Vaisala MetMan™ Network Software

Comprehensive Data Management
Designing and Managing your Network

Vaisala MetMan™ Network Software has been designed to meet the immense and diverse demands for managing observation data of national meteorological and hydrological institutes, as well as those of other organizations with environmental monitoring needs.

The Software supports various measurement systems for meteorological and hydrological observations including advanced automatic stations and semi-automatic observation systems. Vaisala MetMan™ Network Software effectively utilizes the most recent advances in modern telecommunication and software technology. A feature that can make a huge difference to operation and maintenance costs as well as to the reliability, consistency and integrity of the measurement data.

Our business is based on a deep understanding of the requirements of your measurement needs and data management processes. We offer high quality innovative and cost-effective solutions, along with a full range of support services throughout the life cycle of your measurement network.

Whether you need to design a totally new observation network or decide to enlarge an existing measurement platform, our technical expertise and project management experience ensure smooth and efficient implementation of systems and networks of all sizes.

We are available for you locally in your own country, in almost any part of the world and are therefore able to support you just the way you want and whenever you need it.
Vaisala MetMan™ Network Software can be used for a wide range of application areas. The adaptable architecture of the software allows you to add specific software modules to tailor the software to meet the requirements of each application area exactly. The software can even be adapted to several networks covering synoptic, climatological, precipitation, radiometric and hydrometric applications at the same time and thus provide cost savings and greater operational efficiency in managing and maintaining your network.

**Meteorological Networks**

Synoptic observations networks form the base of National Meteorological Services around the world. Vaisala MetMan™ Network Software together with Vaisala HydroMet™ Automatic Weather Stations offer you a powerful platform for managing your synoptic observation networks. SYNOP messages can be created according to WMO recommendations. However, customized SYNOP messages according to national requirements are also possible with the software. Accurate measurements and timely scheduling are key features of all synoptic observations.

Meteorological messages can be created by the fully automatic weather stations. Alternatively the software can be used at your data center to collect raw observation data automatically, generate and spool messages for your GTS network.

There are more stringent requirements emerging for the meteorological observation networks, such as real-time observations due to the requirements for improved weather services. The MetMan™ Network Software is geared to meet these new requirements with its high transaction capacity and support for broadband telecommunication.

It also facilitates your transition to the BUFR/CREX coding specifications.

**Climatological weather observations** serve long-term scientific purposes and provide important data input for sophisticated weather models and climate change research. A key requirement for climatological observation systems is to provide continuous, homogenous and high quality measurement data over a long time period. Vaisala HydroMet™ Automatic Weather Stations and Vaisala MetMan™ Network Software with its robust and secure database, automatic quality control and extensive data and meta-data management capabilities support your processes to provide a reliable continuous climatological time series data output.

**Modern precipitation networks** need to produce real-time precipitation data. Using Vaisala Precipitation Measurement Systems together with Vaisala MetMan™ Network Software national precipitation measurements can be automated and modernized to meet this requirement.

**Hydrological Networks**

Hydrological Networks including ground water monitoring, surface water monitoring, dam and reservoir water management serve several applications for a large number of interest groups. Vaisala HydroMet™ Automatic stations together with the Vaisala MetMan™ Network Software enable automatic and continuous in-situ hydrometric measurements of water level, water flow and water quality.

**Other Observation Networks**

Vaisala MetMan™ Network Software has been implemented as a flexible data collection and management platform in the energy field to support several meteorological measurements e.g. for wind energy parks. Additionally, it has been used as an application for data management for different automation solutions.
Networking Solution Layers

**Web Based Application Modules**

**Reporting and Analysis**
- Report Generators
- GIS Analysis
- Real-time Displays
- Rain Analysis
- Climatological Analysis

**Network Management**
- Maintenance Plans & Reports
- Preventive Maintenance
- Repair Maintenance
- Documentation Storage
- Metadata Management

**Observation Data Management**

**Automated Functions**
- Data Distribution
- Message/Product Generation
- Database Import
- Quality Control
- Decoding
- Automatic/manual data acquisition

**Manual Functions**
- Data Distribution Control (TCP/IP, FTP, SMTP, HTML)
- Message Generation Plans (SYNOP, CLIMAT, BUFR)
- Message Monitoring
- Database Administration (Audit trail of all measurement values)
- Quality Control Plans (Internal, Temporal and Spatial Quality Checks)
- Data Acquisition Plans (Dial-up, GSM, GPRS, TCP/IP, FTP)
- System Monitoring

**Measurement Systems**
- Automatic Weather Stations
  - meteorological
  - hydrological
  - rainfall
  - mesoscale
  - others
  - coastal/maritime
- Upper-air Observations
- Wind Profiling Systems
- Lightning Detection
- Aviation Weather Observation Systems

**External Data Sources**
- Manual Data Entry
- Databases
- Satellite
- Radar

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Functionality

The functionality of the software ranges from simple data collection and storage to complex data management including quality control, tailored reporting, message management or data distribution. By using the Vaisala MetMan™ Network Software you can also manage your network resources and the metadata of observation networks.

Common platform
Software modules use a common platform that a common platform that binds together data storage, configuration applications, monitoring and analysis software and automatic services. The platform enables flexible integration of components into customer specific solutions. Standard interfaces make it possible to link external software modules to the system.

Configuration wizards
Applications are set up using a configuration tool that allows the user to set the control parameters for the system using simple windows views. Station selection, communication settings, scheduling of measurements as well as automatic time synchronization are easily selected from drop down lists or by tagging different alternatives. Software supports either active mode where the base server calls the stations or passive mode where stations send data automatically.

Data Collection Services
Vaisala MetMan™ Data Collection Services complies using a large number of communication protocols, which are common for all software applications. They involve everything from ordinary serial communication to TCP/IP, Dial-up modems, GSM, GPRS, SMS, Radio modems and different satellite communication options. In addition to standard data collection functions, the software can perform automatic retrieval of missing data from remote stations and synchronization of station clocks.

Data Management
Vaisala MetMan™ Data Management covers permanent data storage with quality control and automatic calculation routines. Depending on your needs, data can be stored in text files or in a relational database. The purpose of the quality control is to prevent invalid data from being used in other applications and to warn users about maintenance needs of the various stations. The quality control routines perform a set of checks that monitor missing data and consistency of measurements with regard to previous observations from the same and other stations.

Message Management
Message Management subsystem provides centralized generation of meteorological reports, including BUFR, FM-12 SYNOP and FM-71 CLIMAT, as well as a delivery service to send reports to preplanned destinations. Delivered reports can be either locally produced or received from external reporting subsystems. The reports can be based on data from one weather station only or, alternatively, the reports can be compiled as bulletins containing data from several stations.
Vaisala MetMan™ Network Software is the ideal choice for a small number of automatic weather stations or hydrological stations. It supports data collection from 1 to 10 stations. MM10 is a non-customized product provided on a CD. Installation and system integration is easy to perform by the user.

Vaisala MetMan™ Network Software MM100 is the next choice when the number of stations exceeds 10 but is less than 100. It is designed for data collection from automatic weather stations, hydrological stations, intelligent sensors or any kind of data loggers. MM100 consists of a configuration application, monitoring application and automatic data collection services. It can be delivered either as a standard product on a CD or as a customized package.

Vaisala MetMan™ Network Software MM400 is the ideal choice for managing data from a large network of observation systems. MM400 is run on a base server supported by one or more client workstations. Communication with the automatic stations can be done by using LAN/WAN, dial-up modems, or some other telecommunication device. MM400 can also be customized to support non-standard message formats. Final design and system integration is made according to the customer requirements.

Vaisala MetMan™ Network Software MM10 is the ideal choice for a small number of automatic weather stations or hydrological stations. It supports data collection from 1 to 10 stations. MM10 is a non-customized product provided on a CD. Installation and system integration is easy to perform by the user.

Vaisala MetMan™ Network Software MM100 is the next choice when the number of stations exceeds 10 but is less than 100. It is designed for data collection from automatic weather stations, hydrological stations, intelligent sensors or any kind of data loggers. MM100 consists of a configuration application, monitoring application and automatic data collection services. It can be delivered either as a standard product on a CD or as a customized package.

Vaisala MetMan™ Network Software MM400 is the ideal choice for managing data from a large network of observation systems. MM400 is run on a base server supported by one or more client workstations. Communication with the automatic stations can be done by using LAN/WAN, dial-up modems, or some other telecommunication device. MM400 can also be customized to support non-standard message formats. Final design and system integration is made according to the customer requirements.

Project specific customization may additionally involve modules for tailored meteorological message handling, data visualization using Geographical Information System (GIS) or dedicated data distribution using Global Telecommunication System (GTS).
Vaisala MetMan™ WebView is an application for generating reports and viewing data in several formats in a web browser. It is an optional software that can be used with MM10, MM100 or MM400.

Network Management

Network Management applications let users administer, modify and store metadata information about stations. This information includes data logger configuration file processing, station equipment descriptions, maintenance planning and instrument documentation. Terminal applications can be used to update station configurations. The maintenance planning and reporting sections help maintenance crews to react quickly to maintenance needs.
Finnish Meteorological Institute modernizes AWS data collection system using Vaisala MetMan™ Network Software MM400

Vaisala MetMan™ Network Software MM400 was taken into operative use at Finnish Meteorological Institute (FMI) in April 2004. The software controls data acquisition in the national observation network consisting of 193 weather stations.

Background
At FMI, the station network consists of 110 Vaisala HydroMet™ Data Collection and Processing System MILOS500 and some 30 MILOS200 stations for synoptic and climatological use, airports, radiation measurement and air quality stations. The stations have different types of operating configurations, modes of communications and data collection schedules.

Central station
The central station consists multiple servers and dial-up modems. Collected data is stored into Oracle 9i database that is running in high-availability cluster servers. Utilizing the existing hardware not only brought FMI cost savings but also guaranteed that there would be no problems due to mismatch between AWS modems and central station modems. Today, the system has a pool of 20 modems. In addition to dial-up modems, the system polls data from FTP servers and receives data files from different sources.

Operative use
The system runs 24 hours a day. At regular intervals, MM400 makes calls to the stations. It is possible to define the data collection intervals freely within the 24 hour cycle. Since most of the stations in the network use dial-up modems and connection times are relatively long (30..50 seconds), the system overall throughput can be increased by maximizing the number of dial-up modems at service. During a communications session, a station can be polled for one or more data messages. At the MM400 server, the messages are decoded and data values are stored in the database. The database forms an interface between MM400 and FMI’s real-time and climatological database systems, where all measurement data is automatically forwarded for postprocessing.

The operators can observe the data collection process from a MM400 application screen that displays stations currently being polled, calls queuing for free modems, state of communication ports and system events. The operators have the option of initiating manual polls to stations, either one at a time or to groups of stations. If a station is undergoing maintenance, operators may decide to remove it temporarily from the data collection. If an error is noticed (e.g. station does not reply or replies with an invalid message), the operators enter an error report into FMI’s error tracking system.

Support for current and future data formats
Besides FM-12 SYNOP, FMI has several different data message formats in use. Managing the message formats requires detailed planning. In particular, one has to take into account the possibility of being able to support new kinds message formats that have not been used before.

Designing for reliability
The system has been designed to have back-up functions at several levels for every contingency. The modem pools offer a natural aid against modem malfunction. Software watchdog protect against process failures. Should the server hardware fail, the a back-up server will be switched online.