Users
- System
- Servers
- Others
- Networking
 - ADSL Client
 - Bandwidth Monitoring
 - Kerberos5
 - Linux Firewall
 - NFS Exports
 - NIS Client and Server
 - Network Configuration
 - PPP Dialin Server
 - SSL Tunnels
 - Shorewall Firewall
 - TCP Wrappers
 - idmapd daemon
- Hardware
- Cluster
- Un-used Modules

Search:

- View Module's Logs
- System Information
- Refresh Modules
- Logout

Network Zones (zones)

Network Interfaces (interfaces)

Default Policies (policy)

Firewall Rules (rules)

TOS

Types of Service (tos)

Masquerading (masq)

Static NAT (nat)

Proxy ARP (proxyarp)

When Stopped (routestopped)

VPN Tunnels (tunnels)

Zone Hosts (hosts)

Blacklist Hosts (blacklist)

Additional Routing Providers (providers)

Custom parameters (params)

Master configuration file (shorewall.conf)

Apply Configuration Click this button to activate the current Shorewall configuration with the `shorewall restart` command.

Refresh Configuration Click this button to activate just the Blacklist and Traffic Shaping tables with the `shorewall refresh` command.

Clear Firewall Click this button to clear the Shorewall firewall with the `shorewall clear` command. This will allow access from all hosts without restriction.

Stop Firewall Click this button to shut down Shorewall with the `shorewall stop` command. This will block access from all hosts except those in the When Stopped table.

Show Status Click this button to view Shorewall's tables and rules from the `shorewall status` command.

Check Firewall Click this button to have Shorewall validate your firewall configuration with the `shorewall check` command.

Show Dump Click this button to view Shorewall tracing information from the `shorewall dump` command.



Power DNS sikuliaq.alaska.edu

Poweradmin

[Index](#) [Search zones and records](#) [List zones](#) [List zone templates](#) [List supermasters](#) [Add master zone](#) [Add slave zone](#) [Add supermaster](#) [Change password](#) [User administration](#) [Logout](#)

Edit zone "sq.alaska.edu"

Name	Type	Content	Priority	TTL
<input type="checkbox"/> ns1.sq.alaska.edu	CNAME	sqsbn-s-0.sq.alaska.edu		86400
<input type="checkbox"/> sq.alaska.edu	SOA	sqsbn-s-0.sq.alaska.edu hostmaster.sq.alaska.edu 2011092210		86400
<input type="checkbox"/> sq.alaska.edu	NS	sqsbn-s-0.sq.alaska.edu		86400
<input type="checkbox"/> sqsb-fw-0.sq.alaska.edu	A	137.229.42.99		86400
<input type="checkbox"/> sqsb-gw-0.sq.alaska.edu	A	10.0.0.1		86400
<input type="checkbox"/> sqsb-gw-1.sq.alaska.edu	A	10.1.0.1		86400
<input type="checkbox"/> sqsb-gw-2.sq.alaska.edu	A	10.2.0.1		86400
<input type="checkbox"/> sqsb-inf-0.sq.alaska.edu	A	10.0.0.10		86400
<input type="checkbox"/> sqsb-ns-0.sq.alaska.edu	A	10.0.0.5		86400
<input type="checkbox"/> sqsb-ssh-0.sq.alaska.ec	A	10.0.0.9		86400

Comments:

Name	Type	Content	Priority	TTL
<input type="text" value="sq.alaska.edu"/> .sq.alaska.edu	IN A	<input type="text"/>	<input type="text"/>	<input type="text"/>

Owner of zone
Administrator

Type:

a complete(r) poweradmin v2.1.4 - credits



phpVirtualBox

The screenshot displays the phpVirtualBox application window. On the left, a list of virtual machines is shown, with 'sb-win7x32-0' selected and running. The main area shows the configuration for this VM, including general information, system settings, display, storage, audio, network, and serial ports.

File Machine Help

New Settings Start Stop Details Console Snapshots

sb-inf-0 Powered Off

sb-sjhartz-0 Powered Off

sb-training-rh-1 Powered Off

sb-win7x32-0 Running

sqsb-fw-0 Running

sqsb-gw-0 Running

sqsb-inf-0 Running

sqsb-jehaverlack-1 Running

sqsb-ns-0 Running

sqsb-pfsense-0 Powered Off

ua-edir-0 Powered Off

General

Name: sb-win7x32-0
OS Type: Windows 7

System

Base Memory: 1024 MB
Processor(s): 1
Boot Order: CD/DVD, Hard Disk

Display

Video Memory: 256 MB
Server Port: 3391 (fx-vm-1.sfos.uaf.edu:3391)

Storage

SATA Controller
SATA Port 0: sb-win7x32-0.vdi (Normal, 100 GB)
IDE Controller
Secondary Master (CD/DVD): office2010.iso (731.81 MB)

Audio

Disabled

Network

Adapter 1: Intel PRO/1000 MT Desktop network card (Bridged adapter, eth0)
(Guest Network Adapters)

Serial Ports

Disabled

Preview

Windows 7 desktop environment.



vboxdashboard



VBoxDashBoard

[VM_Hosts] [VM_Guests] [About] [Hostfile]

VirtualBox Guests

[Expand All] [Collapse All]

VM Host: [+]fx-vm-0 VBox Web UI

VBox Ver: 4.0.10r72436 OS: CentOS release 5.7 (Final) Arch: x86_64 CPUs: 8 RAM: 31.437 GB Mem Free: 85.167% Load: 1.56, 1.35, 1.20 Disk: 886G Disk Free: 730G Disk %Used: 14%

VM Host: [-]fx-vm-1 VBox Web UI

VBox Ver: 4.0.4r70112 OS: CentOS release 5.6 (Final) Arch: x86_64 CPUs: 8 RAM: 31.437 GB Mem Free: 55.342% Uptime: 32 days Load: 2.43, 2.38, 2.46 Disk: 886G Disk Free: 651G Disk %Used: 23%

VM Guest	MAC	IP	Guest OS	Memory	Video RAM	CPU Cores	Boot Order	Halt Order	Powered	RDP
sb-win7x32-0	080027A3BF0D		Windows 7	1024MB	256MB	1	No Config	No Config	on	137.229.42.102:3391
fx-rdp-0	0800274EB040	137.229.42.73	Windows 7	1024MB	256MB	2	25	75	on	137.229.42.102:3392
fx-apps-0	080027C9A759	137.229.42.74	Red Hat (64 bit)	2048MB	8MB	2	20	80	on	137.229.42.102:3393
fx-sapps-0	080027FE94E3	137.229.42.78	Red Hat (64 bit)	1024MB	8MB	2	20	80	on	137.229.42.102:3395
sb-apps-0	0800275D4705	137.229.42.145	Red Hat (64 bit)	750MB	8MB	2	70	30	on	137.229.42.102:3396
fx-rproxy-0	08002721D165	137.229.42.79	Red Hat (64 bit)	512MB	8MB	2	20	80	on	137.229.42.102:3397
dm-wormApp-0	080027E8D125	137.229.42.205	Red Hat (64 bit)	512MB	8MB	2	No Config	No Config	on	137.229.42.102:3416
dm-sb-0	080027406999	137.229.42.144	Red Hat (64 bit)	512MB	8MB	2	No Config	No Config	on	137.229.42.102:3417
fx-web-0	080027CDD23D	137.229.42.97	Red Hat (64 bit)	512MB	8MB	2	No Config	No Config	on	137.229.42.102:3418
sqsb-fw-0	0800272601B2	137.229.42.99	Red Hat (64 bit)	512MB	8MB	2	No Config	No Config	on	137.229.42.102:3421
sqsb-ns-0	080027078BBB	137.229.42.44	Red Hat (64 bit)	512MB	8MB	2	No Config	No Config	on	137.229.42.102:3423
sqsb-gw-0	08002792FCD0	137.229.42.161	Red Hat (64 bit)	512MB	8MB	2	No Config	No Config	on	137.229.42.102:3424
sqsb-inf-0	080027B93B70		Red Hat (64 bit)	512MB	1MB	2	No Config	No Config	on	137.229.42.102:3426
sqsb-jehaverlack-1	080027159BF1		Red Hat (64 bit)	512MB	8MB	2	No Config	No Config	on	137.229.42.102:3427
ua-edir-0	080027C3AFC5	137.229.42.77	Red Hat (64 bit)	2048MB	8MB	2	10	90	off	137.229.42.102:3394
sb-inf-0	080027A9560E	137.229.42.197	Red Hat (64 bit)	512MB	8MB	2	75	25	off	137.229.42.102:3398
sb-training-rh-1	080027CA1BCA		Red Hat (64 bit)	512MB	8MB	2	No Config	No Config	off	137.229.42.102:3401
fx-swim-2	080027853EBA		Red Hat	1024MB	256MB	2	No Config	No Config	off	137.229.42.102:3415
fx-auth-0	080027F582AE	137.229.42.98	Red Hat (64 bit)	512MB	8MB	2	No Config	No Config	off	137.229.42.102:3419
sb-authstest-0	080027E239DC	137.229.42.190	Red Hat (64 bit)	512MB	8MB	2	No Config	No Config	off	137.229.42.102:3420
sqsb-pfsense-0	080027A718F2		FreeBSD (64 bit)	512MB	4MB	1	No Config	No Config	off	137.229.42.102:3425
sb-sjhartz-0	080027E6ACA3	137.229.42.241	Red Hat (64 bit)	512MB	8MB	2	No Config	No Config	off	137.229.42.102:3428

VM Host: [+]fx-vm-2 VBox Web UI

VBox Ver: 4.0.6r71344 OS: CentOS release 5.6 (Final) Arch: x86_64 CPUs: 8 RAM: 31.437 GB Mem Free: 84.471% Load: 0.42, 0.27, 0.25 Disk: 886G Disk Free: 710G Disk %Used: 16%



Timeline

2011 4th Quarter	VM Mockup Ship Network Ready for IT Access
2012 1st Quarter	VM Mockup Ship Network Ready for Tester Access
2012 2nd Quarter	VM Mockup Shore Network Ready for Demo
2012 3rd Quarter	Sikuliaq Launch
2012 4th Quarter	Underway Data System Testing
2013 1st Quarter	Deploy Production Shore Side Systems
2013 2nd Quarter	Ship Side Systems Deployment Ready
2013 3rd Quarter	Delivery to UAF Install Ship Side Systems
2013 4th Quarter	TBD

