Electrical Distribution Network Access Register (EDNAR)

Feature Tour

Jan, 2021 – Version 1.3

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1 INTRODUCING EDNAR

EDNAR (Electrical Distribution Network Access Register) is an application designed from the ground up to support the planned network access request workflow for electricity distribution networks.

EDNAR utilises an electrical network data model from the GIS or ADMS, optionally combined with customer information from the CIS, to generate customer lists based on isolation points and identify conflicting jobs early in the Network Access Request (NAR) lifecycle.

Integrations with the ADMS provide real time monitoring and notifications of ADMS job status changes.

Support for the customer notification process is built into the application workflow, along with the ability to integrate with external systems to support mail-outs, email and SMS notifications.

EDNAR provides Cradle to Grave support for planned work in electricity distribution networks.

Early capture of jobs during the planning process provides opportunities for better works management and less outages through the advanced clash detection functions, as well as the ability to combine deferrable asset maintenance activities with customer works in the same outage.

EDNAR provides digitisation of manual processes typically used for the outage planning workflow, with all attendant benefits such as transparency of operation, audit trail, reduction of double entry of data, and effective job management.

1.1 BENEFITS

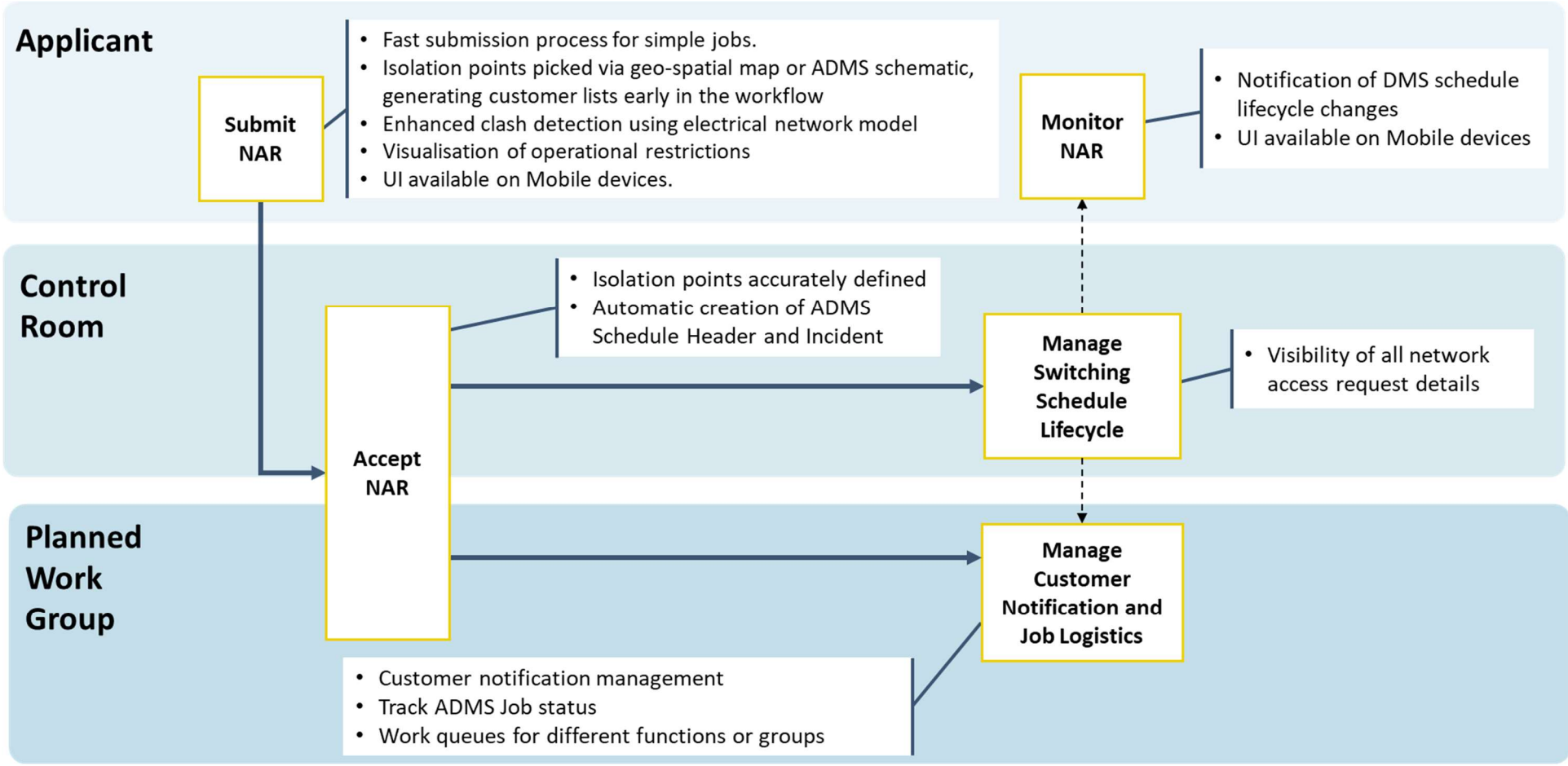
- Intuitive support for the planned access workflow streamlines business operations and reduces costs,
- Improved job visibility across the enterprise reduces demand surge and reactive work practices, resulting in reduced costs and avoidance of cancellations, and improved customer service,
- Supports the creation of work queues using complex logic to create pipelines for different people and organisational units.
- Eliminates paper forms and associated workflow limitations,
- Enhanced security and accountability via comprehensive audit trail, access control and privileges framework,
- Checks and reporting to monitor and measure performance,
- Automation and tracking of customer notifications,
- Enforcement of business rules and data validation to improve data quality and acceptance rates of requests,
- True HTML5 react client for enhanced user experience, including on mobile devices,
- Easy deployment, including to external parties, and
- Integrates with ADMSs to create switching schedules and monitor progress of the job within the ADMS

EDNAR fills a major gap in typical ADMS functionality by providing a widely accessible, enterprise view of planned network outages from early in the lifecycle of the planned outage to the final updates of the asset model in the GIS and ADMS.

The various opportunities for productivity improvements are illustrated in the graphic on the following page.

2 EDNAR PRODUCTIVITY BENEFITS

Full visibility of the Network Access Request (NAR) lifecycle across the enterprise



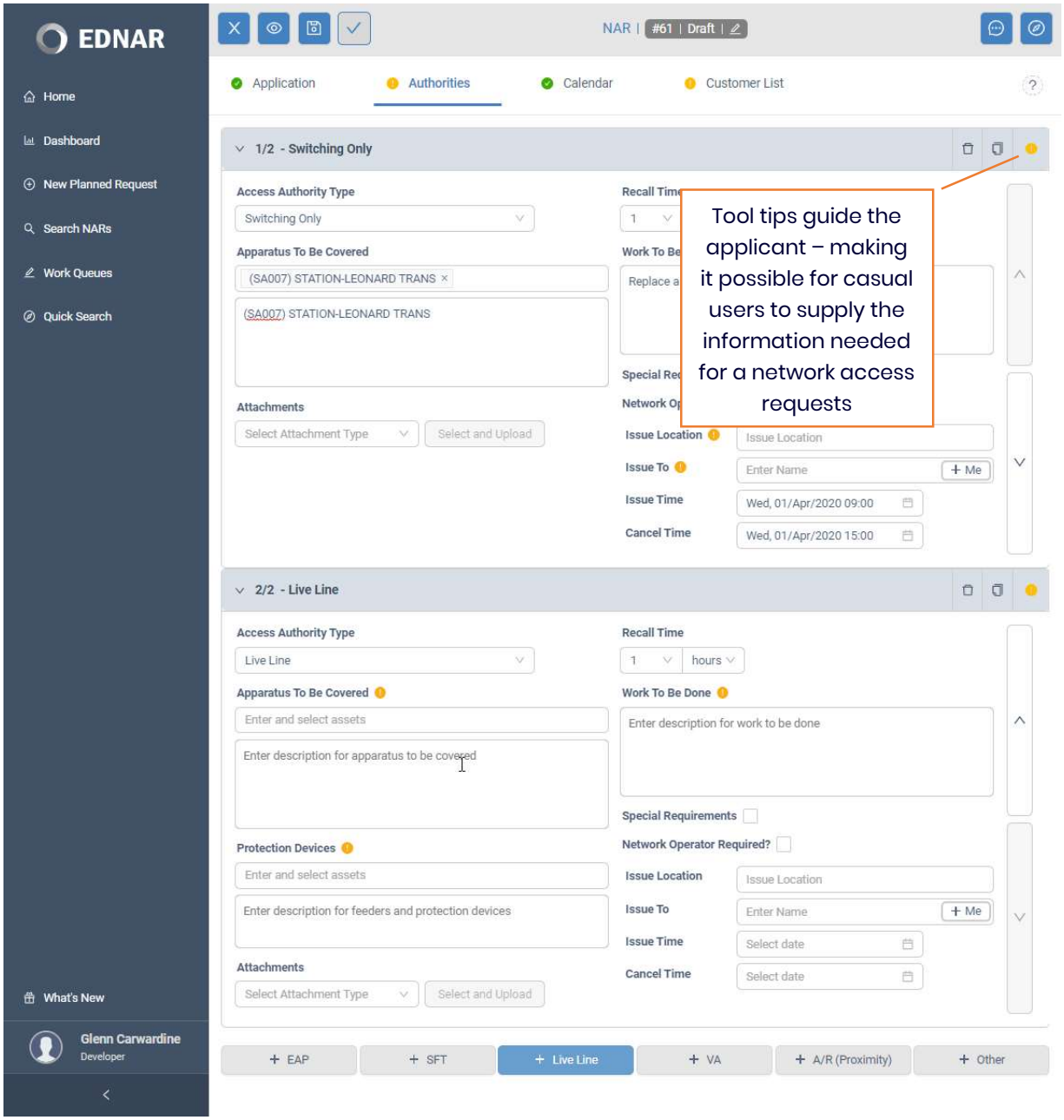
3 FEATURES OVERVIEW

The following brief description of the main features of EDNAR provides practical examples of how process improvements are achieved, and how the user interface works.

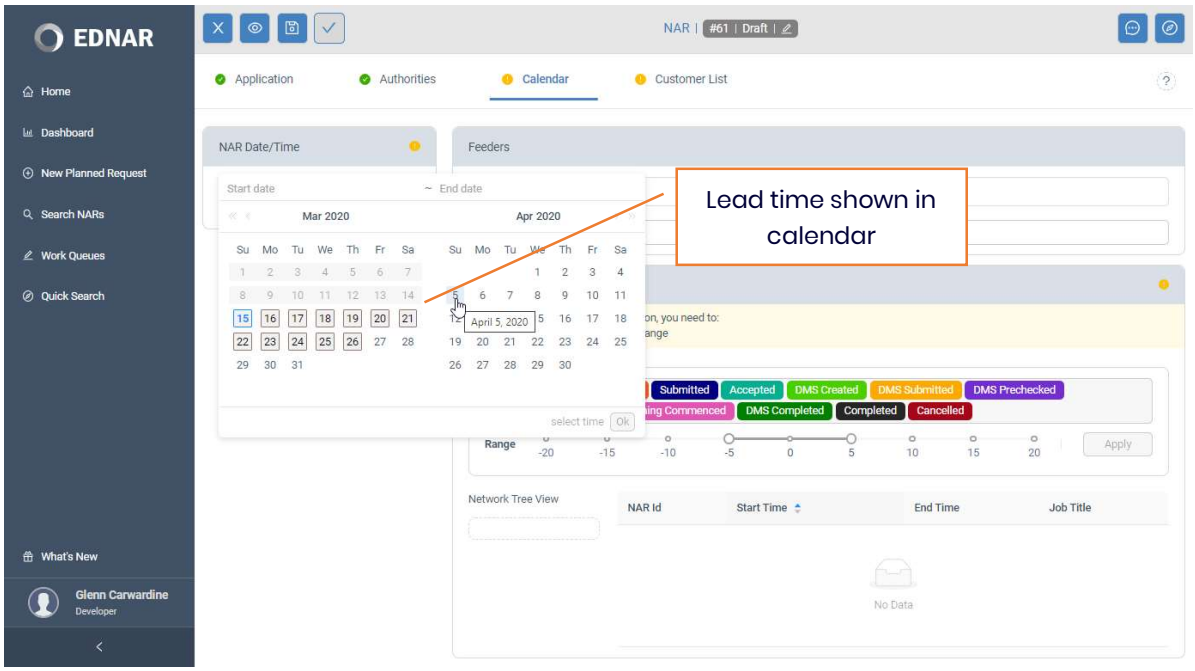
3.1 WIZARD FOR NETWORK ACCESS REQUEST

New network access requests are entered via a wizard that guides the applicant to provide all the information required, providing tool tips for guidance, validation of user inputs and hints about what additional information must be provided by the Applicant.

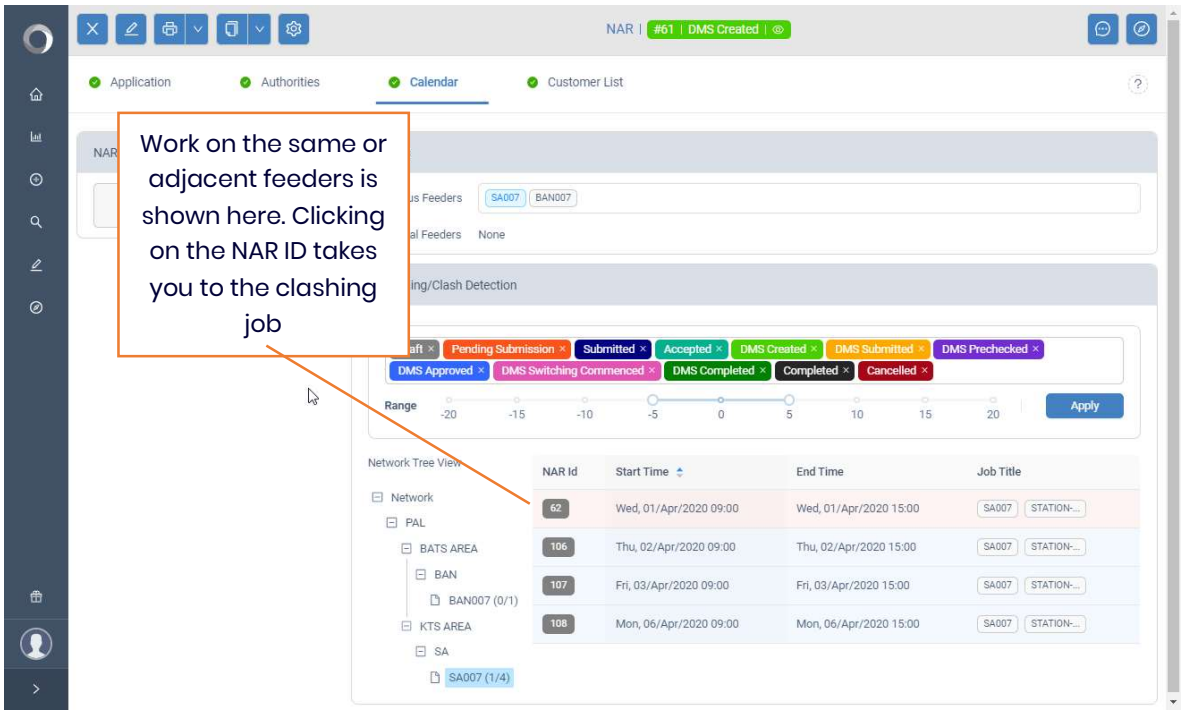
In the screenshot below, the yellow dots indicate missing information. Hovering over these provides tool tips about what needs to be entered. When all the dots turn green, the application is complete.



The screenshot below shows a calendar which allows the user to pick the date and time required for the outage. Different job types can be configured with different lead times, with the lead time shown in the date picker.



Clash detection is performed on this page as well to alert the user to any other jobs within the same time period on the same feeder, or adjacent feeders, as illustrated in the screen shot below.



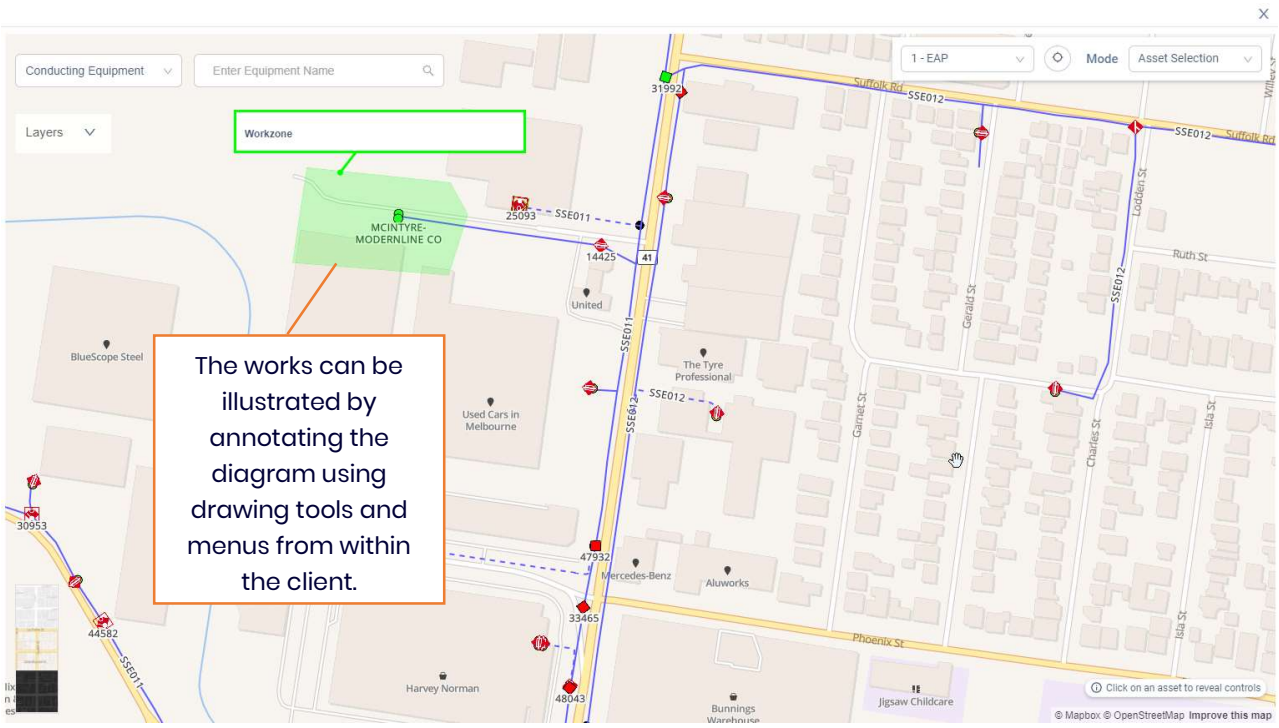
3.2 Map-Based Selection of Isolation Points

Map-based asset selection mechanisms can be optionally implemented. This allows users to select isolation points and apparatus to be covered from geo-spatial maps with asset overlays. Customer lists are generated based on selected isolation points, using the underlying HV asset model obtained from the GIS or ADMS.

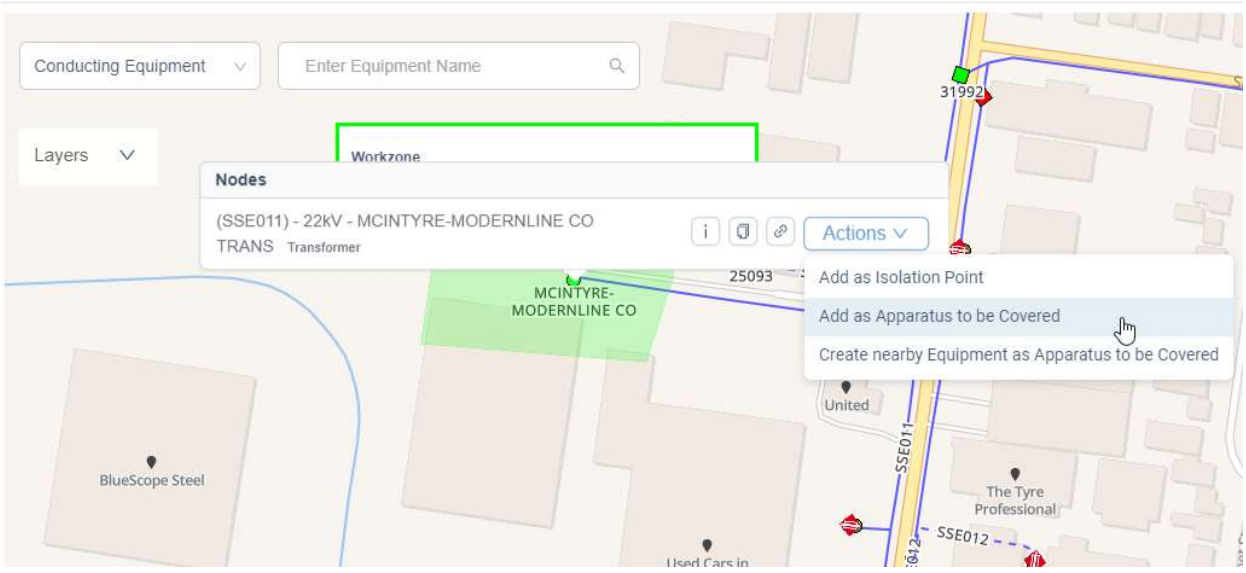
This allows customer lists to be generated very early in the application life cycle, providing opportunities for impacted customer reconnaissance to be performed at the same time as the outage is being contemplated for the first time, including on mobile devices in the field.

The maps can be annotated with shapes and text callouts to describe the outage, and any other relevant information, significantly reducing the need to upload separate attachments that describe the work to be done.

An example of map-based asset selection and annotations is provided on the following page.



Apparatus to be covered and isolation points can be added against the entire NAR, or against individual access permits for the NAR via menu items on the assets, as illustrated below.



3.3 SUPPORT FOR DIFFERENT NETWORK LEVELS

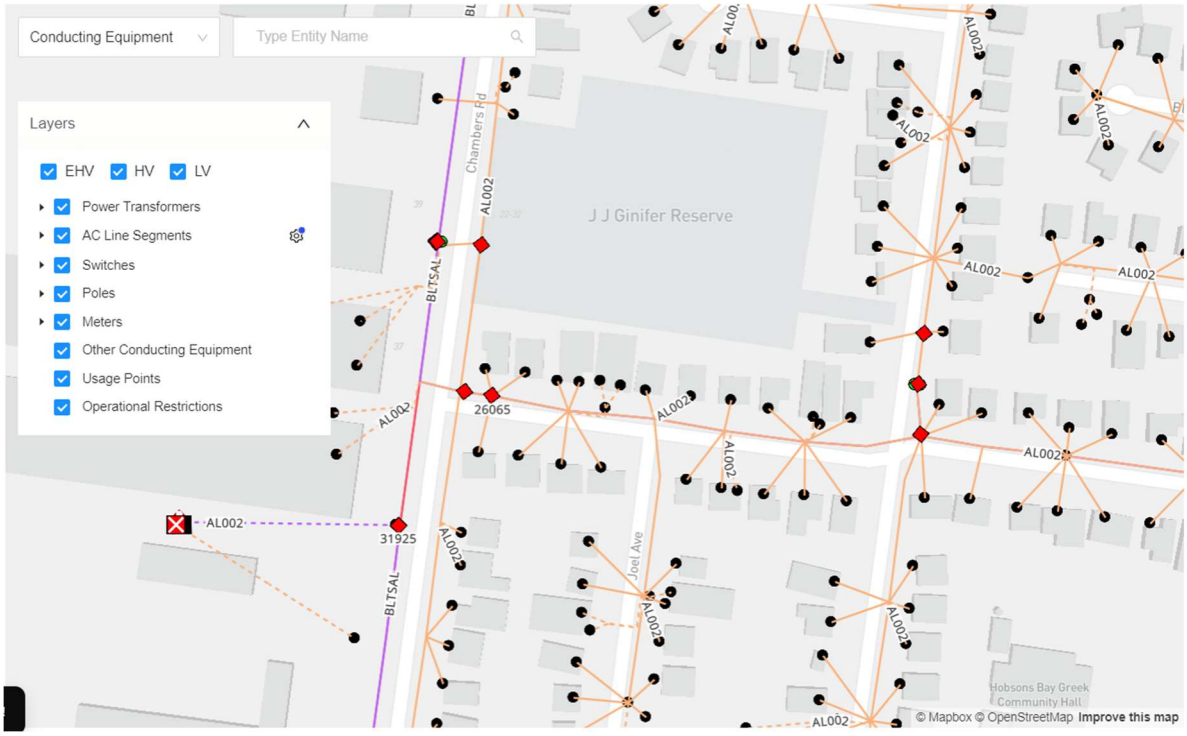
The application has been designed to work with or without LV and transmission level asset and topology models.

If the LV and transmission models are available, the assets will be rendered on the applications maps. The calculation of customers impacted by an outage is performed based on the selection of isolation points in the LV network.

The transmission network model supports advanced clash detection algorithms that will identify work occurring on transmission loops and at Zone Substations within a specified date range for new outage requests.

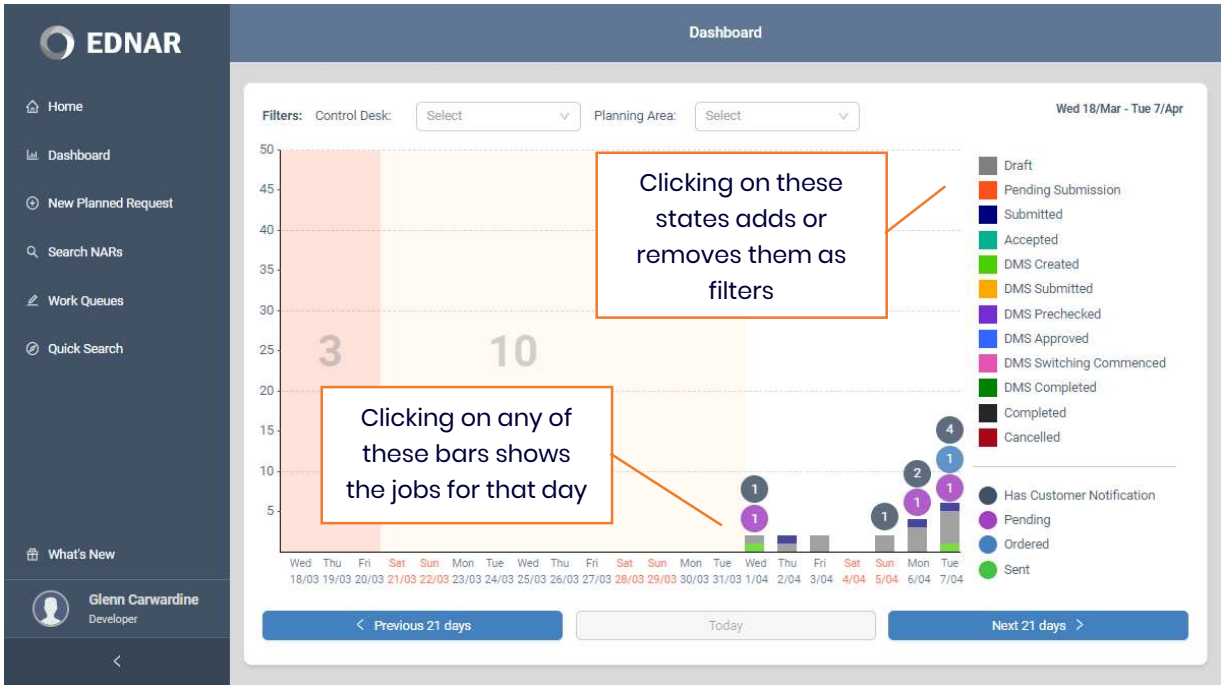
Poles can also be added to the asset model. These are displayed on the map and can be added as "apparatus to be covered".

In the screenshot below, a portion of the LV network is shown for an urban area, as it appears in the application, along with the filtering options for the various network layers and asset types.



3.4 DASHBOARD VIEW

The dashboard view provides an overview of the upcoming workload, in a 3-week window. Various filters can be turned on and off for different NAR statuses, and the individual jobs within each of the categories can be easily displayed by clicking on the relevant bar on the calendar.

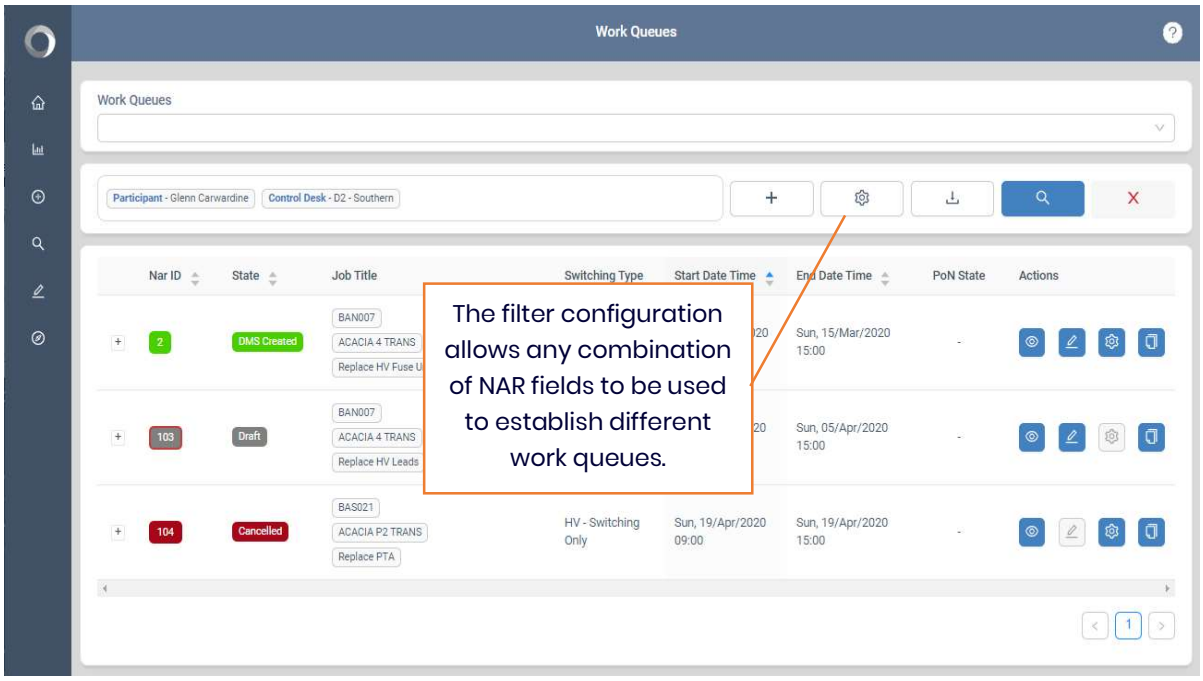


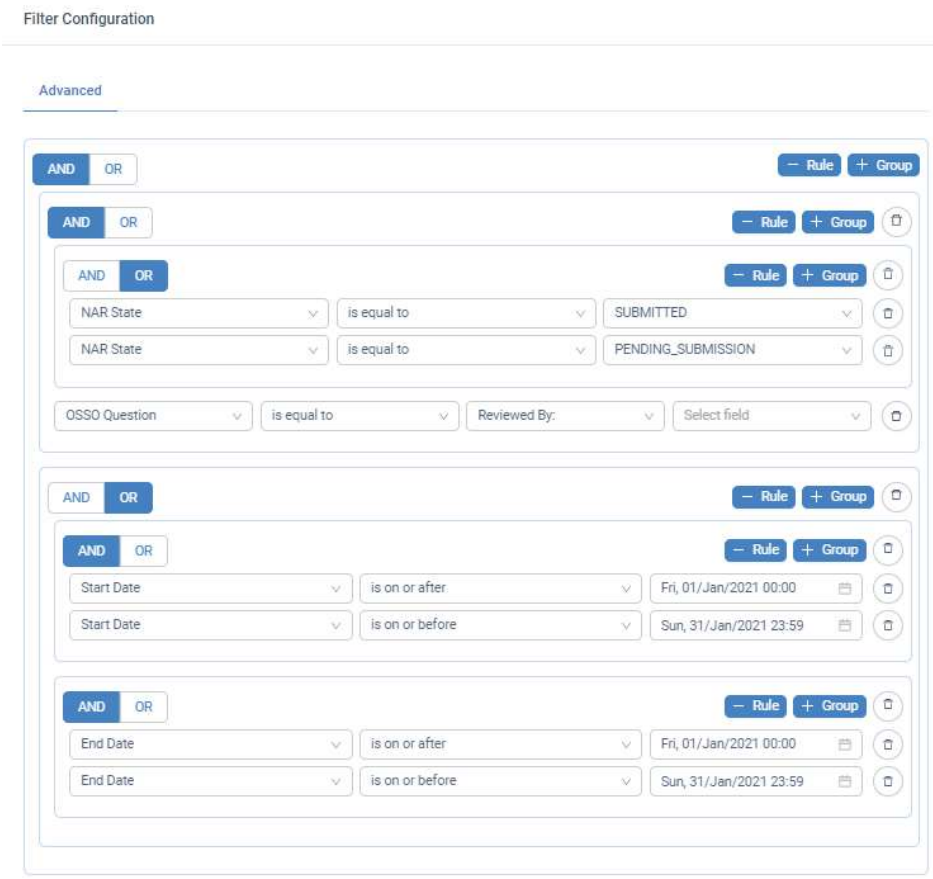
3.5 WORK QUEUES

Work queues allow users with different roles to set up filters for themselves to show only NAR's that are relevant to them. Administrators can also set up work group filters so that multiple people in a work group can see relevant NARs.

Combined with the email alerts that occur automatically when NARs transition between different states and the dashboard calendar view, the work queues provide an effective job tracking system.

Filtering on almost all fields in the NAR can be set up to define work queues, providing ultimate flexibility for setting up permanent or ad-hoc work pipelines.

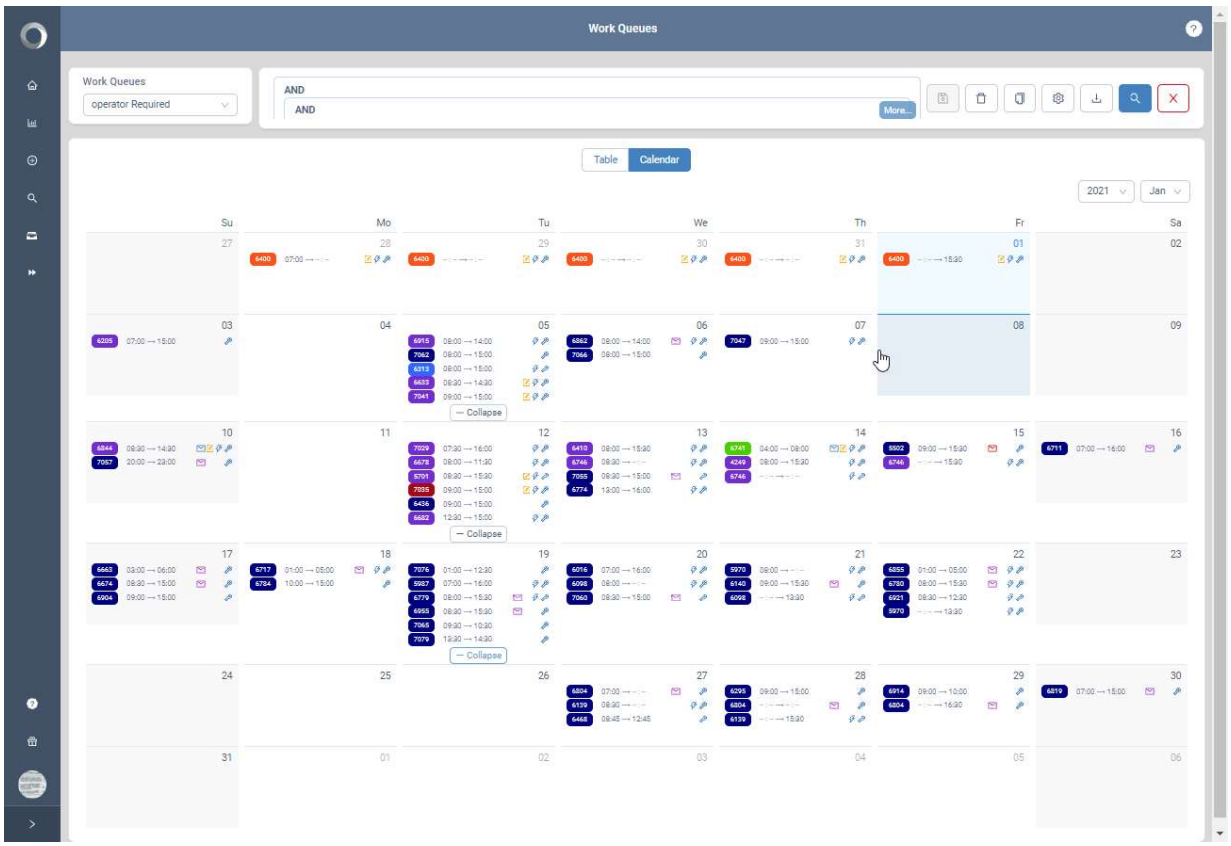




Complex logic can be used to specify what access requests are included in the work queues. An example of this is illustrated in the screenshot to the left.

3.6 CALENDAR PAGES

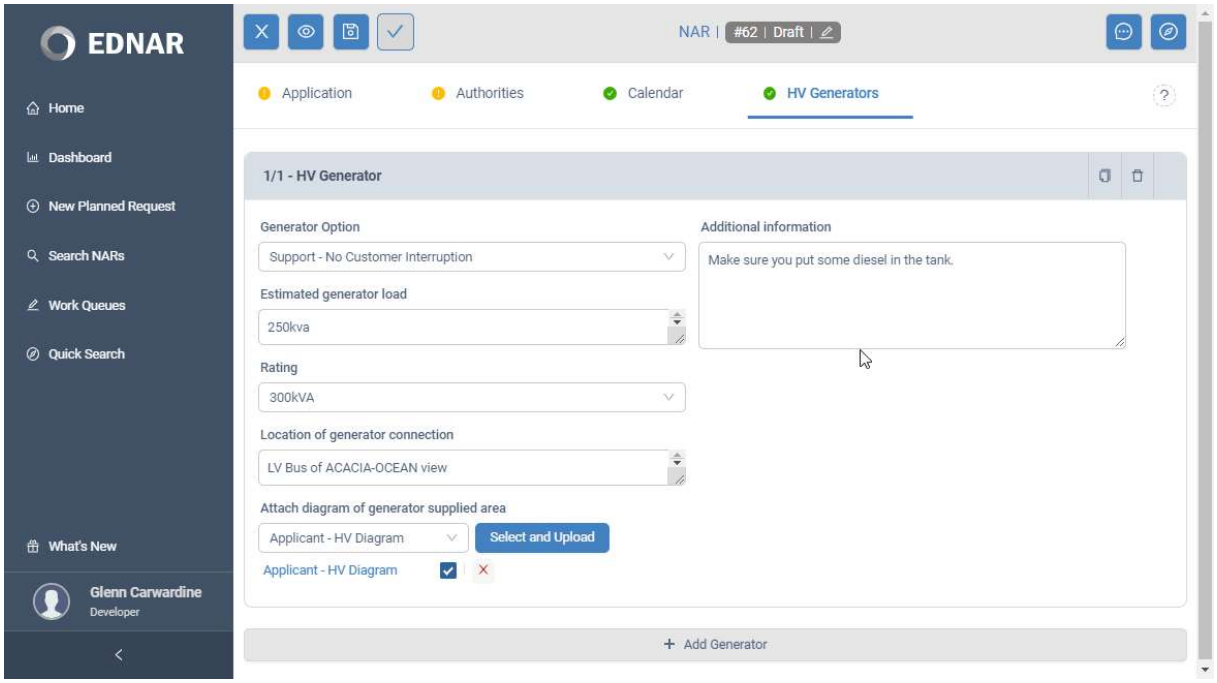
The work queues can also be shown in a calendar view, as illustrated in the screenshot below.



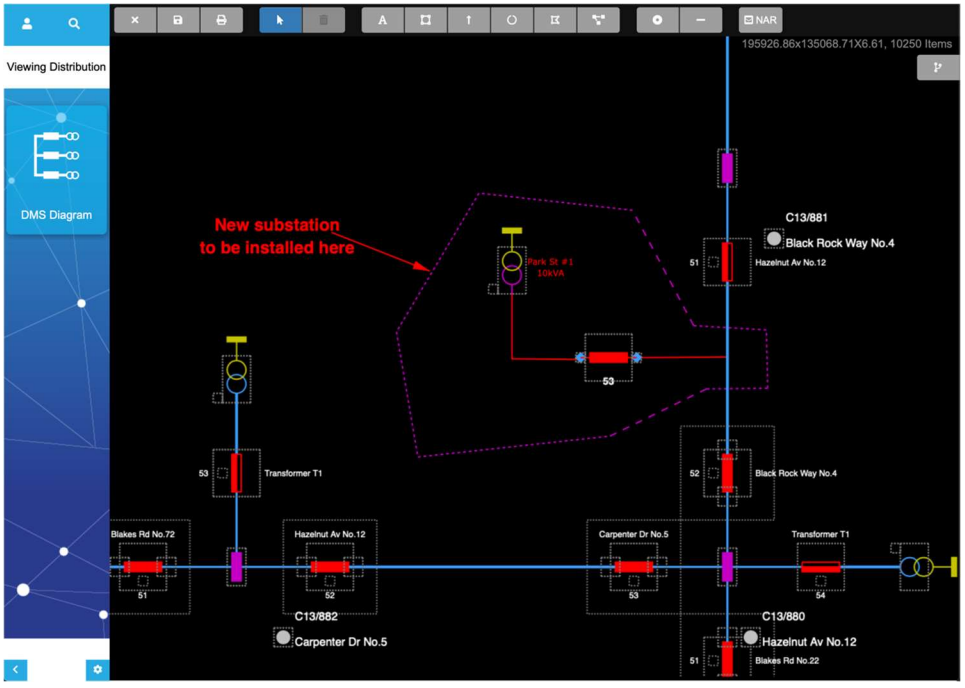
3.7 GENERATOR PAGES

The generator pages allow information about generators that may be needed to support the job to be captured. HV and LV generators are allowed for, as well as options for different types of interruptions, or no interruption.

As with all pick lists in EDNAR, the text is user configurable.



3.8 DMS DIAGRAM VIEWER



Zepben is collaborating with Synerty to provide an ADMS diagram viewer that is integrated with the EDNAR application, allowing applicants to select isolation points and annotate a schematic view of the network with proposed changes.

This annotated diagram is then available to all participants in the workflow.

This removes or significantly reduces the need for creating and uploading images of proposed mark-up drawings.

The ADMS diagram viewer looks identical to the schematics displayed in the ADMS, works natively in a browser and provides a real time view of SCADA and hand dressed values and states.

The DMS diagram viewer is one of Synerty's ***peek*** application modules. Zepben acts as an OEM supplier for the Synerty ADMS diagram viewer.

More information on the peek diagram viewer and the peek Mobility applications can be found on the Synerty web site:

https://www.synerty.com/

3.9 ATTACHMENTS

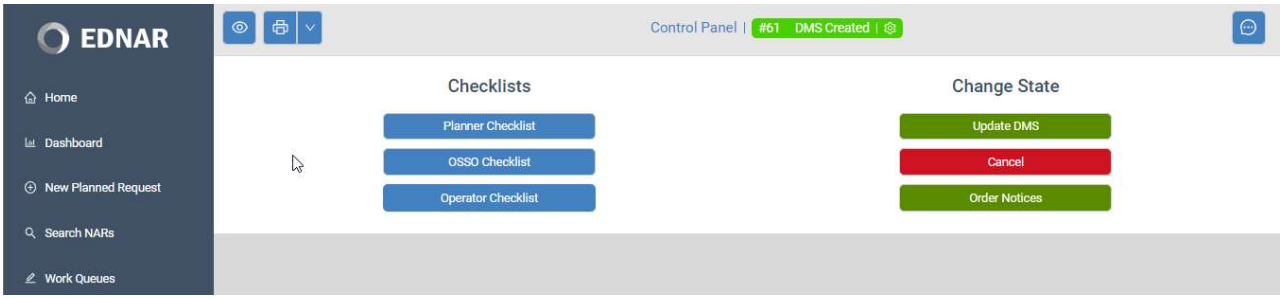
Attachments can be uploaded to EDNAR from a variety of locations within the overall workflow to capture information about the work to be done. The reporting function will render many of these attachments, such as .docx, excel spreadsheets, and .pptx files as PDF's into a consolidated PDF document, along with other information about the outage request.

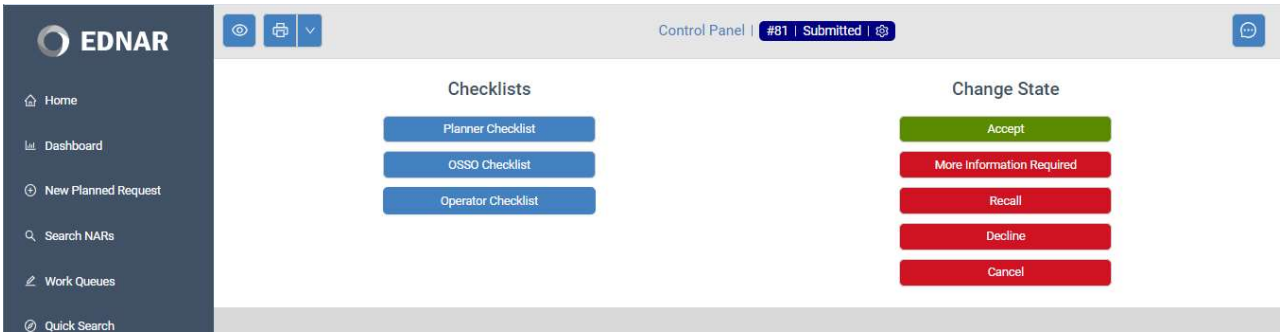
The attachments are persisted with the EDNAR database and can be readily accessed at any time in the future, contributing to the audit trail outcomes of the application.

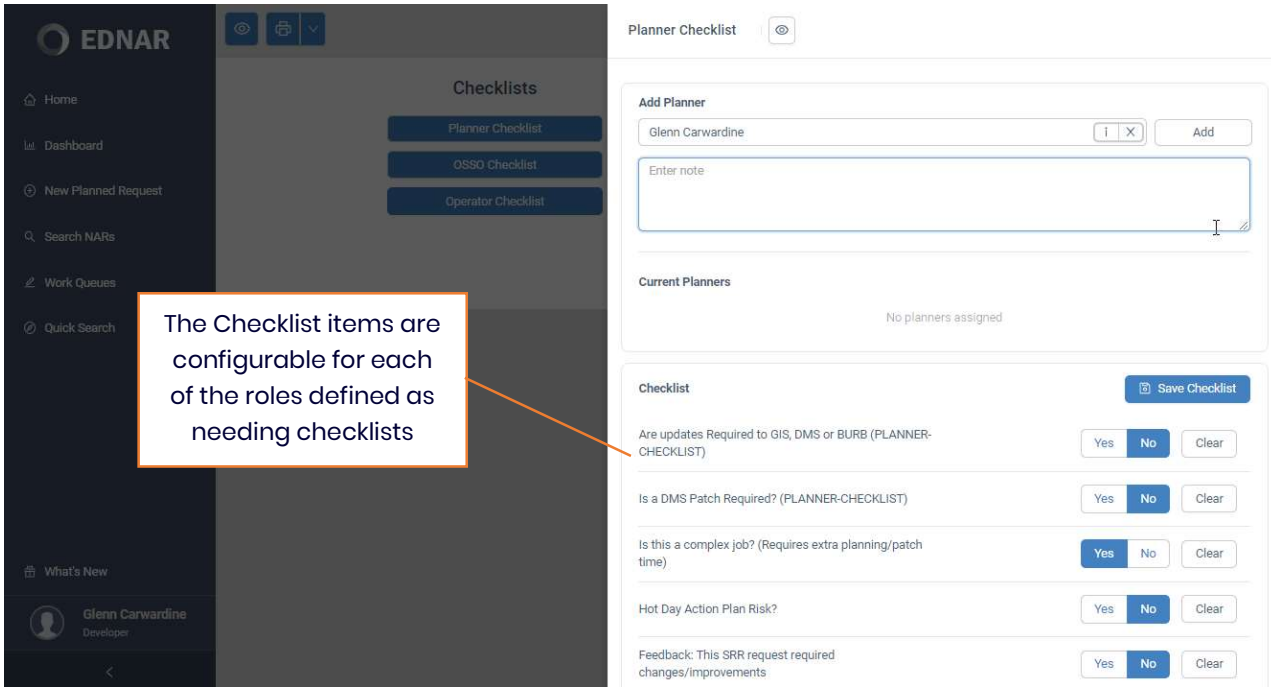
3.10 CHECKLISTS

Checklists are configurable and allow different participants in the workflow to both enter additional information about the outage request and confirm they have completed required activities.

The checklists are NAR status sensitive. The following screenshots show examples of the check list control panel and the types of questions that can be provided in the checklist.

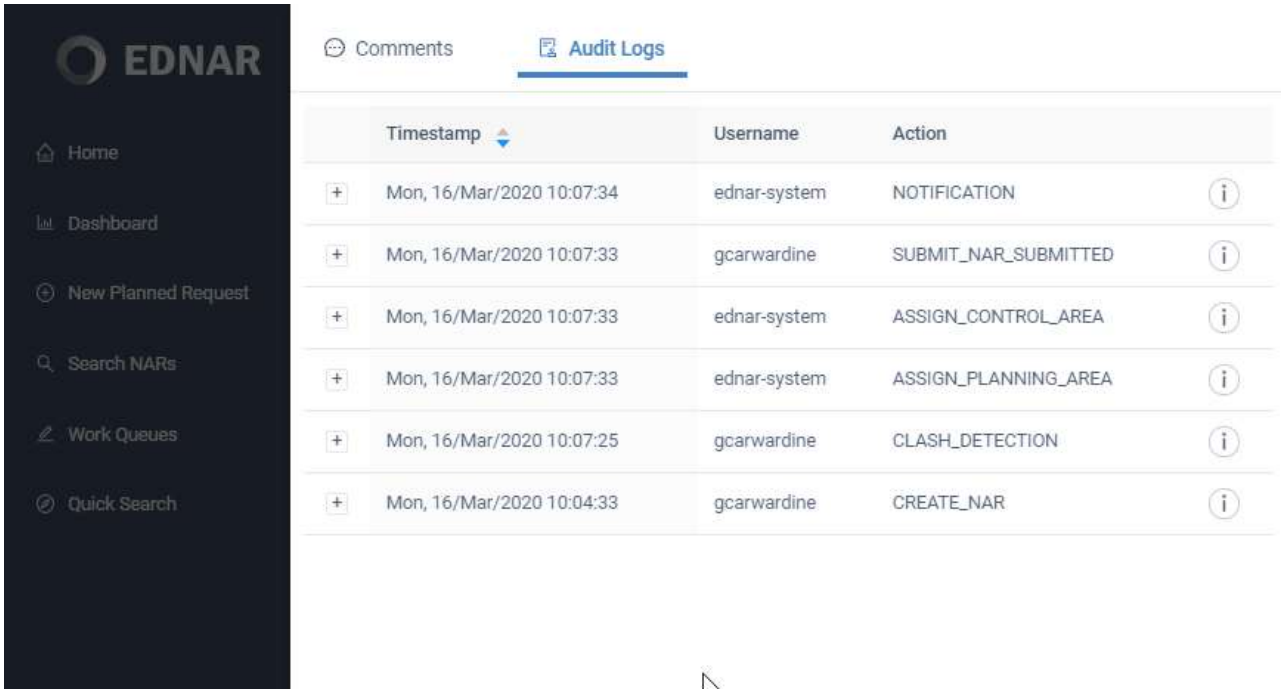






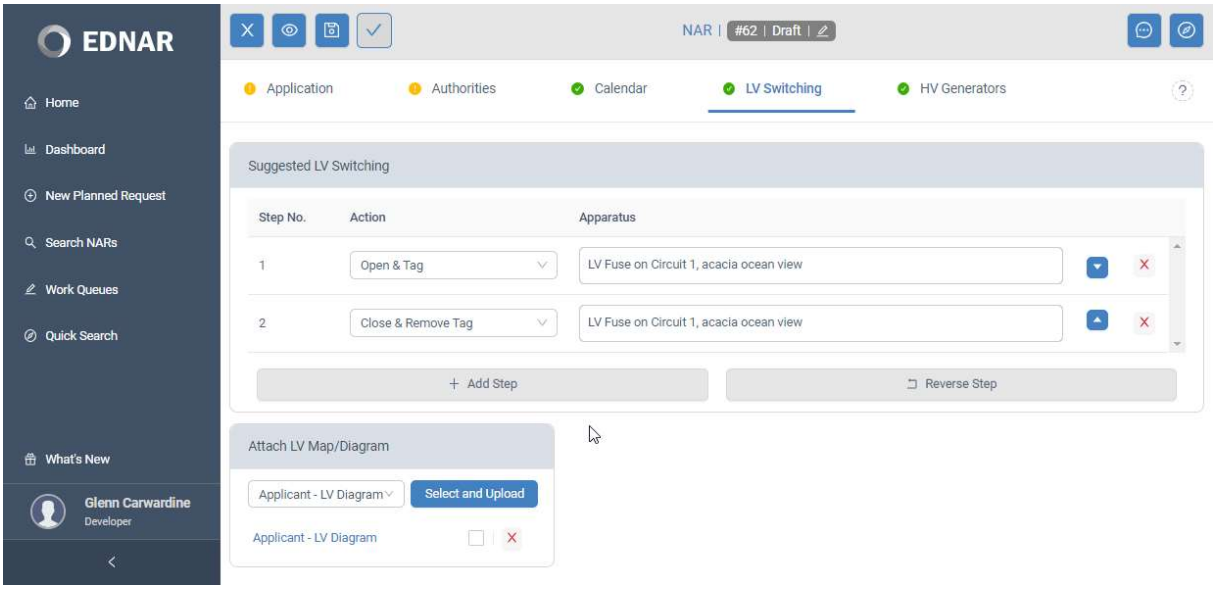
3.11 Audit Logs and Comments

EDNAR records all actions and state transitions for outage requests, as well as miscellaneous comments. Contextual information is stored against each audit trail entry. This provides a complete audit trail as a permanent record for all planned outages, as well as a source for reporting outcomes.



3.12 LV Switching Steps

EDNAR provides a simple switching writer that allows LV switching steps to be supplied by the outage applicant or planner. The actions can be user configured, and include reverse steps for the switching and the ability to attach a document if required to describe the work.



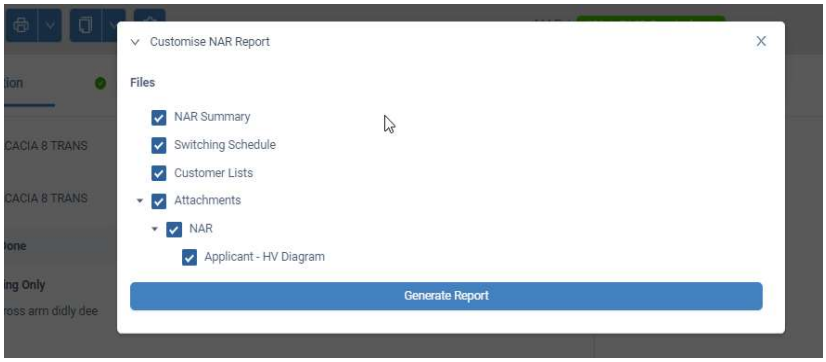
3.13 ADMS INTEGRATION

When integrated with the ADMS, EDNAR can create schedule headers automatically in the ADMS once the NAR is accepted by the control room or planned work group.

The ADMS integration also tracks the status of the NAR in the ADMS through its lifecycle, and updates fields in the NAR to indicate who has checked and approved the ADMS switching schedule as it is developed.

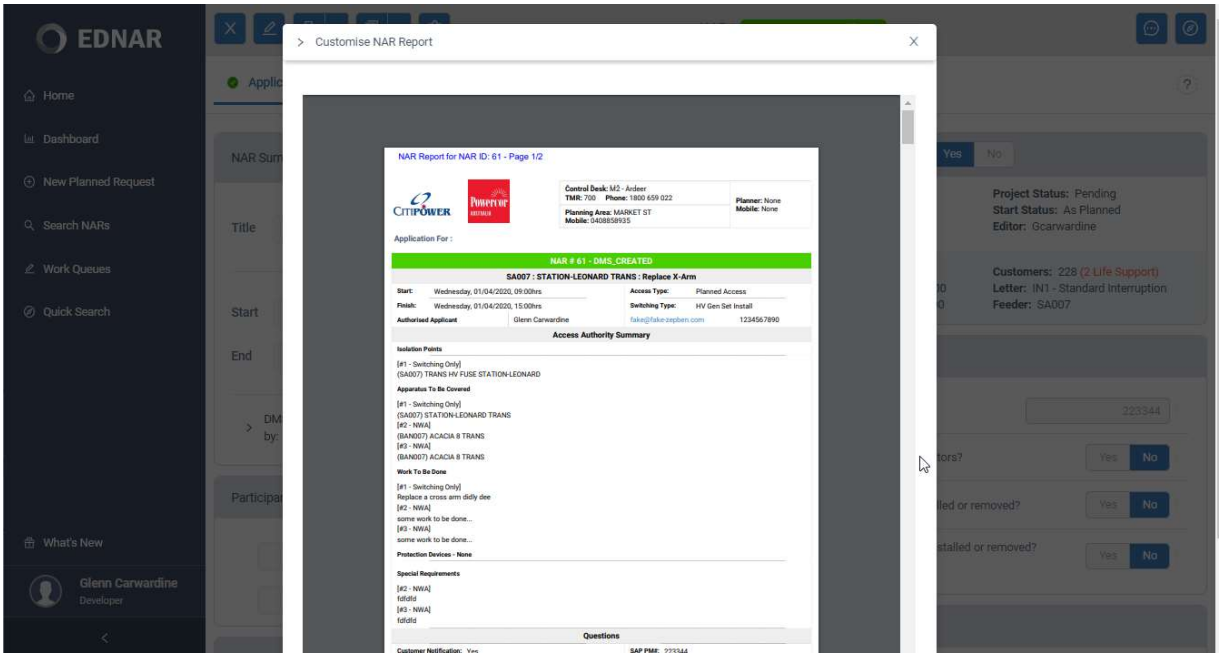
EDNAR also obtains operational restriction information from the ADMS, and displays this on the geo-spatial asset maps, providing early indications to applicants of potential limitations in isolation early in the outage request lifecycle, which reduces re-work later in the process.

3.14 SUMMARY REPORT



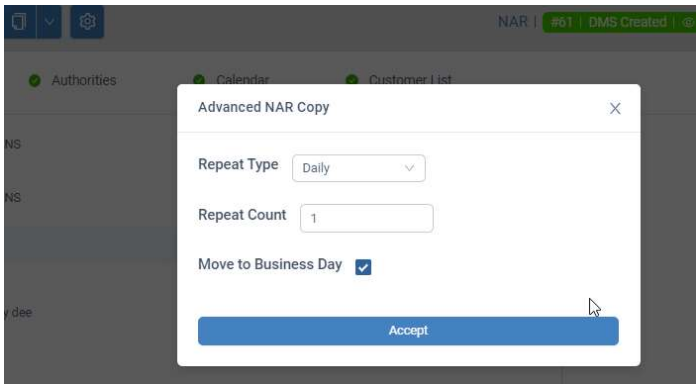
EDNAR allows a user to request a PDF report which shows summary information about the outage request, including information about the outage request presented as a report, customer lists and, if integrated with the ADMS, the ADMS job header and switching steps.

An example request summary report is provided in the screenshot below.



3.15 DUPLICATING NARS

Outage requests can be duplicated for multi day jobs, allowing the same access permits to be issues for two or more days, as illustrated in the screen shot to the right.



3.16 INTEGRATION WITH EMAIL AND SMS

All outage requests have a life cycle. Whenever an outage request transitions from one state to another in the life cycle, the system can be configured to send emails and SMS messages to applicants and interested parties. The format and content of the emails is user configurable. An example email is provided below.

SA007 : STATION-LEONARD TRANS : Replace X-Arm
From: Mon, 06/Apr/2020 09:00
To: Thu, 09/Apr/2020 15:00

NAR 112 has been SUBMITTED

SUBMITTED by: Glenn Carwardine
Email: fake@fake-zepben.com
Phone: 1234567890
Mobile: 1234567890

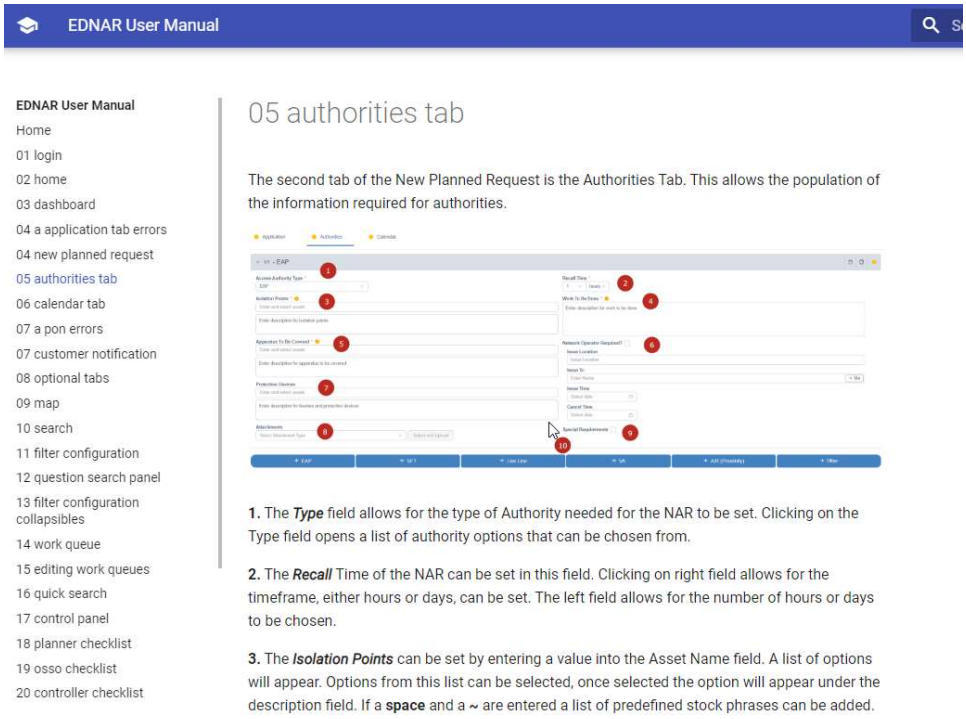
Glenn Carwardine, you are receiving this email because you have been assigned as an **Authorised Applicant** in this Network Access Request.
For any queries please contact the **MARKET ST** planning area.

View NAR: NAR 112
NAR PDF: NAR 112 PDF

CITIPOWER Powercor AUSTRALIA

This Email has been generated automatically.
Please do not reply to this email.
Emails sent to this address cannot be answered.

3.17 ONLINE HELP



EDNAR comes with a comprehensive online help system, as illustrated on the left.

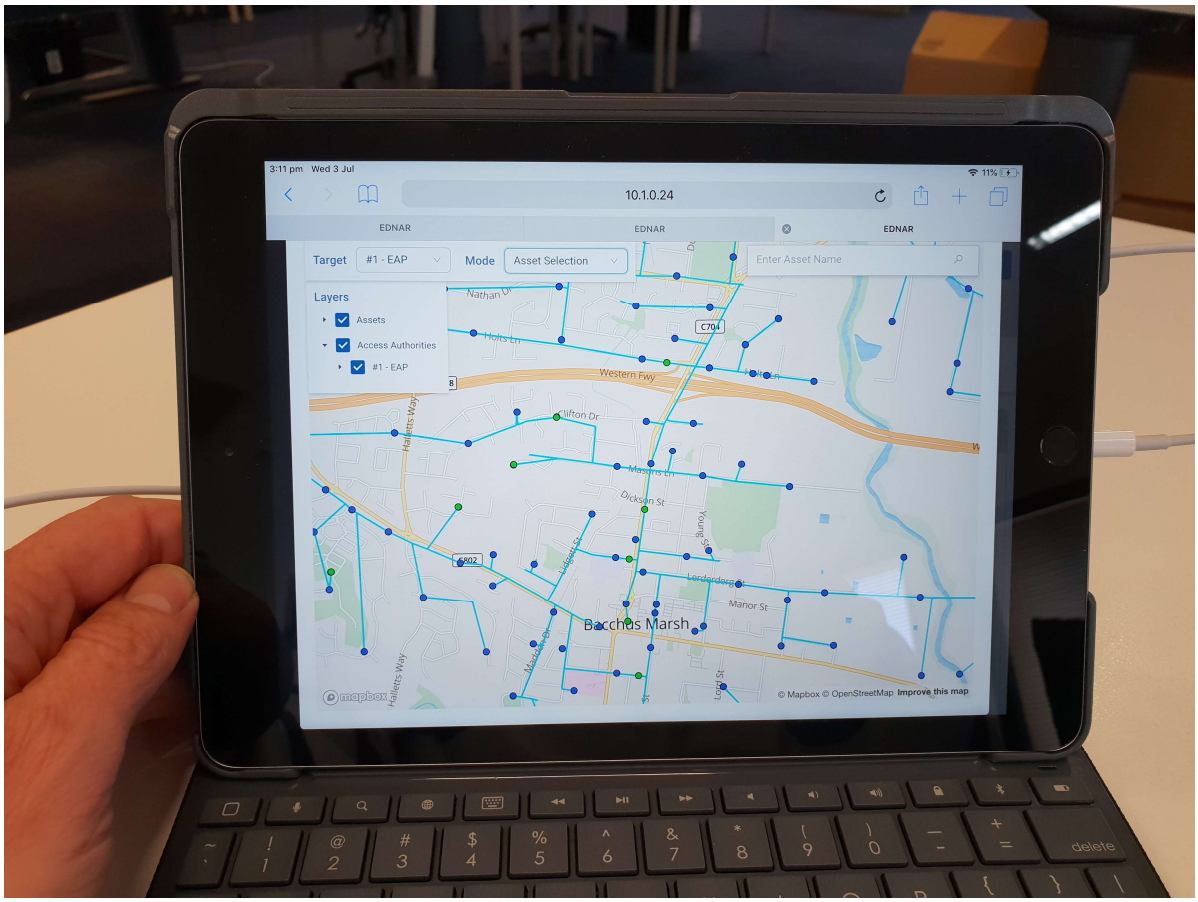
The source for this is provided with the software.

3.18 MOBILITY

Support for mobility has been built into EDNAR from the ground up, making it possible to perform many functions effectively on a mobile device, whether on iOS, Android or Windows tablet.

This is particularly important for early identification of isolation restrictions and customer list refinement while field operators are performing reconnaissance of a job site early in the NAR application life cycle.

With the Synerty peek application, both schematic and geo-spatial views of the network assets are available on mobile devices.



Support for tablet or large format mobile devices is provided.

3.19 LOCALISATION

The application has been written from the ground up to be easily localised. All text that appears in the application can be readily changed to support different languages, and different terminology between different organisations.

4 System Level Considerations

4.1 Server and Database Requirements

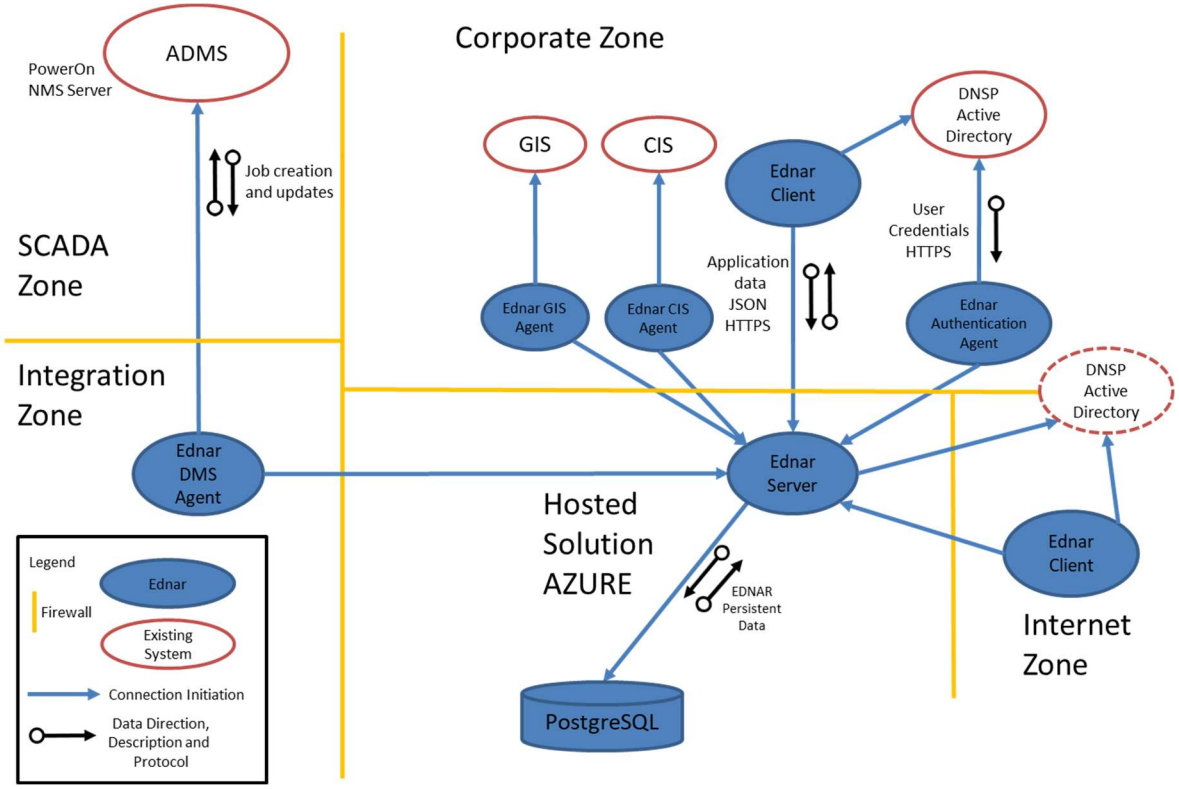
The EDNAR application consists of a main server written in Java, using a lightweight web services framework, making deployment very straightforward.

We support a number of database technologies, including Oracle, PostgreSQL and MS SQL Server.

The main application server can be hosted on-premise and managed by the internal IT team, or we can provide a hosted solution with defined service level agreements.

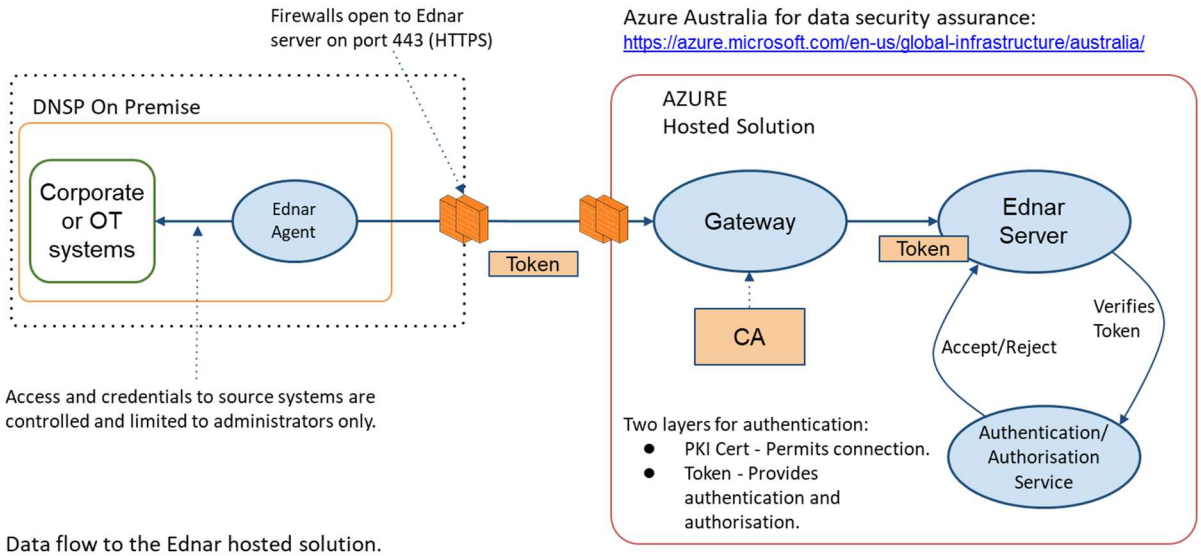
There are various integration agents that are deployed on-premise to provide integration with corporate systems. These agents are typically hosted in a DMZ and provide the means by which the main application server can be securely hosted in the cloud, while still having integrations with corporate systems, including operational technology such as the ADMS.

A typical architecture for a hosted solution with various integration points is provided in the diagram below. In this architecture, all adapters to corporate or OT systems initiate an outbound IP connection to the EDNAR server.



A two-layer authentication approach using both PKI certs and Tokens can be used for Agent access to the hosted server if needed.

More detail about how the Agents access the EDNAR server is provided in the diagram below.



Data flow to the Ednar hosted solution.

- PKI Cert and key configured on the agent to connect to our web server. Allows us to verify agent connections. Keys must not be distributed.
- Token - We will package the Agent with a token that we generate - the token identifies the agent and its role, which defines access to the Ednar Server.

To provide a single sign-on solution for both internal and external users, which authenticates against the corporate Active Directory (AD), the AD would need to be internet facing for external users.

Alternatively, Zepben could provide the user authentication service.

Zepben works with our customers to develop an appropriate security model for internal and public facing access to the EDNAR application.

4.2 Access from Multiple Devices

EDNAR has been designed for multiple devices including desktops, laptops, tablets, and smart phones. The functionality exposed via these devices may be different based on their use cases and will take into account the form factor of the device to optimise the user experience.

4.3 Application and Server Logs

Application logs are persisted in the database. Server logs are persisted on the web server. However, they can be stored in other locations if there is a need to do so.

4.4 Application and Database Redundancy

The EDNAR application server is stateless, meaning multiple web servers can be readily deployed to provide redundancy and load balancing.