

Optional middleware extension providing users/systems with topologic relationships network wide

Offering invaluable insight into network logic

Mapped network documentation provides the operator with a topographical overview of the network showing the locations of components and addresses, the lie of trenches and cables, etc. It does not however present the user with a logical representation of the network showing the interrelationships between components nor the relationships between network and subscribers. Such data is invaluable when analysing the repercussions of network modifications, outages, and in order to have a greater awareness of the status of network sections when considering upgrades, extensions, and evolution.

AND NISservice, a middleware extension, resolves this issue by providing users/systems with access to network-wide topologic relationships. It delivers AND with a comprehensive understanding of the network logic and the interrelationship between components in the network and associated addresses.

When a project is checked in AND NISservice analyses the project data and inserts the relevant information into the database. As a result, there is always an up-to-date network structure available for both hierarchical (e.g. PON and DOCSIS) as well as non-hierarchical (e.g. P2P) network architectures.

AND NISservice allows complex database queries by both internal and external tools to rapidly determine vital information about the network topology, its components, and all existing routes.

For example, the MDU count function, which makes use of AND's inherent understanding of the network logic, produces a tally of the number of apartments with a list of associated address serviced by any point in the network, e.g. amplifier, POP, etc.

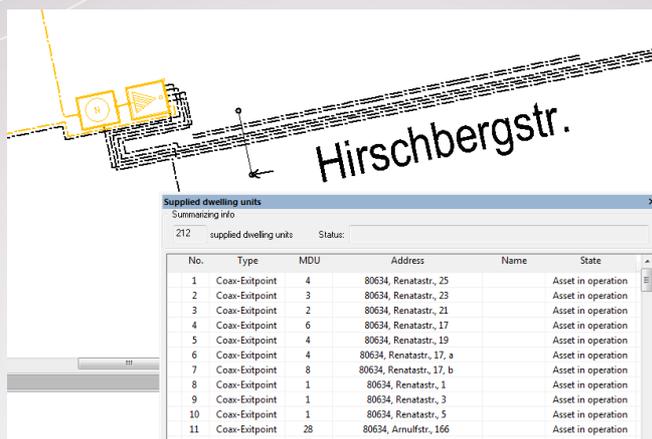


Figure 1: MDU count for amplifier; 212 homes served with addresses listed

NISservice via SOAP

AND NISservice can be used to interface to external applications such as provisioning tools where network logic is required. It offers access to data regarding nodes, cables, routes, and wires.

Powerful functions allow, for example, the retrieval of addresses pertaining to connected households for any network element.

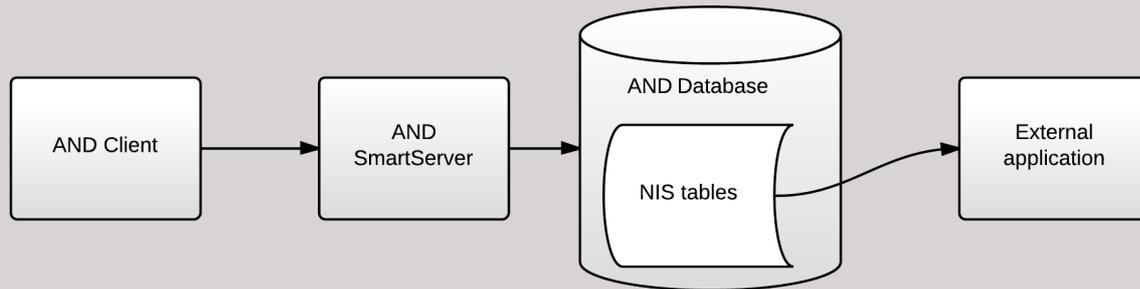


Figure 2: SOAP interface for AND NISservice

NIS queries in AND

NIS queries are executed via the *ExecuteNisQuery* SOAP command providing the user with a wide range of information:

- ID of the node corresponding to a supplied transponder ID or address ID
- ID of the wire corresponding to a supplied transponder ID
- ID of the node or cable corresponding to a supplied installation number
- Data for routes and their start and end nodes that pass through a given cable, wire, or node
- List of nodes and their addresses that are located at the start or end of routes passing through a given cable, wire, or node
- Number of free wires for a given cable
- All the elements of a route identified by a given ID
- Elements of all the routes that end at a node corresponding to a given address ID

Use Cases

In the following examples we will set out to show how AND NISservice can significantly aid and benefit daily operations.

Determining effort to add further ONTs

In this scenario we are going to assume it here are already customers connected in the apartment house and further parties have signed up. A check can be made to see if sufficient infrastructure is available to connect further ONTs. AND returns data, e.g. to the provisioning system, allowing for a corresponding evaluation of the status.

With the initial build completed the operator's goal will of course be to expand his network and bring new subscribers on board as fast as possible.

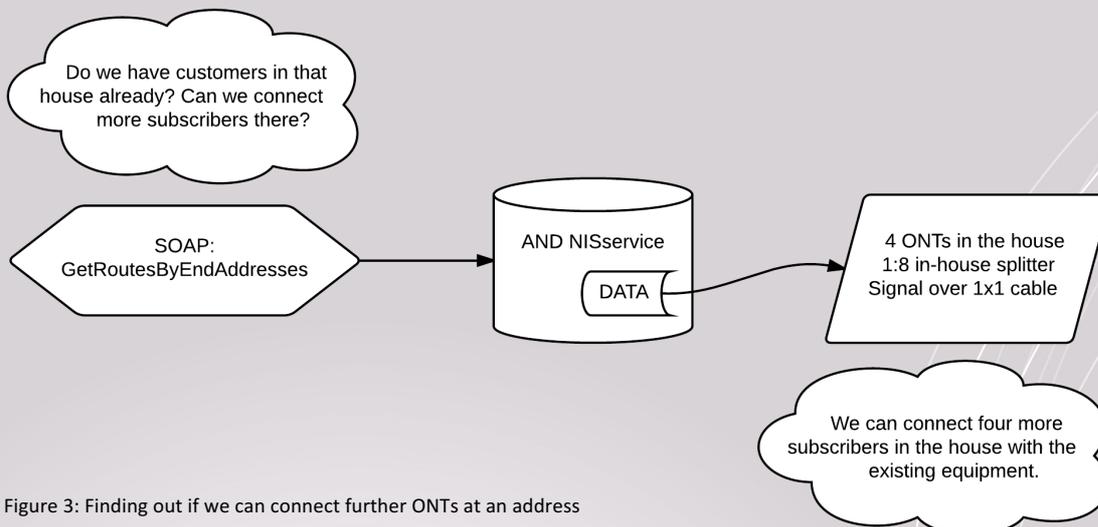


Figure 3: Finding out if we can connect further ONTs at an address

Determining addresses affected by component or fibre failure

If an important network component stops operating properly, e.g. amplifier, splitter, etc., or a cable is cut, this can then lead to an influx of customer complaints. The situation can be made dramatically worse if the customer desk is not in a position to correlate known outages with disgruntled customers. What's worse than a customer knowing about network issues than the operator?

Therefore, being able to immediately generate a list of addresses affected by an outage is of immense importance and benefit to customer help desk. Not only are they made aware of the subscribers presently without service but there is also a good chance they can proactively offer information regarding the outage, e.g. "We are sorry about the loss of service. There is a network issue in High Street, which is currently being addressed by our service team. We hope to resume service very shortly. Thank you for your patience."

In similar fashion, this type of data query can provide a timesaving benefit for a scheduled outage due to pending network maintenance work. This allows the operator to generate a corresponding mailing list, send out letters, or perhaps even broadcast a message on a local challenge.

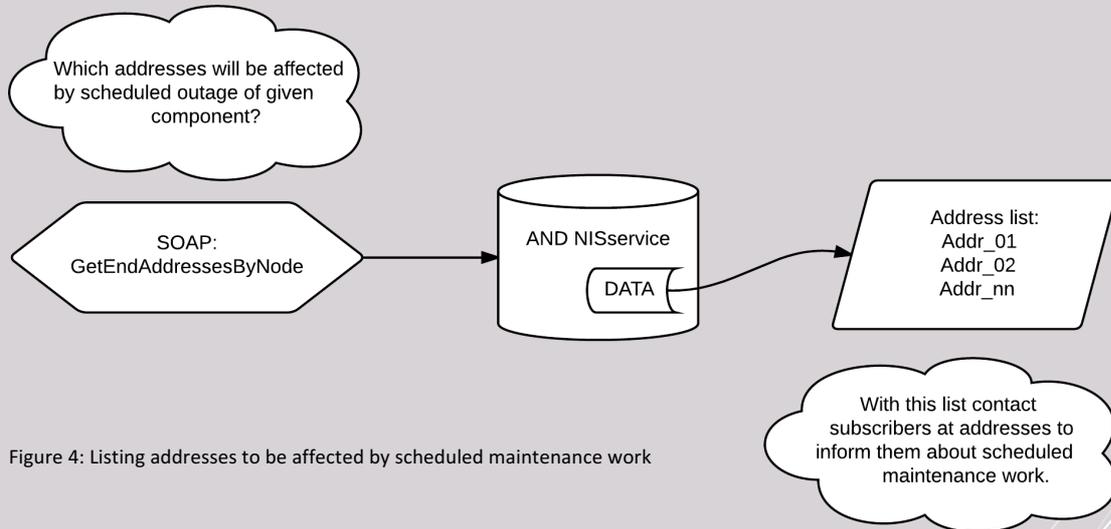


Figure 4: Listing addresses to be affected by scheduled maintenance work

Listing a cable's free fibres

Management of fibres is essential for the efficient operation of the network. Very quickly the overview of the network can be lost if the appropriate data is not readily available turning day-to-day operations into an administrative nightmare.

Sometimes it is a simple matter of trying to find out information about the number of free fibres for a given cable. Perhaps the operator wants to lease out fibres or perhaps a new housing development is being built and data is required with regards requirements for the network evolution.

With a list of the free fibres the operator gains valuable information about the current status of the network build and possible constraints. Decisions can be made regarding possible installation of further cables.

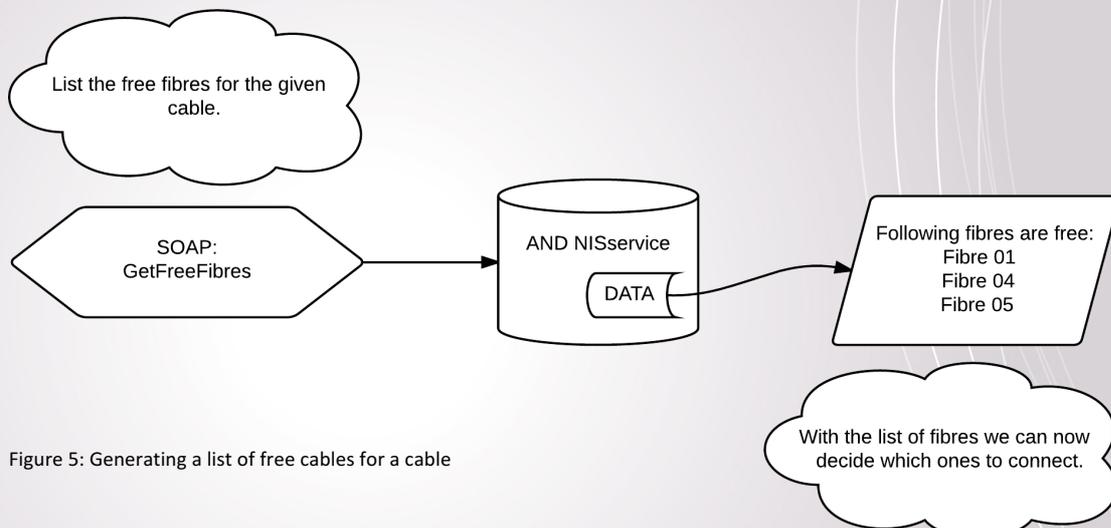


Figure 5: Generating a list of free cables for a cable

Querying the technical path for ONTs

AND can query any topological structure from any point in the network.

An interesting example from the FTTH perspective might be the querying of an ONT's technical path returning essential status data for a subscriber connection.

Here the technical path describes the path from a given ONT to the OLT listing components and, where applicable, ports used. The list of elements can be pre-configured so as only required components are reported. In each case the status of the element in the path is provided.

In addition, the ONT and OLT have customer-definable service states, independent of the aforementioned element states in the technical path.

Using address information it is possible to query the technical path from an external system, e.g. provisioning system, to check on the current status of the build.

To obtain the technical path, a stored procedure is called using the address ID as the key.

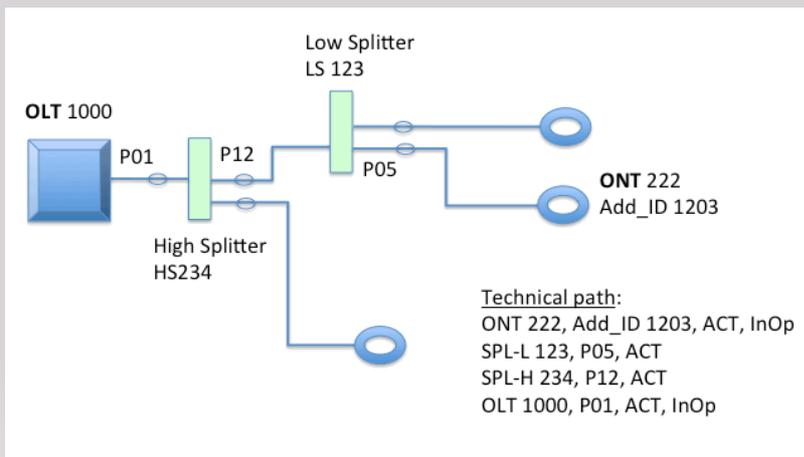


Figure 6: Technical path for ONT 222

Interfacing to monitoring solutions

One of the fastest ways to lose customers is not because of the cost charged for services but because of reliability – or to be more exact, the lack of reliability. Today’s customers expect their Internet, TV, and telephone to work 24/7, 365 days a year.

In an effort to prevent unnecessary churn, if there are network issues it is imperative to be aware about them and to resolve the matters as soon as possible. Otherwise there are nearly always alternative operators who will only be too happy to take on new subscribers.

Many operators deploy or plan to deploy monitoring solutions. However, in most cases these solutions can only report individual issues devoid of any relationship to other network issues. Correlating problems and identifying possible causes and locations can become a long-winded and tedious exercise for the NOC (network operations centre).

Some solutions require some basic network documentations resulting in the need to maintain a further data set as well as the main network documentation system. Should several monitoring systems be deployed, e.g. CPE and transponder based solutions, then this can get not only expensive but also messy.

NISservice provides the basis for the AND Alert option, which enables AND to easily interface to 3rd party monitoring solutions thereby considerably enhancing them.

Taking both topography and topology into consideration, AND Alert visualises real-time alarm and CPE states (used for alerting purposes) in a Web-view of the network documentation. Through its awareness of topology via NISservice AND is furthermore able to indicate the common point of failure.

This cuts out considerable effort evaluating problems on the network and allows staff to tackle problems immediately, perhaps even resolving them before the subscribers have realised that there is an issue.

For further information about AND Alert please also refer to the corresponding data sheet.

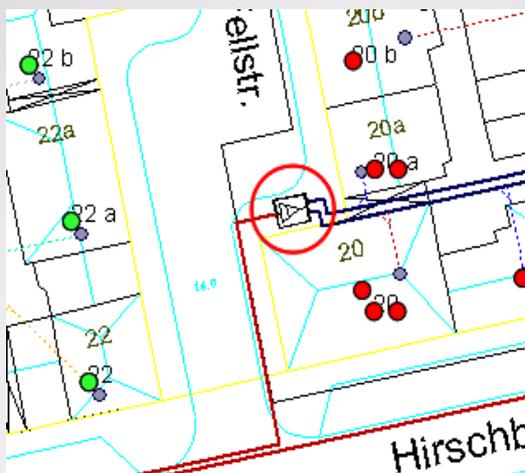


Figure 7: CPE states colour coded; amplifier ringed red showing common point of failure.