



Electricity North West Limited

Decentralised ANM

Server Build Lessons Learned

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1. DOCUMENT ISSUE CONTROL

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2. INTRODUCTION

2.1 Project Background

Smarter Grid Solutions (SGS) is working with Electricity North West Ltd (ENWL) and other project partners to deliver the QUEST innovation project. The role of SGS in this project is to deliver Active Network Management (ANM) systems for the management of Distributed Energy Resources (DER) with flexible connections and the forecasting and dispatching of DER flexible services to provide alignment and transferability with other UK DNOs.

2.2 Purpose of Document

This document details the challenges encountered, how these challenges were overcome, and the lessons learned from the build and installation of the Decentralised ANM system.

2.3 Intended User

This document is intended for use by the following:

- ENWL QUEST project representatives
- SGS project delivery team

2.4 Scope

This document only focuses on the activities related to the build and installation of the Decentralised ANM servers. Figure 1 shows an overview of the Decentralised ANM system consisting of five servers – dual redundant SGS Cores and SGS Comms Hubs connected on a dual redundant network.

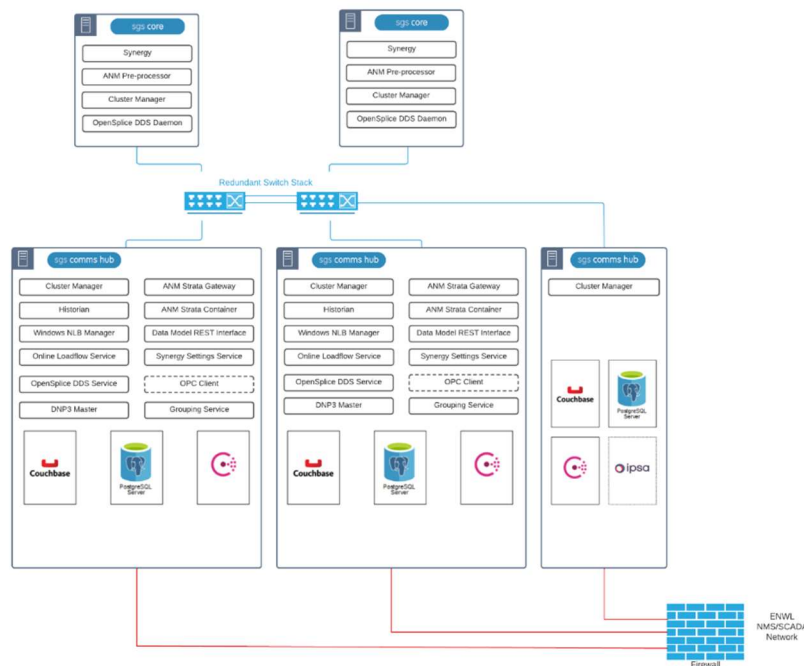


Figure 1 - System Overview

It should be noted that as at the time of writing this document, the build and installation work is still in progress, hence this document may require further updates on completion of the server build and installation scope of work.

2.5 Terminology

Table 1: Terminology

Term	Definition
ANM	Active Network Management
ENWL	Electricity North West Limited
SGS	Smarter Grid Solutions
SGS Comms Hub	Data gateway server within an ANM Site
SGS Core	Server hosting applications within an ANM Site

3. BUILD

3.1 Remote Access and User Account Setup

3.1.1 Challenges Encountered

There was some delay, by a few weeks, in setting up the remote access infrastructure and user accounts for SGS remote access. This has resulted in delays to the SGS deployment of the Decentralised ANM software platform.

3.1.2 Solution

The request was raised internally by ENWL and processed on behalf of SGS. The request required a level of authorisation and validation that was not considered as part of the tendering process. The inclusion of ENWL IT at the tender stage may well have highlighted potential delays and therefore this could have been mitigated.

3.1.3 Lesson Learned

ENWL has a process for setting up new users and this can take a couple of days/weeks to complete. New users will undergo some screening prior to being granted access to the ENWL IT network.

3.2 Strata Grid on RHEL 7.9

This is SGS' first commercial deployment of Strata Grid application using Red Hat Enterprise Linux 7.9 on the SGS Core Servers, which worked as expected.

3.3 Hardware Delivery Lead Times

3.3.1 Challenge

PanelView HMI panels could not be procured in time for the project due to significantly unexpected long lead times. This was a combination of the knock-on effect of COVID on the manufactures supply chain and the impact of the microprocessor plant fire in China.

3.3.2 Solution

The ANM Outstation design was reviewed, and the decision was made to exclude the HMIs from the scope of supply.

3.3.3 Lessons Learned

Delivery lead times of PanelView HMIs equipment have significantly increased and no suitable alternatives have yet been identified. This should be considered when defining the project timescales or have a check for alternative suppliers/manufacturers of project materials.

3.4 Server Set Up and Operating System Installation

The server build was a joint endeavour between ENWL and SGS. ENWL procured and set up the server hardware whilst SGS installed and configured the Decentralised ANM software platform on the servers via a remote network connection to the ENWL network. As part of setting up the servers, ENWL

installed the server operating systems – Red Hat Enterprise Linux on the SGS Cores and Windows Server 2019 on the SGS Comms Hubs with a Build Guide produced by SGS to support this activity.

3.4.1 Challenges Encountered

The servers were set up in compliance with ENWL's IT policy, which means some of the implemented OS settings were not as specified in the SGS Build Guide. This deviation from the Build guide presented the first challenge as the SGS Software Platform could not be installed due to missing dependencies from the base OS. This applied to both Windows and Linux environments.

With internet access to all servers disabled, it was not possible to update the OS for the missing components over the internet.

3.4.2 Solution

The missing dependencies were identified and downloaded from the internet by SGS. The downloaded files were relayed to ENWL using an encrypted USB removable disk drive and the files were retrieved and subsequently installed on the affected servers after which the SGS software platform was installed.

3.4.3 Lesson Learned

Internal IT policies can affect SGS standard server build procedure to the extent that the SGS software cannot be installed. Installation of Windows and RHEL operating systems on the Strata Grid servers should be performed as documented in SGS server build guides with the servers connected to the internet. Otherwise, some prerequisite software may be missed and when the servers are off the internet (due to IT requirements), it can be challenging finding and installing the missing software components.

4. INSTALLATION

4.1 Hardware

All hardware installation scope for this project is managed by ENWL.

4.1.1 Challenges

One of the challenges with the hardware installation from SGS' point of view is the absence of a dual-redundant IT network for the Decentralised ANM system, which is a deviation from standard SGS ANM delivery. A dual redundant network enhances ANM high availability.

4.1.2 Solution

No solution identified yet; however, this is not considered critical for the QUEST trials. The Decentralised ANM system will operate on a single data/control network connection. As this is an innovation project the demands of a BaU system are less likely to occur in this installation.

4.1.3 Lessons Learned

To be determined during the trials when we are moving data and simulation of responses are being undertaken.

4.2 Software

4.2.1 Challenges

Non-standard SGS server build impacts the application and third-party software installations. As it is an Innovation project changes will occur. Changes can easily be tracked however tie back to the key project objectives should also be undertaken so that deviation does not occur and integration between partners is designed in.

4.2.2 Solution

No solution identified yet; however, this is not considered critical for the QUEST trials.

4.2.3 Lessons Learned

To be determined during the trials. Data exchange requirements with third-party systems and suppliers should be finalised prior to commencing system builds and installation to avoid delays/rework. Data exchange requirements should be treated as part of the system concept rather than later detail within integration and testing.

5. CONCLUSION

There are valuable lessons that have been learned so far, and more lessons are still being learned, as the build and installation scope of work progress. These lessons have been recorded here for the purpose of:

- improving the build and installation process of Decentralised ANM systems in the future.
- reference for future maintenance and support of the deployed ANM system.

6. RECOMMENDATION

The server builds and installation is progressing well. In view of the issues highlighted in this document, the following recommendations have been made to improve the process:

- Delivery lead times should be determined when scoping future projects that require HMIs and suitable alternatives should be researched.
- Installation of Windows and RHEL operating systems on the Strata Grid servers should be performed in line with the Build Guide provided by SGS, which usually recommends the servers to be connected to the internet during initial OS setup. Otherwise, some prerequisite software components may be missed which can lead to unnecessary delay in the build process. Where an alternative build method is adopted, this should be agreed in advance and any foreseen issues mitigated against.
- Based on the above, building and configuring strata servers by SGS before they are taken to site is highly recommended, as this significantly reduces the cost involved in fixing issues remotely or on site.
- The time taken to set up new users on the ENWL network should be taken into consideration when planning any future work that requires creating new user accounts for remote access.

7. APPENDICES

None.

