

NetVal is an OMS network validation application developed by Enspira. The application reads an entire network data model from the OMS database (and associated log files from the OMS model build folders). Using the network model NetVal performs various network tracing and validation tasks and generates customized validation reports. The application connects to an OMS Oracle database via the Oracle Call interface (OCI).

### Connectivity

The network tracing function detects and reports the following abnormal network connectivity conditions:

- **Cold** – Any branch (conductors, switches, and transformers) with de-energized phases.
- **Isolated** – Any branch with dead phases (cannot be traced to a source node).
- **Looped** – Any branch with looped phases (indeterminate flow direction from the same source). Meshed – Any branch with meshed (fed by two sources with different meshed group IDs).

Based on the total phases, traced states, and flow directions, Cold, Isolated, and Meshed conditions can be further classified as follows:

- **All Cold** – All phases are de-energized.
- **Partial Cold** – Some but not all phases are de-energized.
- **All Isolated** – All phases are isolated.
- **Degraded** – Some but not all phases are isolated.
- **Meshed** - Fed by two sources from opposite directions.
- **Parallel** - Fed by two sources from the same direction.

A branch may contain multiple conditions. NetVal detects and reports on all conditions encountered.

### Topology

The network tracing function checks the following topological features:

- **Boundary Object** – The tool checks among boundary objects such as source node (SRC), feeder ID (FID), meshed ID (MID), feeder boundary (FBD), and boundary node (BND) to ensure that feeders and substations are connected properly.
- **Location** – The tool checks partition boundaries for illegal overlapping, port to port connections of the connecting objects between partitions, zero-length conductors, and abnormal switch sizes.

### Key Benefits

The NetVal tool performs various checks on a network model enabling the user to identify and report on errors detected. The tool checks the following elements of the model:

- Connectivity
- Topology
- Model Build Validation
- Attributes

The tool can be used in various stages of the model build to detect issues as early as possible in the build process.

### Model Build Validation

NetVal performs the following post model build checks:

- **Duplicates** – Duplicated network objects (other than boundary nodes).
- **Model Edit Parameters** – Check for dynamic network class parameters to ensure that the Model Editor does not invalidate the normal model build process.
- **Partition and Patches** – Check for uncommitted or failed partitions and patches.

### Attributes

NetVal checks for following valid network attributes:

- **Symbology States** – check if any network class has its complete symbology states specified with valid symbology IDs.
- **Symbols** – Check if all specified Symbols exist and they are matched with the correct type of network classes
- **NCG** – check if the Network Component Groups (NCGs) are valid.
- **GIS Attributes** – check if the required GIS attributes have valid values and correct formats.

### Issue Tracking

NetVal provides following features to support issue tracking and management:

- **Database Hosting** – Validation results and issues are stored in a database and shared by all users. Users can load the issues from the database and save the updates back to the database.



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- **Issue Grouping** – NetVal automatically groups a set of objects related to a single issue. The lead object of each issue group is identified with clues/hints indicating the possible cause of the problem.
- **Object Navigation** – With a single button click, users can quickly navigate to the targeted network object in a GIS viewer or an OMS viewer. Users can also navigate/toggle quickly between the Group view and the detailed Segment view of the same object.
- **Work Assignment** – Administrators can assign issues to the model editors and set the priorities to the issues.
- **Status Tracking** – Users can enter the resolutions or comments and update the statuses.
- **Data Persistency** – User inputs and updates to the unresolved issues are persistently maintained.

### Reporting

NetVal produces various validation reports in Excel spreadsheet format. It utilizes the Excel spreadsheet sorting, filtering, and printing capabilities for easy data viewing. The following are some sample reports generated by NetVal:

- **Summary** – The summary report lists the statistics and counts of abnormal conditions by network classes.

CLASS	COLD	ISOLATED	LOOPED	MESHEID	AN
Conductor	1646	419	316	841	30097
Switch	1914	1340	32	129	79177
Transformer	159	143	0	157	7529
Feeder	1	0	0	0	503
Supply Node	162	106	0	0	7539
Network Node	3223	1021	0	0	37129
Ignored Group	147	29	4	3	993
Abnormal Group	339	289	11	3	642

- **Abnormal Groups** – A detailed report of groups of branches with abnormal conditions. Each group is identified with the lead object suggesting the probable source or top location where the abnormal conditions start.

- **Abnormal Segments** – A detailed report of all branch segments with abnormal conditions.

- **Special Report** – Customized reports of specific categories.

### Validation Process

NetVal can be used in different stages of the model build process.

- **Manual or Automated Process** – NetVal can be manually executed by individual users. It can also be configured as a script file (using its rich set of commands) and be invoked as an automated process.
- **Post-Model Build** – NetVal is used primarily after a model build. It loads the committed network data from the OMS database after the MB files are successfully loaded.
- **Pre-Model Build** – Occasionally NetVal may be used before a model build. It reads an MB file directly and conducts data validation to compare pre-build and post-build data quality. This is used primarily to validate that the model build process itself may have some issues.
- **Manual Data Correction and Validation** – NetVal reports contain suggested source or lead location of abnormal conditions. Based on the report, the MB files can be manually modified and then re-checked by NetVal to validate a specific data problem and a possible resolution.
- **Special Reports** – NetVal can be used to generate special reports.

NetVal can be utilized to detect some data problems and model build deficiencies that are not addressed by the extractor and pre-processor. It may include following know problems:

- **Map Dependency** – Dependency may exist among a set of maps where one object is moved from one map or circuit to another map or circuit. If the maps are loaded in a wrong order, a conflict may occur and an error may be flagged by the model build process.
- **Change in Map Name or ID** – When a map name or ID is changed, it is a manual process to remove and clean the old map completely from OMS database before a new map can be loaded to avoid model build process failure.
- **Multiple Port Connections** – When more than three branches are connected through a common port, the port references have to be made in a specific way in the MB file. Otherwise the model build process may not recognize the connection correctly.
- **Connection to Network Node** – Certain network nodes require specific connections for the model build process. For example, there can be no more than one downstream branch connected to a feeder ID node (FID or MID).

Contact Enspira Solutions for more information or to arrange a demonstration today!  
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