Library IT systems overview

1 Machines and services

The Library's Linux Systems Administrator is mainly responsible for three core services: repositories, journals (and conferences), and off-campus access. Remaining services generally support these three core services.

1.1 Repositories

The Library runs the following DSpace repositories (virtual machines unless specified otherwise):

1. SUNScholar (scholar.sun.ac.za): Physical machine. The institutional repository containing all theses, dissertations and published articles. Curator and contact person: Mimi Seyffert-Wirth (mseyf@sun.ac.za).
2. SUNDigital Collections (digital.lib.sun.ac.za, aka ir2.sun.ac.za): Physical machine. The special collections repository containing digitised versions of special collections' material. Curator and contact person: Mimi Seyffert-Wirth (mseyf@sun.ac.za).
3. SUNeTD (etd.sun.ac.za): The Electronic Theses and Dissertations submission repository, i.e. the staging area where submissions are sent prior to being cleaned and moved to SUNScholar. Contact person: Paulette Talliard (plt@sun.ac.za).
4. ALP: The Antarctic Legacy Project (alp.lib.sun.ac.za), a repository containing historical documents and media relating to South African expeditions to the south pole and nearby islands. The Library manages this repository on behalf of the ALP. Curator and contact person: Ria Olivier (riaolivier@sun.ac.za).
5. RADAR (lib.riskreductionafrica.org): Also known as PeriPeri or the Risk Reduction repository. Contact person: Carinus de Kock (dekockc@sun.ac.za). Not directly maintained by the Library.
6. CIB (ir.sun.ac.za): The repository for the Centre of Excellence for Invasion Biology. No longer directly maintained by the Library.
7. Development (repository.sun.ac.za): The dev/test server.

The Library runs the following Figshare repositories:

1. SUNScholarData (scholardata.sun.ac.za): Cloud service. The institutional research data repository. Curator and contact person: Samuel Simango (ssimango@sun.ac.za)

1.2 Journals and conferences

The Library hosts a number of journals and conferences. These services rely on the Open Journal System and Open Conference System software by the Public Knowledge Project. The following journals instances exist:

- journals.sun.ac.za (the development and training platform)
- ngtt.journals.ac.za
- aeaa.journals.ac.za
- applj.journals.ac.za
- ajobe.journals.ac.za
- akroterion.journals.ac.za

- aps.journals.ac.za
- fundisa.journals.ac.za
- globalmedia.journals.ac.za
- lexikos.journals.ac.za
- spil.journals.ac.za
- spilplus.journals.ac.za
- missionalia.journals.ac.za
- orion.journals.ac.za
- perlinguam.journals.ac.za
- sajlis.journals.ac.za
- scientiamilitaria.journals.ac.za
- scriptura.journals.ac.za
- sajie.journals.ac.za
- www.journals.ac.za (a federated instance hosting multiple journals)

Note that most of these journal instances are hosted on the same virtual machine. The following conference instances also exist:

- conferences-dev.bib.sun.ac.za (the development and training platform)
- conferences.sun.ac.za

These two services are running Ubuntu 14.04 which is no longer supported. The OCS platform does not run on PHP 7 (used from Ubuntu 16.04 onwards) and has effectively been abandoned by PKP.

1.3   Off-campus access

Off-campus access is facilitated by an EZProxy server hosted at ez.sun.ac.za. This proxy is not a traditional proxy server, rather it provides access to paid databases and journals through subdomains under *.ez.sun.ac.za (and therefore makes use of a wildcart TLS cert) by rewriting HTML and JS links and performing all queries on behalf of the user, without them needing to set a proxy URL in the browser. Access is facilitated using SSO.

The EZProxy software is largely managed by Natasja Malherbe (nmalherbe@sun.ac.za), although occasionally it is necessary for more technical investigations by the Linux sysadmin to take place to update the database stanzas (rules) used to rewrite traffic. The EZProxy server is a virtual machine running on the VMWare farm at campus IT.

1.4   Other services

The Linux sysadmin is also responsible for other support services, such as backups, mailing lists and minor web services.

2   Network

Stellenbosch University owns 146.232.0.0/16. The main library uses 146.232.122/23 for students and 146.232.124/22 for staff, and is supplied with a gigabit fibre connection for each subnet. There are various subnets for the other libraries, but they are generally not of major interest to the Linux sysadmin. Generally the network and Wi-Fi are managed by the ICT Services' networking team.

3   Security

Matters related to security, such as phishing, unauthorised access to accounts and suspicious activity on the network or services should be reported to csirt@sun.ac.za (an alias of help@sun.ac.za that ensures requests are routed to the correct respondents on Jira). Serious matters will be followed up by Gert Albertse (gjja@sun.ac.za) who will involve operations team members as required.

4   Licensing

The Library renews licensing for the following every year:

1. The EZProxy software license
2. The VMWare licensing for the development server (STBVH23)
3. The Handle prefixes for the repositories

Wouter Klapwijk (wklap@sun.ac.za) and Anita Liebenberg (adl@sun.ac.za) handle these procedures and the renewals generally happen on their side without the need for intervention from the Linux sysadmin.

5   Monitoring

Monitoring is handled by multiple services, since a single product does not cover all monitoring needs. For standard service availability alerts, the Library makes use of Icinga (a fork of Nagios that allows parallel checks). The complete monitoring documentation is on the BIB IT wiki.

6   Disaster recovery

The Library makes use of three backup servers, all of them running Backuppc. These servers are:

- ark.bib.sun.ac.za (the oldest of the three)
- arc.bib.sun.ac.za
- arg.bib.sun.ac.za (the newest of the three, managed by Puppet)

These servers connect to all of the other machines on the Rsync port (IP-based authentication) and pull backups nightly. This involves a combination of incremental and full backups, all of which can be viewed on the corresponding web interfaces. SUNScholar is also, additionally, backed up by Paul Merritt to the NetApp storage. All servers which make use of databases create database dumps every night, which is also included in the backups. During maintenance on services running on VMWare it is advised to create a snapshot and keep it for the duration of the maintenance process. Snapshots should not be kept for longer than a week.

7   Automation

Given the number of services managed by the Library sysadmin, it is necessary to perform some kind of automation to keep up with the workload. The following is currently set up:

7.1   Configuration management

Configuration management is handled using Puppet. This service runs at puppet.bib.sun.ac.za and makes use of manifests of desired states which are assigned site-wide, or per-node. The Puppet agent on each machine periodically (every hour on Linux, and every half-hour on Windows) fetches its manifests from the Puppet Master and applies the latest set of rules. A default set of rules for SSH authentication, firewalls and backups is applied on every node added to Puppet. ***Note****: a separate document describing the Puppet setup, authored by Ian van der Linde, is available.*

7.2   Version control

All of the Puppet manifests are stored in a Git repository hosted at dev.sun.ac.za. The code is divided into four branches: Linux production and dev, and Windows production and dev.

7.3   Orchestration

Orchestration was in testing by Ian van der Linde (ivdl@sun.ac.za). The orchestration software is rundeck, and it runs at orchestration.bib.sun.ac.za. This software currently listens on localhost only, and proper authentication still needs to be set up. Rundeck allow predefined scripts and jobs to be executed on subsets of nodes (based on Puppet roles). Any machine added to Puppet is automatically added to the list of nodes rundeck can access.

8   Procedures

The following tasks require change control approval (whether production or otherwise):

- Software updates
- Firewall changes (including InetKey or internet access requests)
- FQDN, DHCP and DNS changes

The following tasks require Jira tickets:

- TLS certificate signing requests

Generally change control tasks are completed without accompanying Jira tickets at the moment, although that is likely to change in the near future as the change control process is absorbed into Jira. Tasks logged by the sysadmin for change control may need to also be logged to the Library's Jira for personal time tracking.

9   Other Library services

The Library also makes use of the following services, which may from time-to- time require technical input from the Library sysadmin:

- ExLibris Alma: The Library Management System (LMS). This is a cloud service.
- ExLibris Primo: The discovery system, a search engine for the LMS, and an interface for clients to see their borrowed items and fines, and also allows clients to renew items. This is a cloud service.
- Sharepoint: Used for the Library website (https://library.sun.ac.za) and the Library staff portal (https://stbsp01.stb.sun.ac.za/vrr/library/default.aspx).

10   External services

The Library interacts with the following external services:

- SAFIRE (https://safire.ac.za): The South African identity federation. Provides authentication to Figshare and some paid-for e-resource databases.
- TENET (https://tenet.ac.za): Handles the ac.za TLD. The Library has one domain under this TLD that is managed by campus IT: journals.ac.za. TENET also handles Figshare licensing negotiations on behalf of South African institutions from 2020 onwards.

11   Documentation

Documentation for Library IT systems is stored in the following places:

- The Git repository for Puppet manifests
- The three Wikis (BIB IT - internal and private, PROBIB - internal and public, and Libopedia - external and public)

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