

Open Source Software Initiative Overview

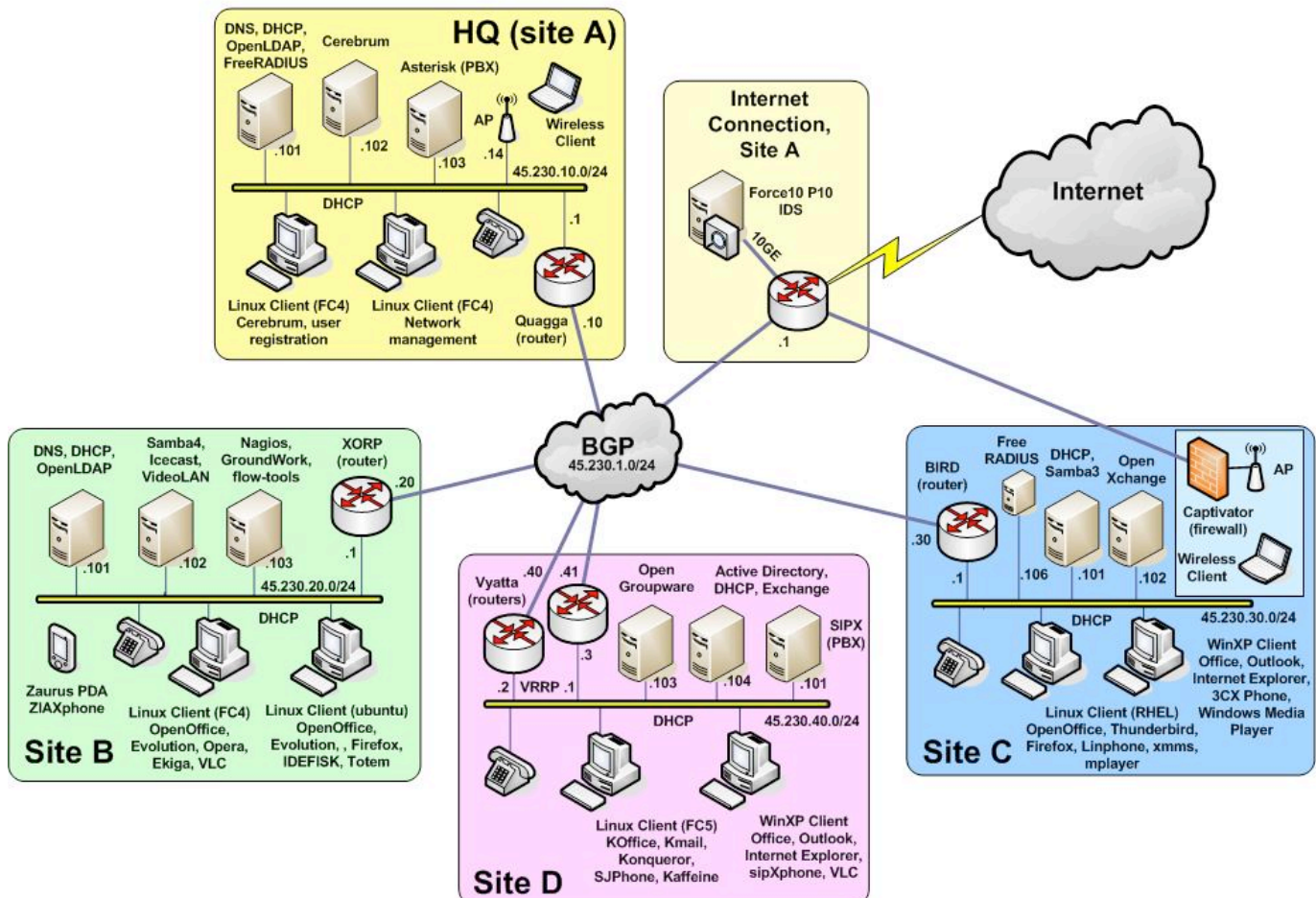
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Focus on Open Source Software continues to increase and Open Source Software is now an important part of the infrastructure in many enterprises. Availability, stability and flexibility, as well as the number of Open Source applications available, are all factors that have contributed to this. The approval and support from major commercial hardware and software vendors is another significant factor. Open Source Software has great benefits in terms of the large number of choices, low cost and flexibility to meet your business needs. But with these benefits comes the challenge to identify and integrate the software to meet those needs, finding the right hardware and testing for quality and interoperability.

In the iLabs Open Source Software (OSS) area we demonstrate the implementation of open source software from two different angles. First, we show how close to all of a company's infrastructure can be implemented using open source applications. In our live lab environment, we simulate a company with three sites (A, B, C) running mainly open source operating systems and applications on all servers and the majority of desktops. Second we demonstrate how a company with an infrastructure predominantly based on proprietary software can be integrated with an open source infrastructure. In our lab we simulate a fourth site (D) of the company described above. This fourth site was recently acquired, and at the time of the acquisition their infrastructure was based almost entirely on closed source software.

For the three original sites, ABC, the standard server operating system is the Fedora Core 4 (FC4) distribution of Linux. On top of this we run most of our applications, with the exception of a few that have pre-built images with other Linux distributions. Site D runs Windows 2003 server as the main server operating system.

InteropNet Labs - Las Vegas 2006 – Open Source Software Initiative



The four sites all run different open source or open source based routing stacks (Quagga, XORP, BIRD, Vyatta) and the inter-site routing protocol is BGP. Site D has two Vyatta routers running VRRP for additional redundancy.

For our basic infrastructure, we have one DHCP server running at each site to make sure there will always be DHCP even if a WAN link should go down between sites. This also avoids the problem of some routing stack implementations not supporting DHCP forwarding. We have DNS, NTP, SYSLOG, RADIUS and LDAP services running in redundant configuration with the redundant servers always located on different sites.

The largest and most complex piece of our infrastructure is ID management, which ties closely to our file servers, email and calendaring. Cerebrum is the application that registers new users and pushes the data out to OpenLDAP/OpenXchange for the open source part of our company, and Active Directory/Exchange for the closed source part. Depending on where the client PC is located (e.g. ABC or D), the user will when he logs in be authenticated against OpenLDAP, Samba/OpenLDAP, or ActiveDirectory, and get his home directory mounted from either our Samba server, the Windows2003 server or both.

We have two SIP PBXs. One is an Asterisk server located at site A which runs a Linux distro based on Asterisk called *AstLinux*. The other is a SIPX server located at site D running SipX's 3.0.1 version of SipXpbx. Since D was just acquired, we are adding dial plan info such that calls for site D from sites ABC are simply forwarded to the SipXpbx and vice-versa. In addition, the Asterisk server is handling calls that are sent and received from the outside world using an external VoIP provider account. We are running a mix of clients ranging from Cisco desk phones to a variety of soft phone clients

All of our audio and video streaming services are provided by the multimedia group, located at site B. The streaming services run on a FC4 Linux server. Icecast is used for audio streaming in ogg format. VideoLAN is used for video streaming in mpeg4 format. Both audio and video services are unicast and clients need to know the unicast IP address and port number of the audio/video server to receive the streams.

Our main network management system is Nagios/GroundWork. We use this system to monitor all our network devices, all of our servers and all of the critical services running on the various servers. We also have dedicated syslog and SNMP trap servers. We receive netflow data from various points in iLabs and the eNet and use flowscan to display the data.

Two of the sites have wireless networks. Site A has an Access Point that acts as a wireless bridge. Authentication is through 802.1X against RADIUS. Site C has an access-point sitting behind a captivator firewall which acts as a captive portal. The captivator gives the user a web page where he has to enter username and password. Captivator then uses RADIUS to authenticate the user before he gets access to the rest of the network. Both RADIUS servers are FreeRADIUS and they get their authentication and authorization data from OpenLDAP.

Our setup includes the P10 IDS appliance from Force10 which performs inline 10Gbps inspection in hardware. The IDS can run on Linux, OpenBSD or FreeBSD and uses the Snort IDS software suite to write signatures. The P10 monitors traffic on the show floor as well as traffic to and from iLabs. In addition we use traffic generators to generate higher volumes of traffic and realistic attacks. The IDS has a simple text interface to see traffic statistics and blocked packets, or to dump matching traffic. New signatures can be written and installed seamlessly on the fly.

OSS Applications:

Quagga: <http://www.quagga.net>
XORP: <http://www.xorp.org>
BIRD: <http://bird.network.cz>
Vyatta: <http://www.vyatta.com>
Cerebrum: <http://www.cerebrum.uio.no>
FreeRADIUS: <http://www.freeradius.org>
Asterisk: <http://www.asterisk.org>
sipXpbx: <http://www.sipfoundry.org/sipX>
Icecast: <http://www.icecast.org>
VideoLAN: <http://www.videolan.org>
Nagios: <http://www.nagios.org>
GroundWork: <http://www.groundworkopensource.com>
OpenXchange: <http://www.openxchange.org>
Snort: <http://www.snort.org>

The following applications, part of the FC4 distribution:
DHCP server, BIND, OpenLDAP, NTP

Vendor Support:

Vyatta, GroundWork Open Source, Avocent, Force10 Networks, Cisco Systems, Extreme Networks, Spirent Communications, APC, iNOC

OSS Team:

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