McSOC:

A scripted 'SOC in a BOX' network deployment

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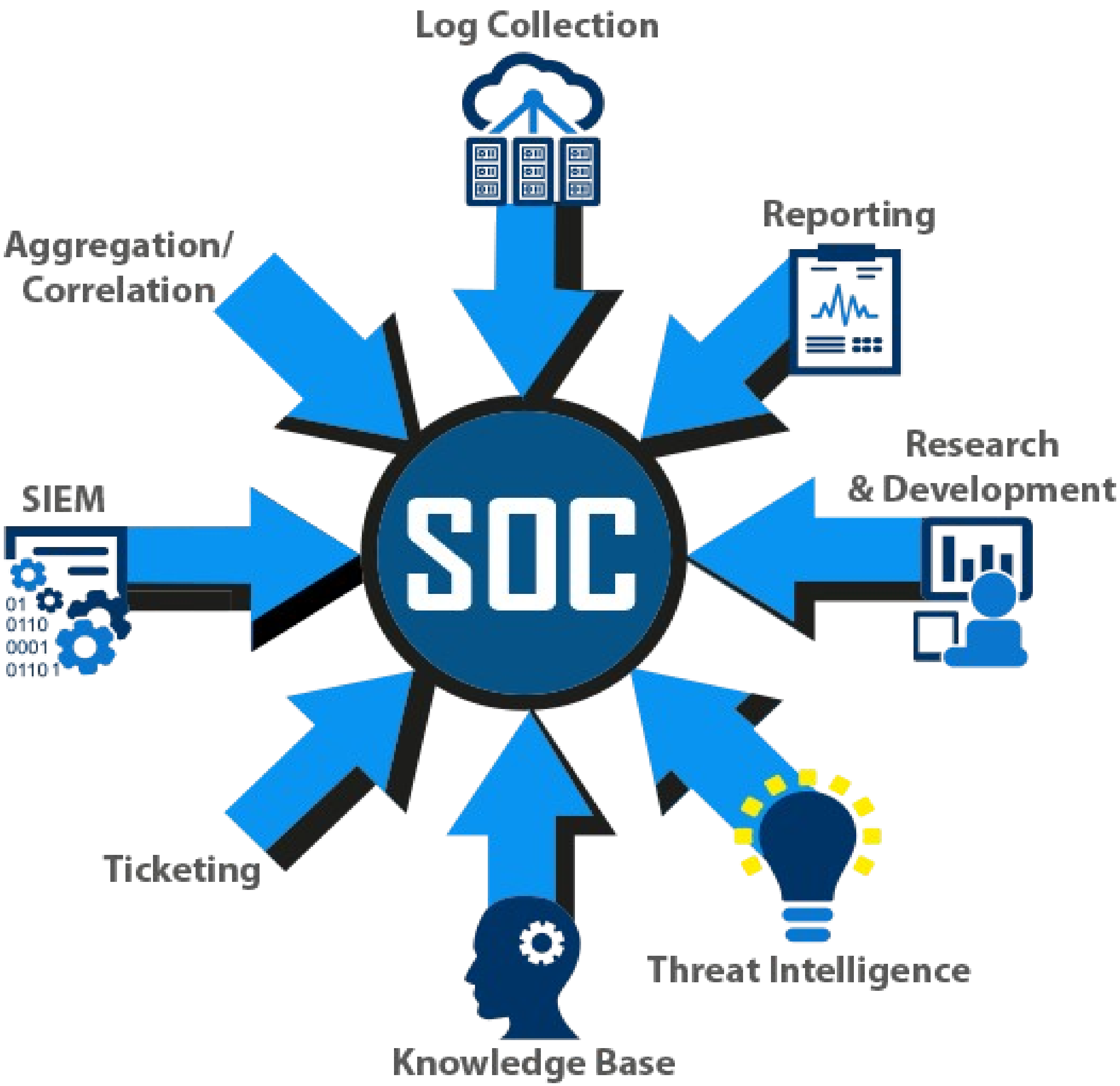
McSOC: Executive Summary

Create a redeployable network architecture that can

- ***demonstrate SOC capabilities***
- ***provide a platform to develop SOC solutions***
- ***Be delivered as a training environment***

McSOC: Capabilities



https://www.nuspire.com/technologies/soc/

McSOC: High Level Features

- **Infrastructure as Code**
  - Network Deployment and Configuration is Scripted

- **Self-Validation**
  - Continuous Monitoring
  - Automated Testing

- **Capabilities Definition**
  - Capabilities Documentation bundle

- **Use Case Development**
  - Use Cases bundled

McSOC: Technology Guide

- **Open Source Components**
  - Minimize License Issues
  - Maximize Re-usability

- **Deployable to Multiple Visualization Hosts**
  - Develop on single server (Oracle VirtualBox)
  - Deploy to Amazon AWS or Vmware Fusion

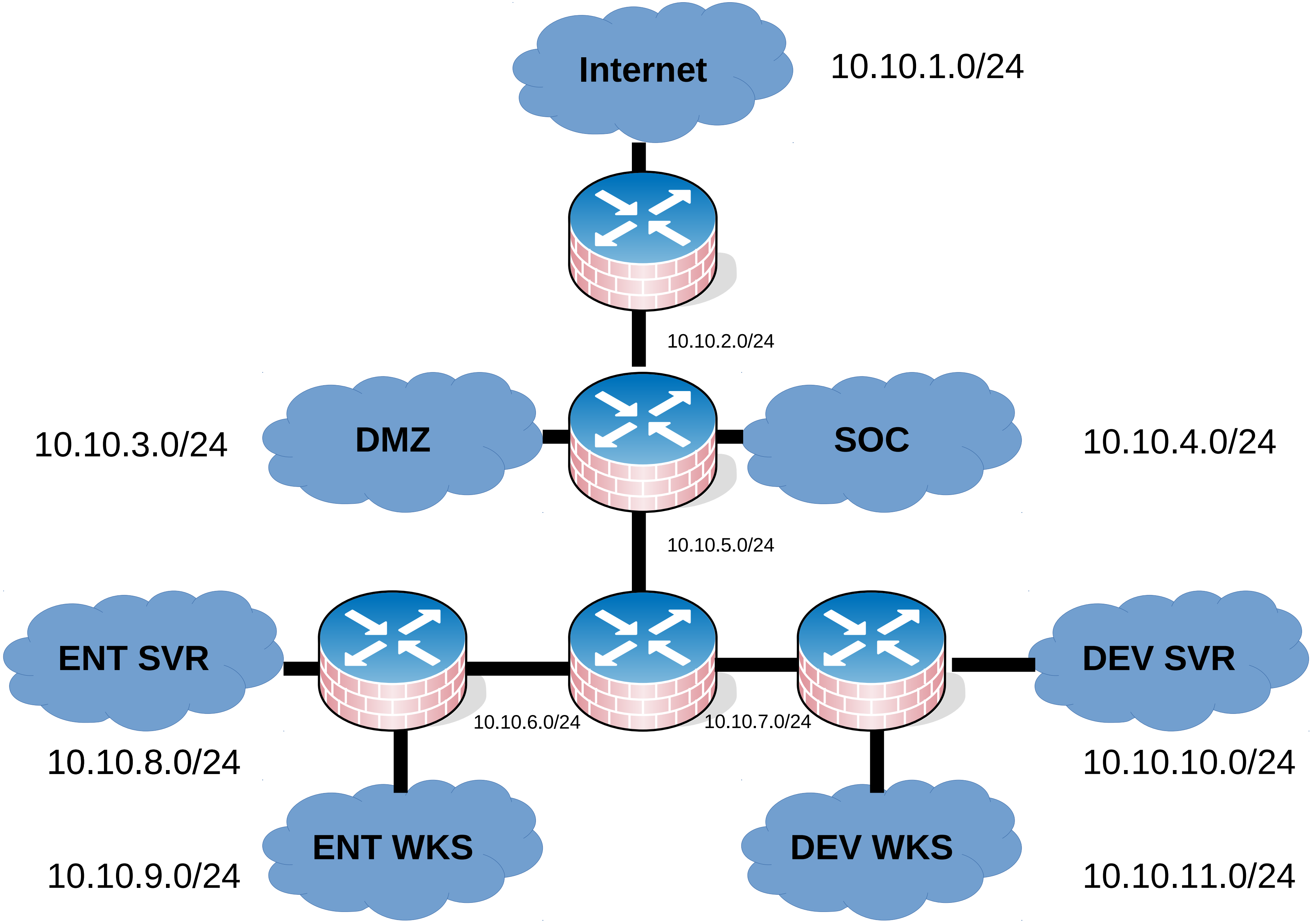
- **Automated Testing**
  - Deployed Project should be able to self-validate

McSOC: Constraints and Limitations

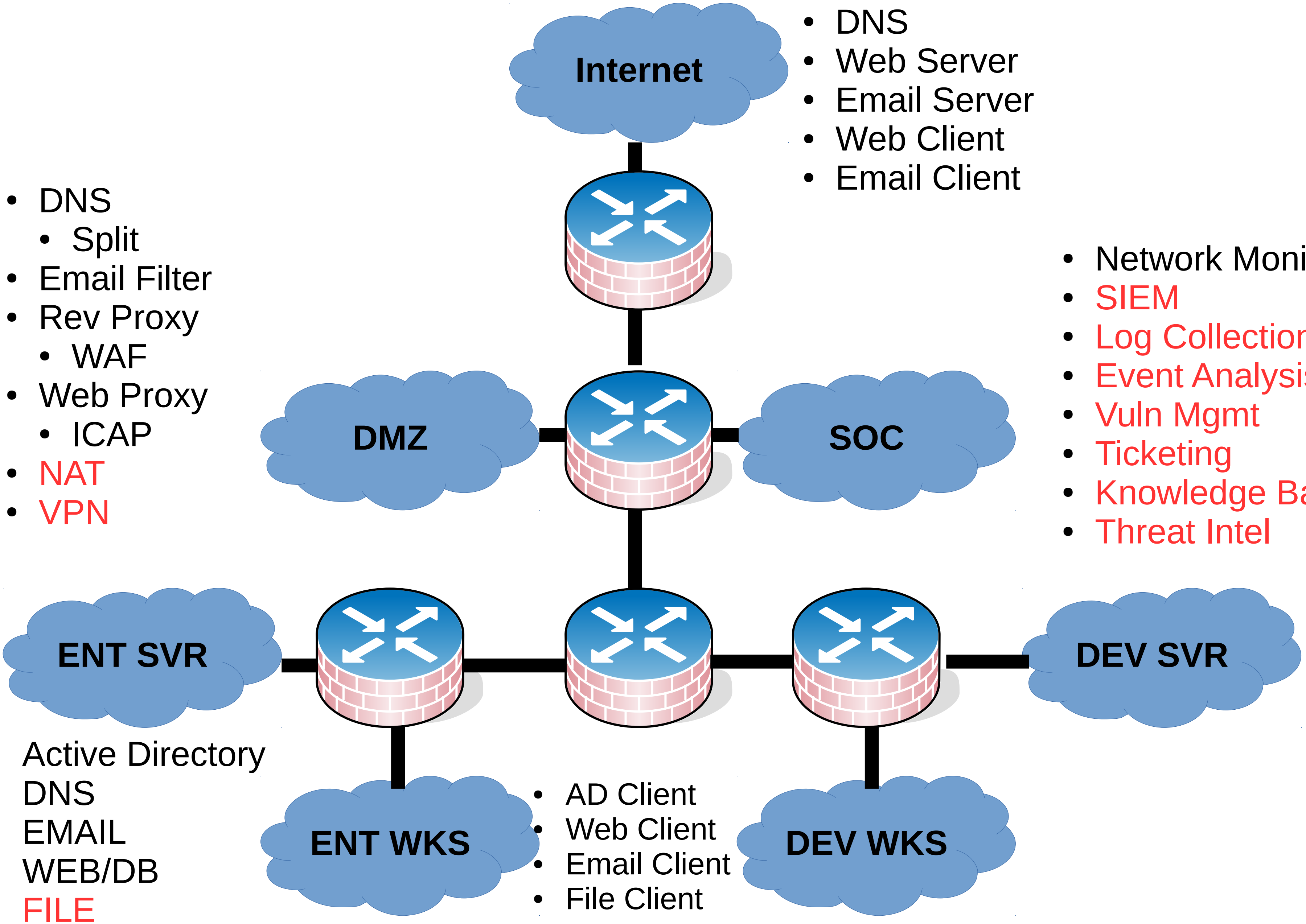
- **Resource Constraints**
  - Not a scalable architecture
- **The NAT interface links nodes undesirably**
  - Limits use a CyberRange model
- **Lack of Microsoft Components**
  - Enterprise Servers Lack Key Microsoft Services
    - Active Directory
    - Exchange
  - Enterprise Workstation Are Not Microsoft
    - Unrealistic reflection of Enterprise

Infrastructure Design

McSOC: Network Layout



McSOC: Infrastructure Layout



- DNS
- Web Server
- Email Server
- Web Client
- Email Client

- DNS
  - Split
- Email Filter
- Rev Proxy
  - WAF
- Web Proxy
  - ICAP
- NAT
- VPN

- Network Monitor
- SIEM
- Log Collection
- Event Analysis
- Vuln Mgmt
- Ticketing
- Knowledge Base
- Threat Intel

- Active Directory
- DNS
- EMAIL
- WEB/DB
- FILE

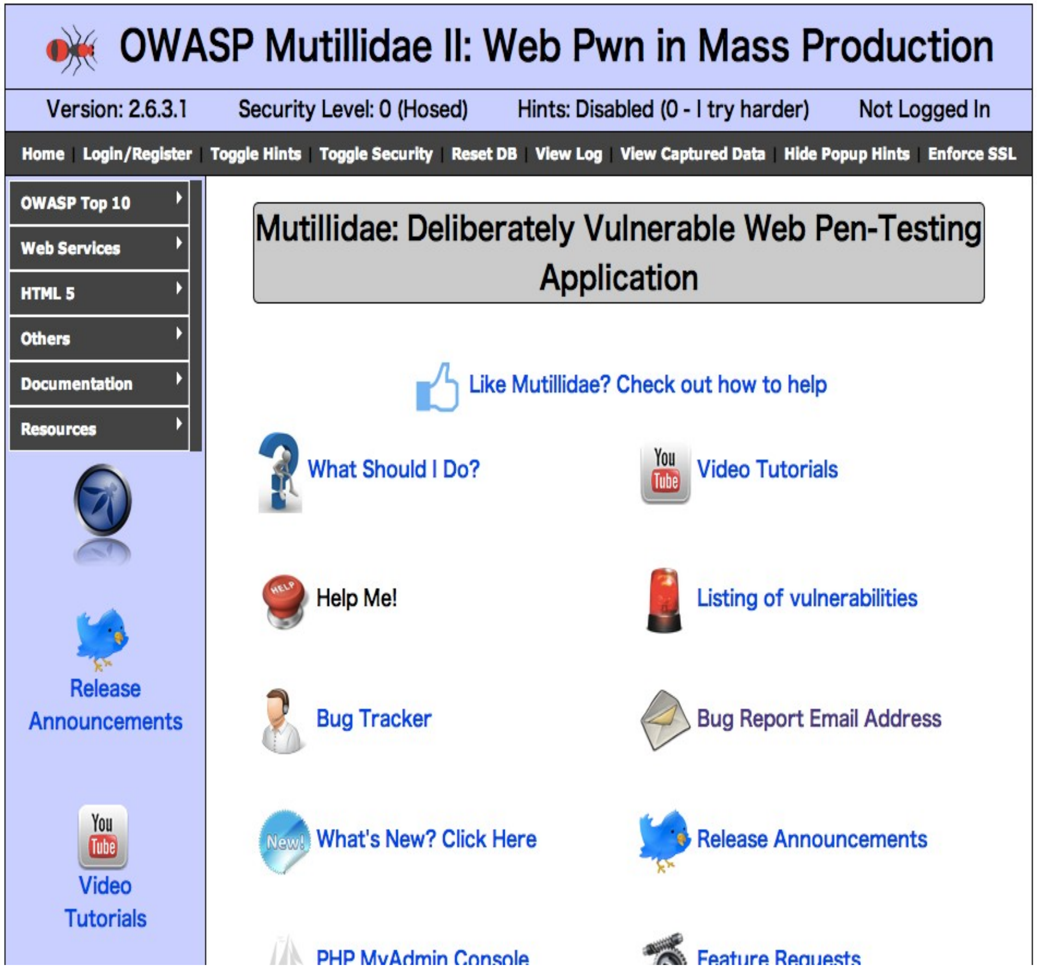
- AD Client
- Web Client
- Email Client
- File Client

McSOC : WAN : TESTMAIL

CentOS 7

- Test Services
  - DNSMASQ
  - NGINX Web Server
  - Email Server
    - MTA
    - MDA
  - Email Client
    - Web Mail

McSOC : WAN : TESTWEB



OWASP Mutillidae II: Web Pwn in Mass Production

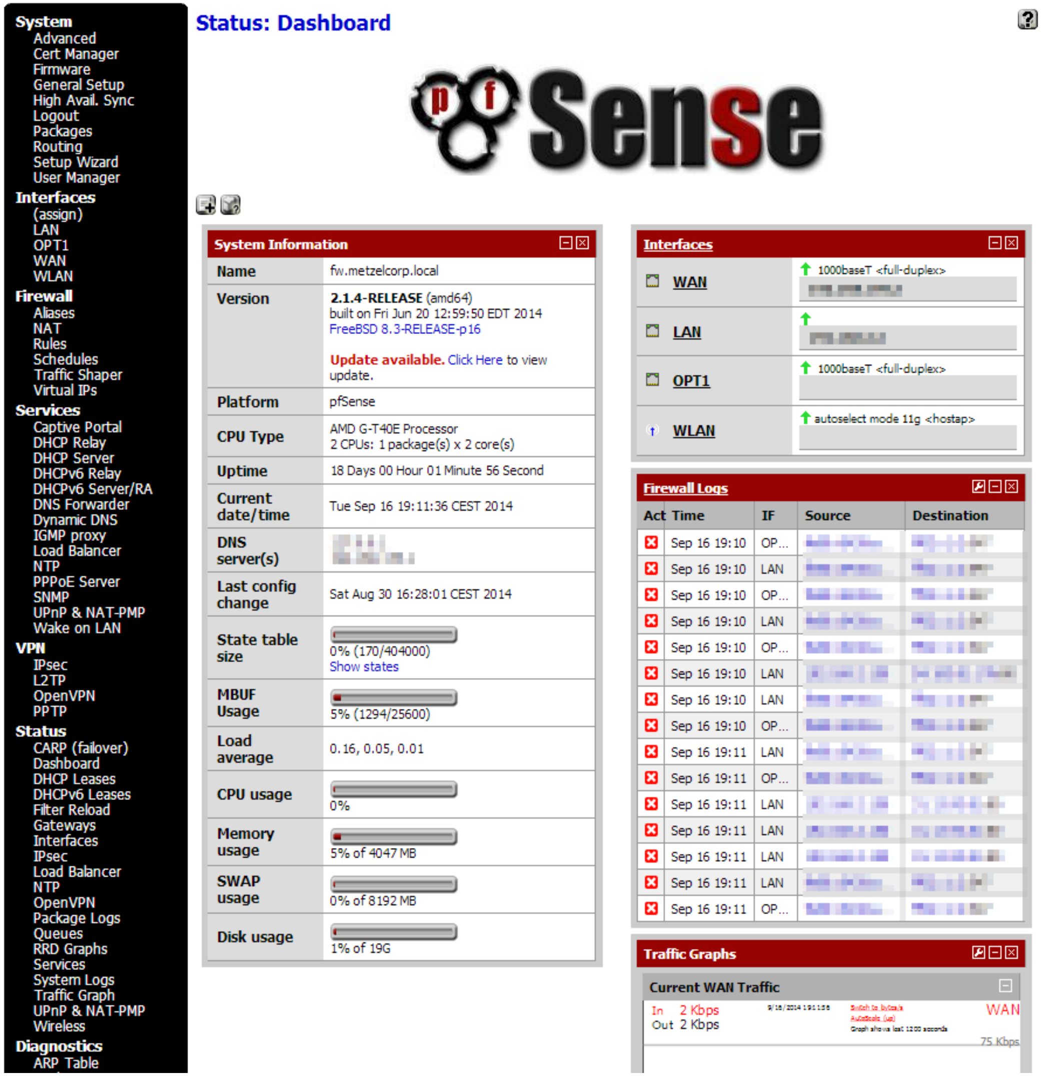
Version: 2.6.3.1 Security Level: 0 (Hosed) Hints: Disabled (0 - I try harder) Not Logged In

Mutillidae: Deliberately Vulnerable Web Pen-Testing Application

CentOS 7

- Test Web Services
  - Mutillidae Web Server
  - LAMP
  - EICAR files

McSOC: - : ROUTERS



Status: Dashboard

System Information

Name	fw.metzelcorp.local
Version	**2.1.4-RELEASE** (amd64) built on Fri Jun 20 12:59:50 EDT 2014 FreeBSD 8.3-RELEASE-p16 **Update available.** Click Here to view update.
Platform	pfSense
CPU Type	AMD G-T40E Processor 2 CPUs: 1 package(s) x 2 core(s)
Uptime	18 Days 00 Hour 01 Minute 56 Second
Current date/time	Tue Sep 16 19:11:36 CEST 2014
DNS server(s)	[redacted]
Last config change	Sat Aug 30 16:28:01 CEST 2014
State table size	0% (170/404000) Show states
MBUF Usage	5% (1294/25600)
Load average	0.16, 0.05, 0.01
CPU usage	0%
Memory usage	5% of 4047 MB
SWAP usage	0% of 8192 MB
Disk usage	1% of 19G

Interfaces

WAN	1000baseT <full-duplex> [redacted]
LAN	[redacted]
OPT1	1000baseT <full-duplex>
WLAN	autoselect mode 11g <hostap>

Firewall Logs

Act	Time	IF	Source	Destination
☒	Sep 16 19:10	OP...	[redacted]	[redacted]
☒	Sep 16 19:10	LAN	[redacted]	[redacted]
☒	Sep 16 19:10	OP...	[redacted]	[redacted]
☒	Sep 16 19:10	LAN	[redacted]	[redacted]
☒	Sep 16 19:10	OP...	[redacted]	[redacted]
☒	Sep 16 19:10	LAN	[redacted]	[redacted]
☒	Sep 16 19:10	LAN	[redacted]	[redacted]
☒	Sep 16 19:10	OP...	[redacted]	[redacted]
☒	Sep 16 19:11	LAN	[redacted]	[redacted]
☒	Sep 16 19:11	OP...	[redacted]	[redacted]
☒	Sep 16 19:11	LAN	[redacted]	[redacted]
☒	Sep 16 19:11	LAN	[redacted]	[redacted]
☒	Sep 16 19:11	LAN	[redacted]	[redacted]
☒	Sep 16 19:11	LAN	[redacted]	[redacted]
☒	Sep 16 19:11	OP...	[redacted]	[redacted]

Traffic Graphs

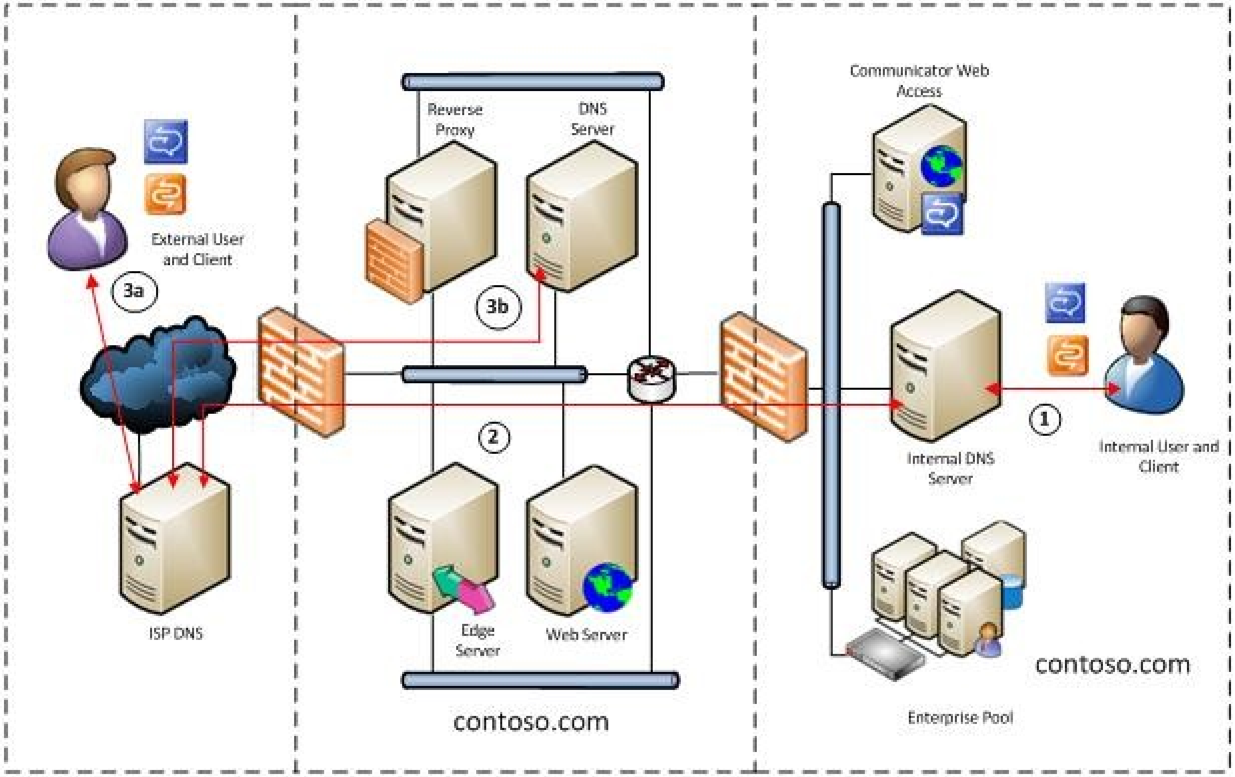
Current WAN Traffic

In 2 Kbps
Out 2 Kbps

- **pfSense**
  - Firewall
  - Routing
  - SNMP

FreeBSD 10

McSOC : DMZ : DNS

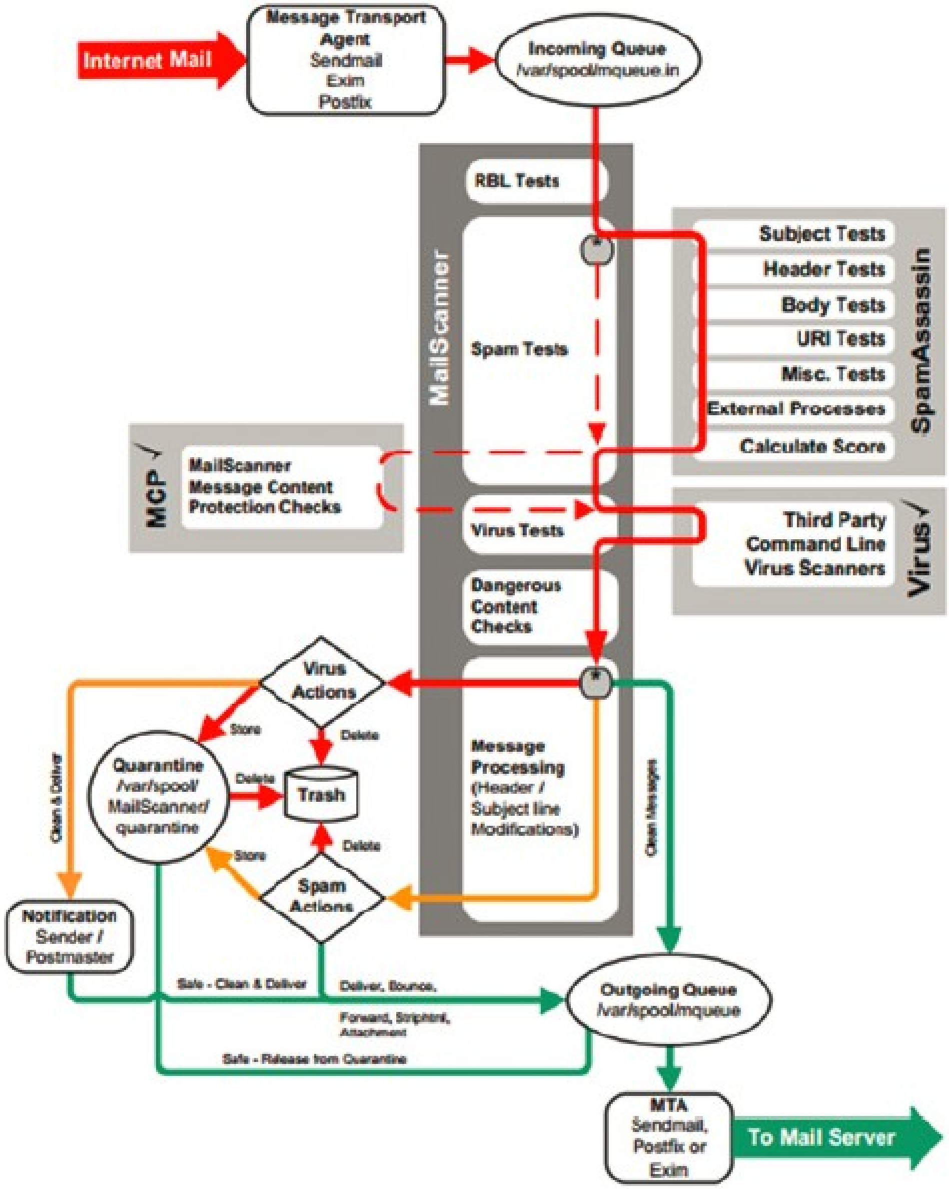


- DMZ DNS
  - DNSMASQ

CentOS 7

https://www.ixsystems.com/blog/an-email-gateway-with-freebsd-to-prevent-malware-and-undesirable-messages/

McSOC : DMZ : MAIL

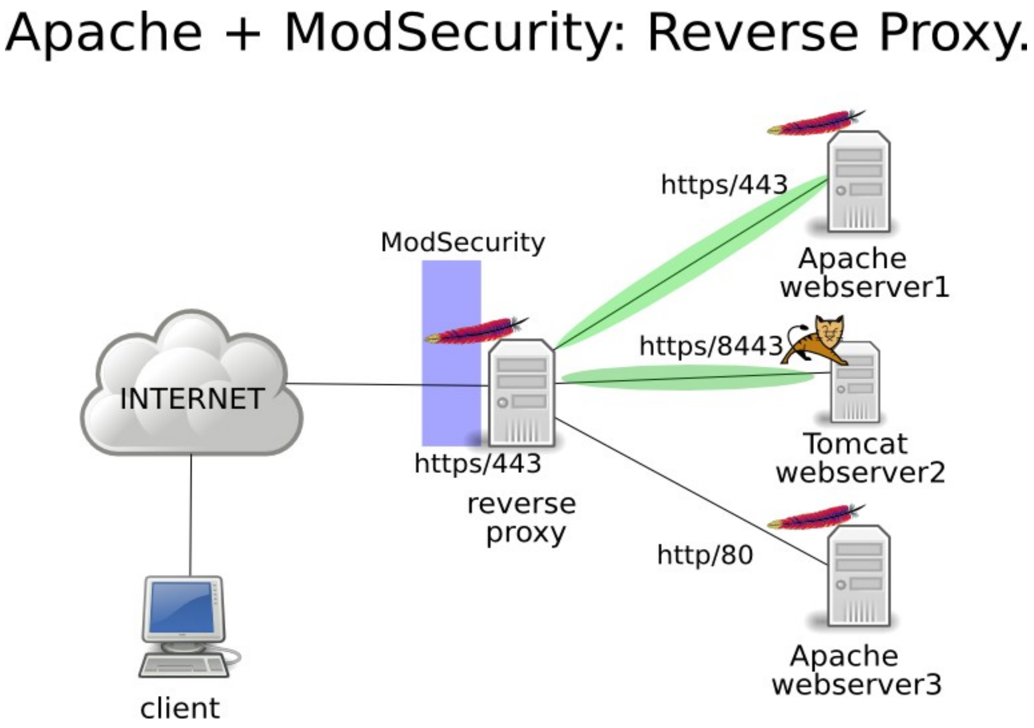


https://www.ixsystems.com/blog/an-email-gateway-with-freebsd-to-prevent-malware-and-undesirable-messages/

- Mail Gateway
  - Postfix
  - MailScanner
  - SpamAssassin
  - ClamAV

CentOS 7

McSOC : DMZ : WEB

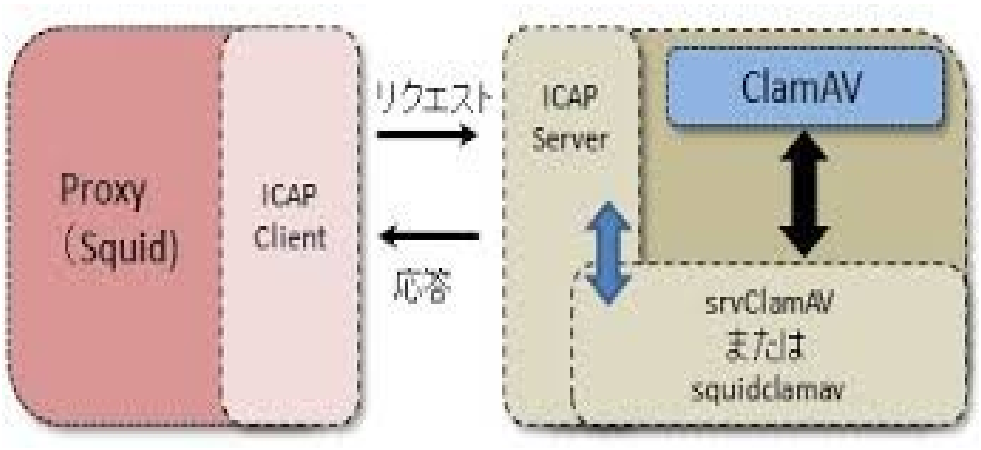


https://adolfomaltez.files.wordpress.com/2011/05/apache-reverse-proxy-modsecurity.png

- NGINX Reverse Proxy
  - Load Balancing
  - SSL Termination
  - HTTP Sanitizing
  - ModSecurity WAF
    - OWASP CRS
      - SQL Injection (SQLi)
      - Cross Site Scripting (XSS)
      - Local File Inclusion (LFI)
      - Remote File Inclusion (RFI)
      - Remote Code Execution (RCE)
      - PHP Code Injection
      - HTTP Protocol Violations
      - Shellshock
      - Session Fixation
      - Scanner Detection
      - Metadata/Error Leakages
      - Project Honey Pot Blacklist
      - GeoIP Country Blocking

CentOS 7

McSOC : DMZ : PROXY

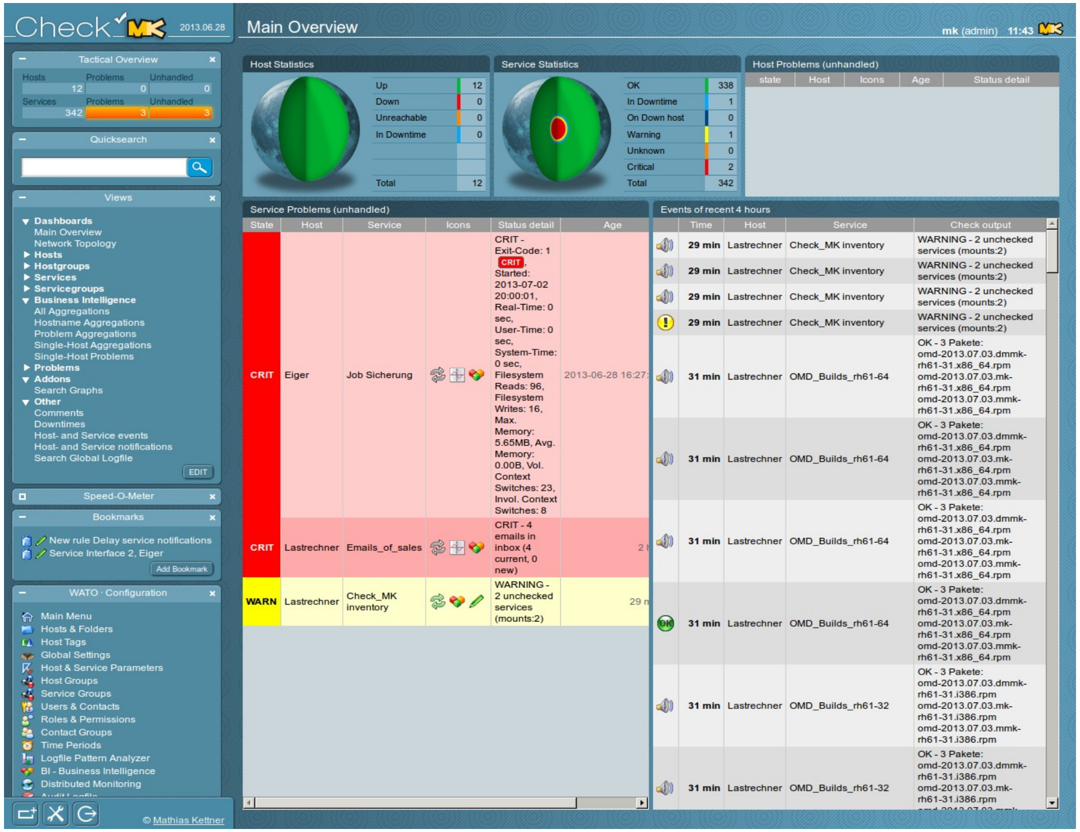


- SQUID Web Proxy
  - Squid
  - ClamAV
  - SquidClamAV
  - C-ICAP
    - Web antivirus service
    - basic URL filtering service

CentOS 7

http://squid.robata.org/setup_clamav.html

McSOC: SOC : NAGIOS



Tactical Overview

Hosts	Problems	Unhandled
12	0	0
Services	**Problems**	**Unhandled**
342	3	3

Host Statistics

Up	12
Down	0
Unreachable	0
In Downtime	0
Total	12

Service Statistics

OK	338
In Downtime	1
On Down host	0
Warning	1
Unknown	0
Critical	2
Total	342

Host Problems (unhandled)

state	Host	Icons	Age	Status detail

Service Problems (unhandled)

State	Host	Service	Icons	Status detail	Age
CRIT	Eiger	Job Sicherung		CRIT - Exit-Code: 1 CRIT, Started: 2013-07-02 20:00:01, Real-Time: 0 sec, User-Time: 0 sec, System-Time: 0 sec, Filesystem Reads: 96, Filesystem Writes: 16, Max. Memory: 5.65MB, Avg. Memory: 0.00B, Vol. Context Switches: 23, Invol. Context Switches: 8	2013-06-28 16:27:
CRIT	Lastrechner	Emails_of_sales		CRIT - 4 emails in inbox (4 current, 0 new)	2
WARN	Lastrechner	Check_MK inventory		WARNING - 2 unchecked services (mounts:2)	29

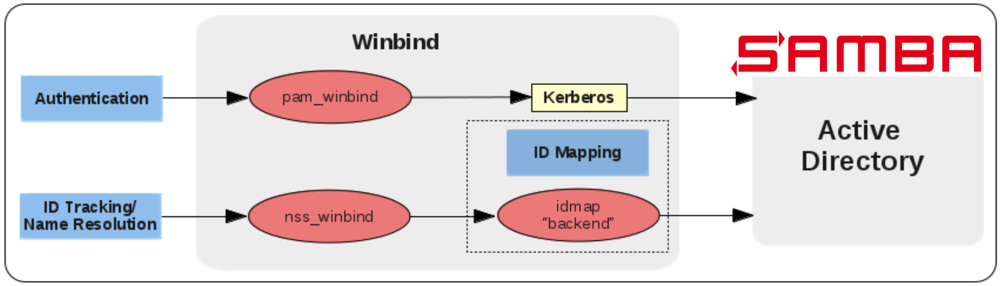
Events of recent 4 hours

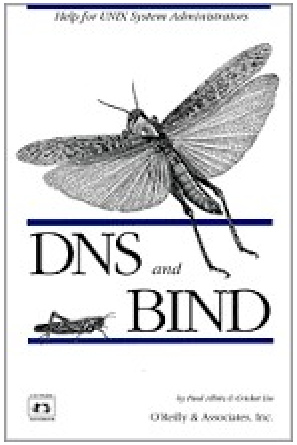
	Time	Host	Service	Check output
	29 min	Lastrechner	Check_MK inventory	WARNING - 2 unchecked services (mounts:2)
	29 min	Lastrechner	Check_MK inventory	WARNING - 2 unchecked services (mounts:2)
	29 min	Lastrechner	Check_MK inventory	WARNING - 2 unchecked services (mounts:2)
!	29 min	Lastrechner	Check_MK inventory	WARNING - 2 unchecked services (mounts:2)
	31 min	Lastrechner	OMD_Builds_rh61-64	OK - 3 Pakete: omd-2013.07.03.dmmk-rh61-31.x86_64.rpm omd-2013.07.03.mk-rh61-31.x86_64.rpm omd-2013.07.03.mmk-rh61-31.x86_64.rpm
	31 min	Lastrechner	OMD_Builds_rh61-64	OK - 3 Pakete: omd-2013.07.03.dmmk-rh61-31.x86_64.rpm omd-2013.07.03.mk-rh61-31.x86_64.rpm omd-2013.07.03.mmk-rh61-31.x86_64.rpm
	31 min	Lastrechner	OMD_Builds_rh61-64	OK - 3 Pakete: omd-2013.07.03.dmmk-rh61-31.x86_64.rpm omd-2013.07.03.mk-rh61-31.x86_64.rpm omd-2013.07.03.mmk-rh61-31.x86_64.rpm
OK	31 min	Lastrechner	OMD_Builds_rh61-64	OK - 3 Pakete: omd-2013.07.03.dmmk-rh61-31.x86_64.rpm omd-2013.07.03.mk-rh61-31.x86_64.rpm omd-2013.07.03.mmk-rh61-31.x86_64.rpm
	31 min	Lastrechner	OMD_Builds_rh61-32	OK - 3 Pakete: omd-2013.07.03.dmmk-rh61-31.i386.rpm omd-2013.07.03.mk-rh61-31.i386.rpm omd-2013.07.03.mmk-rh61-31.i386.rpm
	31 min	Lastrechner	OMD_Builds_rh61-32	OK - 3 Pakete: omd-2013.07.03.dmmk-rh61-31.i386.rpm omd-2013.07.03.mk-rh61-31.i386.rpm

Ubuntu 16 Xenial

- **Network Monitor**
  - Check_MK
    - Nagios Variant
    - Liveevent Service

McSOC: ENTSVR : DC1/DNS

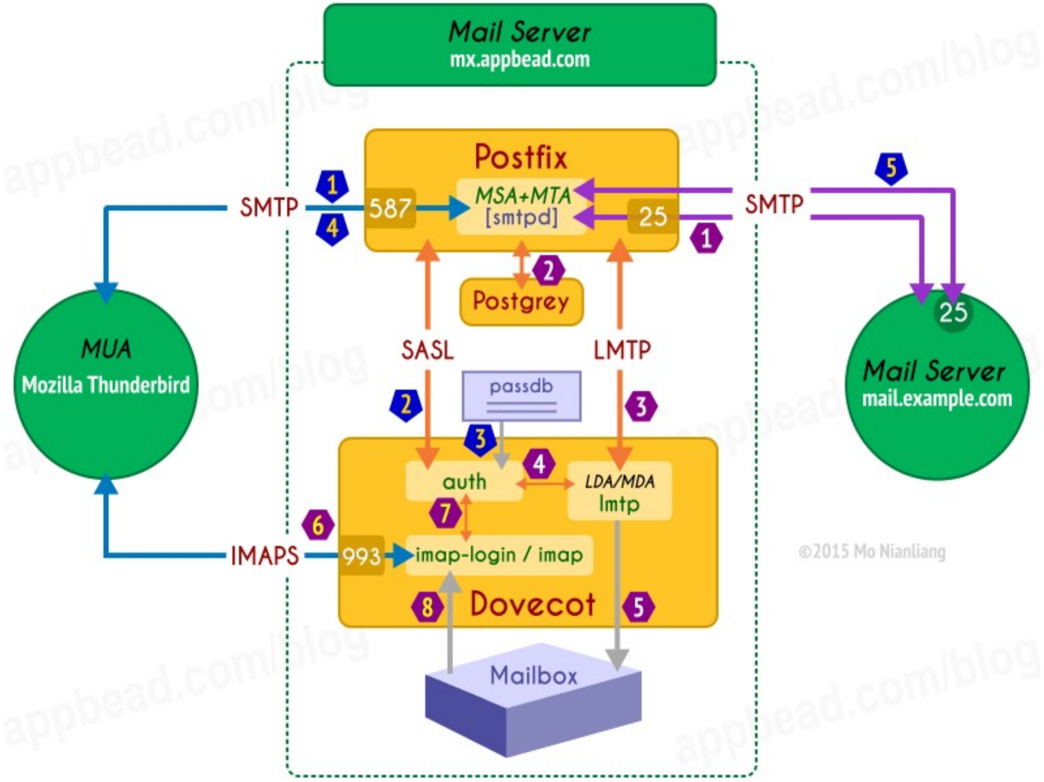



Help for UNIX System Administrators
DNS and BIND
O'Reilly & Associates, Inc.

- **Domain Controller**
  - Samba4 Authentication
- **DNS Server**
  - Bind9

CentOS 7

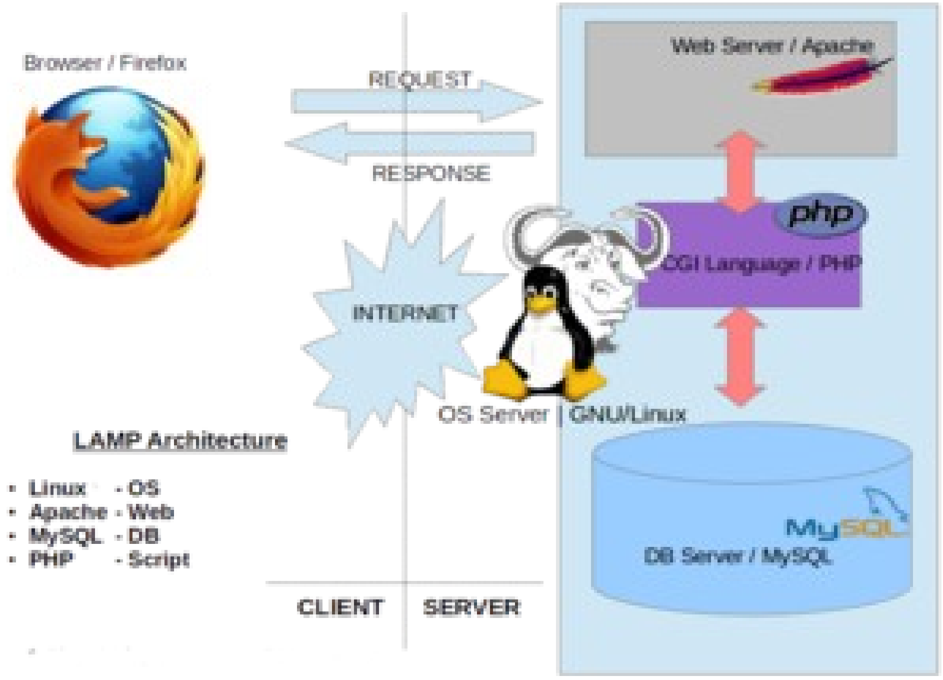
McSOC: ENTSVR : MAIL



- **Mail Server**
  - MTA: PostFix
  - MDA: Dovecot
  - AD/LDAP Authentication

CentOS 7

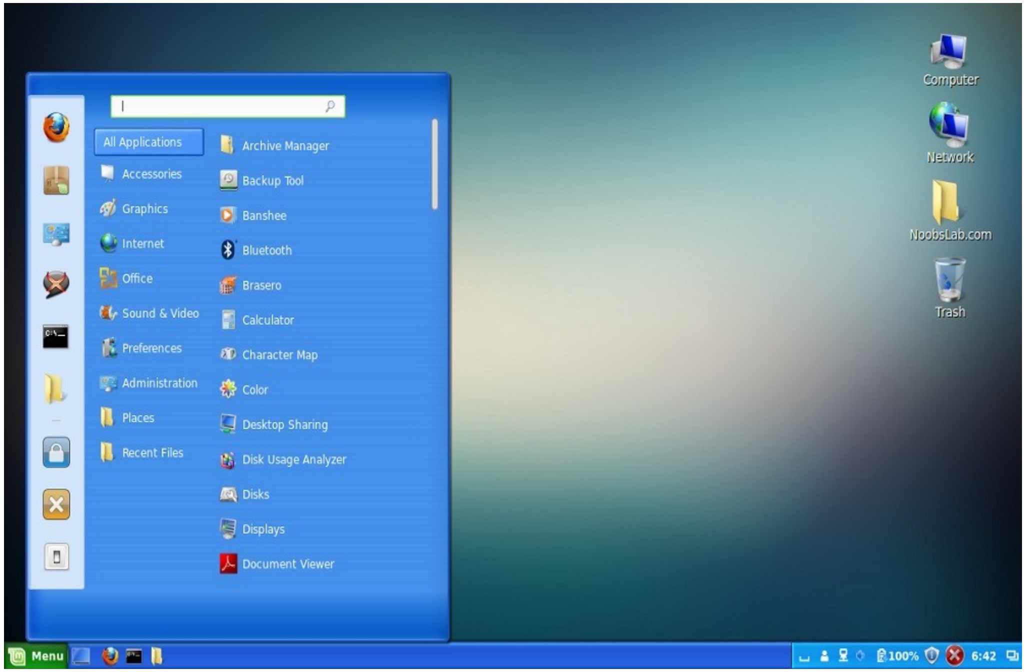
McSOC: ENTSVR : WEB/DB



- **Web Server**
  - Apache2
  - PHP 5
  - Wordpress
- **DB Server**
  - MariaDB
    - Fork of MySQL

CentOS 7

McSOC: ENTWKS : WKS101



Mint Linux 14
Win 7 Look and Feel

- **Domain Client**
  - Samba4 Authentication
- **Mail Client**
  - Mozilla Thunderbird
- **Web Browser**
  - Mozilla Firefox

Network Data Flow

McSOC: Inbound Email Flow

- Postfix holds the mail upon receipt.
- MailScanner scans the email in queue.
  - SpamAssassin
  - ClamAV
- MailScanner re-queues the email and hands it over back to Postfix.
- Postfix processes the email as necessary and delivers the mail to recipient.

Potential Hardware

McSOC: HP DL380

- Fully loaded $7400
- 64GB RAM
- 2x10TB Storage
- Power Supplies: 2 x 800W

McSOC: Dell R710

- Fully loaded $2600
- 144GB RAM
- 12TB Storage
- Power Supplies: 2 x DELL 870W

McSOC: ServerMicro E300-8D

- Barebones $700
- 128GB RAM $1000
- 512 GB SDD $300
- External Storage
- Power Req: 80W chassis (+ ext storage)

McSOC: Intel NUC

- Fully Loaded $1400
- 32GB RAM
- 1 TB SDD
- Power Req: 80W