Contrail Base Station

Total Control of Your Hydrometeorological Network Data and Information Distribution

Contrail Base Station is the visualization tool of choice when managing and controlling access to your hydrologic data is critical. Contrail supports the real-time data collection, processing, archiving and dissemination of your hydrometeorological and water resources data in one place.

**HIGHLIGHTS**

- On-premises enterprise edition of Contrail collects, validates and makes data available inside your organization
- Supports an unlimited number of users via a single or multiple web sites
- You control user access; expose your data as needed
- Makes available historical and real-time data
- View real-time and historical gauge-adjusted radar rainfall
- Access outside information such as USGS, HADS and METAR, as well as neighboring systems

**OPTIONAL**

- 24/7 system health monitoring
- Automated problem notification
- Data backup and recovery
- Redundant, replicated databases
- Remote troubleshooting and technical support
- On-line software upgrades

Contrail collects, validates, processes for alarming and notification, displays on maps, graphs and tables, archives, exports and disseminates hydrometeorological data and information, including gauge-adjusted radar rainfall and inundation maps. Encompassed are tools and reports for sensor management, rainfall and stream-related reporting, maintenance, and custom alarm and notification features. OneRain’s solutions enable management of and quick access to water-related emergency action plan content, links to any outside resources, webcam video feeds from difficult sites, and many other web-hosted tools.

**Makes Decision-Critical Support Data Highly Available**

Contrail is used for operational decision support and emergency operations, post-event analysis, model calibration and planning in flood early warning, dam safety and operations, stormwater and wastewater management.

The Contrail application is configurable to suit specific user needs, for multiple user groups and different types of users simultaneously. The user interface is a common web browser—all recent browsers are supported. Real-time data exchange with other applications is also web/http-based, making firewall issues less problematic when exchanging data among agencies. Contrail’s smart interface is adaptive and responsive with optimized performance for Web-enabled mobile devices.

**Scalable and Reliable Software Architecture**

Running on Linux™ and using a MySQL® database engine, a base station can receive data from any number of sources, sensors and sensor types, and serve any number of different uses. Most licensed server implementations operate at least two servers that are geographically separated, with automated real-time replication of the databases between the two providing redundancy. The database is not limited in size and can grow across multiple servers and disks. Contrail Base Station is the same software that runs behind OneRain’s reliable enterprise level SaaS solution, Contrail Web.
OneRain's mission is to provide industry leading solutions that empower our clients to perform their critical missions.

Multiple Data Exchange Options
Multiple formats are available for automated exchange of data with other systems. Contrail’s application programming interface (API) can enable many output data formats for use by other systems such as XML, Standard Hydrologic Exchange Format (SHEF), Hydstra, AQUARIUS, ASCII text, Excel. There’s also a standard data exchange interface that can be accessed by authorized processes using scripts (e.g., Python, Perl, Java, VB.NET, etc.) on other platforms that wish to retrieve data from or offer data to Contrail.

Contrail includes Data Collectors and Data Agents. Data Collectors receive real-time ALERT, ALERT2™, satellite, cellular and TCP/IP data. Data Agents actively retrieve, automatically and periodically, web-resident data sources such as USGS, NWIS, METAR, HADS, TIDES, RiWS and other sites of interest.

Easily Configurable for Diverse Users
An agency operating a base station can configure one Contrail to meet the needs of many and different users. Multiple web sites are easily created and supported, each with its own branding, logos, content, user accounts, maps, alarms and views of data. Any data view can be for authorized users only, presented to the public, or instantiated as one of each. Within each web site, different user privileges control who sees what. For example, perhaps one web site is for tracking wastewater pump station activities and flow meters along with rainfall from multiple sources including gauge-adjusted radar rainfall; another serves dam operators with dam-related information including inflow, lake levels, gate positions, power production and generator operations, and/or dam safety parameters such as seismic and internal water pressure information; yet another one serves staff who have water quality responsibilities with rainfall, water temperature, dissolved O2, pH, turbidity and other data points.

Powerful Data Analysis and Reporting Tools
There are numerous reports and reporting tools available of interest to (1) people interested in rainfall and hydrology events (Contrail Analytics reports), and (2) people tasked with maintaining and operating real-time monitoring networks (Contrail Analytics and also Contrail Inventory Plus). Custom reports can be created either by OneRain or by qualified agency staff. These reports can be run as needed.

Contrail Analytics - Suite of Integrated Data-Analysis Tools
Contrail Analytics provides a comprehensive toolset that helps you quickly analyze complex Contrail data sets, identity and highlight trends and changes, and gain true insight into the performance of your hydromet sensor network. It reduces mountains of data into simple visual displays and presents complex information in easy to analyze visual charts and graphics. It provides bulk event and time-series exporting.

Both static and pan-and-zoom maps are supported for data display. Flood warning implementations may include inundation maps that are user controlled layers on the map display. High-resolution, custom maps clearly define sensors and their status. Point and click drill-down to sensor data. At the site or sensor level, Webcam and web video data can be linked into Contrail by authorized administrative users with bookmarks and tailored supporting content.

Real-Time Displays and Post-Event Reports
Contrail real-time displays and post-event reports characterize rainfall and its consequences for its users. For example, the Rainfall Summary table shows rain gauge totals in real time for gauges that can be grouped by area/basin. The Water Level Summary table shows water levels in real time with respect to channel bottom, flood alert level, flood level and historic record levels. Rainfall Intensity reports using Contrail Analytics can summarize, grouped by basin or region and individually as gauges, the recurrence probability of a rainfall event over different durations (e.g., 5-year 1-hour rainfall, 5-year 24-hour rainfall, etc.).

Multigraphs and Hyetographs
Multigraphs showing stream flow or levels together with hyetographs from nearby rain gauges can be user-created and bookmarked for repeated use. Any graph in use (can be multiple ones in new windows) will update with new data according to the base station’s configured refresh rate (e.g., once a minute). Graphical displays can also show various alarm and historical thresholds.

Build Custom Definable Alarms and Delivery Notifications
Create user definable rules for alarms to notify via text messages and e-mail. Contrail provides a powerful Boolean equation tool set for identifying conditions of interest. Writing equations in the Alarm rule functions are at your fingertips. Administrators can create customized rules to trigger an alarm for any sensor or group of sensors within your program. You can have different messages delivered to different people all from the same triggered event—send a short mobile-text message to your on-call staff, send a longer descriptive email to managers, including action plans, send a message to a different department, or send no messages at all; the icons still change color and the Alarm Manager still maintains your event history.

Contrail Inventory Plus - Centralized Web-based Asset Tracking & Maintenance
Knowing the equipment model and all the relevant information associated with a gauge sensor—it’s geographical map location, configuration, firmware, cables, spare parts, repair and maintenance records, etc., can be invaluable to your field maintenance operations. Contrail Inventory supports mobile data collection for your field service technicians and engineers to track and manage inventory in the field, create Work Orders for maintenance management, and updates back to the centralized database.

Contact Us
For more information about OneRain’s Contrail software, visit onerain.com or call 1-800-758-RAIN (7246) or 303-774-2033. We’re happy to arrange a demonstration and show real life examples of Contrail in action.
Contrail® Base Station Features

- Enterprise software application deployed on your organization's network for Intranet / Internet browser-based access for both Users and Administrators
- Responsive and Adaptive design for optimal use across a wide range of devices such as desktops, laptops, tablets, mobile phones
- Unlimited number of Users with role-based privileges and security settings
- Onsite Mission Critical Base Station
- Local / On-Site Data
- Web Content Management
- Web Styling and Branding - customizable theme colors and logo
- Public website(s)
- Highly scalable, Linux®-based server running a MySQL enterprise database
- Read Only Server Option
- Redundant Server Replication
- Multi-Client (first 5 client Web sites)
- Administrator Managed Database Backups
- Custom Configured Data Services
- Custom Defined Cache and Refresh Controls
- Reload Metadata - Sync Configuration
- Data Collectors / Control: Serial or TCP/IP Connection options, Two-way ALERT (Flasher and Repeater Control), ALERT2™, StormLink™ Cellular, StormLink IP (logging / queuing), StormLink Satellite, RWIS / NTCIP, Modbus®, Custom Collector Programming
- Data Agents / Data Exchange: DIAvisor™, USGS, METAR, HADS, CDEC, LRGS / GOES, NOAA Tides, RAWs, Rigid (EVENTS), Wonderware, Campbell Scientific, ORBCOMM, GoData, Custom Data Agent, SHEF .A, SHEF .E, Tabular, XML, Hydstra...
- Unlimited Sensors
- Unlimited Online Data File and Image Management
- Advanced Alarm Management: Boolean / Expert Equation toolset
- Flexible Alarm Delivery Notifications: Contacts and Groups management for user definable alarms notify via pager, cell phone, and e-mail
- Value to text translations - define translation tables to map numeric values to text strings for Contrail data display. Useful for intrusion sensors on doors, float switches, road way sensors
- Online Reports: standard built-in reports and custom online reports
- Map View: Static and Pan-and-Zoom
- Rain Gauge Display
- Graphing: real time graphs that keep data on the graphs current with new data. Graphs auto refresh automatically at timed intervals. Easy to use Date Range buttons. Style thresholds with different lines, colors, and markers.
- Bookmarks: save links to your favorite graphs or any other Contrail web pages for easy access in the future
- File Export / Sensor Data Export (MS Excel / CSV)
- Data Editing (with audit trail)
- Data Revalidation (with audit trail)
- Services: scheduled reports via email, database backups, Data Exchange API
- Contrail Inventory plus: Field maintenance operations and inventory management
- Contrail TDMA Manager: ALERT/ALERT2™ network design and provisioning

System Requirements

- CPU: Dual Core 2.0 GHz
- RAM: 2 Gb DDR-2
- Optical Drive: 14x IDE CD-ROM
- Data Storage: 80 Gb
- Operating System: CentOS 6, or Red Hat® Enterprise Linux® (RHEL) 6
- Incoming Network Ports: Some open network ports are required as follows:
  - 80  Web Access to Contrail Web on the server
  - 8080  Contrail Data Exchange interface
  - 8181  Contrail Inventory application
  - 3306  MySQL access
  - 22  Default ssh port (sometimes moved to an off port for security)
  - 60001 - 60010  Reserved for Stormlink IP (logging queuing ALERT data collection)
  - 60011 - 60020  Reserved for ALERT2 (feed from decoder to base station, usually via a serial to IP conversion)
  - 60021 - 60030  Reserved for ALERT data collection (usually via a serial to IP converter)
  - 60031 - 60040  Reserved
  - 60041 - 60050  Reserved for StormLink cellular data collection
  - 60051 - 60060  Reserved for StormLink Satellite (IDP) collection
  - 60061 - 60070  Reserved for ALERT two-way service
- Outgoing Network Ports: Outgoing ports to support data feeds and software updates:
  - 25  SMTP (Simple Mail Transfer Protocol). Required for Contrail to send emails and text messages from alarms. Also used to send reports and notifications of system events.
  - 80 and 8080  Allows data agents to bring in data like USGS, METAR, or FFG
  - IP Outgoing Access / 443: Required for software updates: Redhat (or CentOS), and FFG (handled by allowing IP outgoing access to specific IP or ranges of IP addresses)
- Supported Web Browsers: Microsoft Internet Explorer, Mozilla Firefox, Apple Safari, or Google Chrome (latest versions).
- Note: OneRain does not test or certify Contrail Base Station to run on specific virtualization solutions.

Experts measuring rainfall and its consequences™
Contrail®

Flexible Deployment Options to Manage All of Your Hydrometeorologic Data in One Place

More and more organizations are realizing the benefits of combining on-site and hosted Contrail software deployment options. With Contrail, you have three flexible options. Whether to host your own solution on-site, we host it for you (or combination of both), or choosing our software-as-a-service option, OneRain’s team of experts will help you assess which deployment solution achieves the highest availability and resiliency for your mission-critical operations. It’s good to have options.

Highly Scalable Enterprise Software
Contrail supports the data collection, processing, archiving and dissemination of water resources data collected from your own local ALERT/ALERT2™ gauge sensor network together with federal and state agency data sources such as USGS, METAR, Tides, HADS, RAWS, RWIS, satellite and many other platforms. No matter which solution you choose, only a standard web browser is needed on the user’s end to have secure access to real-time and historical data via their desktop or mobile device.

OneRain’s Contrail software is designed to be a highly scalable enterprise level software solution. At its core are the advanced alarm equations and delivery notification capabilities. Contrail provides simultaneous functionality, management, administration, and services to a large number of users no matter where they are.

DEPLOYMENT OPTIONS

- **Contrail Base Station**—licensed Contrail enterprise software that runs on-premise on your own server(s).
- **Contrail Server**—a OneRain-hosted client-dedicated cloud computing server resource for Contrail.
- **Contrail Web**—the software as a service (SaaS) shared resource edition of Contrail.

SEE OVER ▶▶▶
Understanding Contrail® Deployment Options

Contrail Base Station—you license our Contrail enterprise software and run the application on your own server(s). Includes Contrail Analytics and Contrail Inventory Plus, and enables you to collect as many data sources and create as many web site views as you require to meet all your users’ needs.

Contrail Server—a OneRain-hosted and managed cloud-computing server resource running the full version of Contrail Base Station software for you in our secure industrial data center. Contrail Server delivers the full feature set of licensed Contrail Base Station (includes Contrail Analytics and Contrail Inventory Plus). A fixed annual subscription cost allows you to extend and load it with as many data sources, web views, custom reports, etc., as you require.

Contrail Web—the software as a service (SaaS) edition of Contrail in which we offer you a slot in our multi-tenant enterprise and you administer it for your users. Unlike Contrail Base Station and Contrail Server, Contrail Web operates in a shared resource environment. This is a monthly "pay as you go" subscription model to add more web views and sensor data sources.

Features

**Contrail Base Station**
- Web Accessible Software
- Mobile Access (smartphone, tablet, …)
- Web Styling and Custom Branding
- Web Content Management
- File and Image Management
- Bookmarks
- On-site Mission Critical Database
- Hosted Service
- Processing and Performance
- Configuration
- Reload Metadata – Immediate Updates
- Unlimited Sensors
- Role Based User Privileges
- Multi-Year Data Queries
- Multi-Time Zone Support
- Multi-Sensor Alarms
- Notifications (one alarm, multiple deliveries)
- Map View with Layers
- Unlimited Custom Maps
- Rain Gauge Display
- Optional Rainfall Overlay
- OneRainware™ Radar Rainfall Displays
- Graphing (date selection and real-time mode)
- Sensor Data Export (MS Excel / CSV)
- Data Editing (with audit trail)
- Data Revalidation (with audit trail)
- Real-Time Data Validation
- Incoming Raw Data Viewer
- Automated and Manual Data Entry
- Equation Support
- Ratings Tables (with bulk upload)
- Bulk Site and Sensor Configuration
- Synthetic Sensors
- Online Reports
- Custom Online Reports
- Public Web Site Option
- Read Only Server Option
- Server Replication
- Multi-Client (first 5 client web sites)
- Additional Client Licenses
- **Data Collectors / Control**
  - Serial to TCP / IP Connection Options
  - ALERT
  - ALERT2™

**Contrail Server**
- StormLink™ IP (logging / queuing)
- StormLink Satellite
- StormLink Cellular
- RWIS / NTCP
- Two-way ALERT (Flasher and Repeater Control)
- Custom Collector Programming
- **Data Agents / Data Exchange**
  - DataSight
  - USGS
  - METAR
  - HADS
  - CDEC
  - LRGS / GOES
  - NOAA Tides
  - RAWS
  - Rugged (EVENTS)
  - Wonderware
  - Campbell Scientific
  - ORBCOMM
  - GoData
  - Custom Data Agent
  - SHEF .A
  - SHEF .E
  - Tabular
  - XML
  - Hydstra

**Contrail Web**
- StormLink™ IP (logging / queuing)
- StormLink Satellite
- StormLink Cellular
- RWIS / NTCP
- Two-way ALERT (Flasher and Repeater Control)
- Custom Collector Programming
- **Data Agents / Data Exchange**
  - DataSight
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  - NOAA Tides
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  - Wonderware
  - Campbell Scientific
  - ORBCOMM
  - GoData
  - Custom Data Agent
  - SHEF .A
  - SHEF .E
  - Tabular
  - XML
  - Hydstra

**Contrail Inventory Plus**
- Web Based Inventory Management
- Mobile Inventory Management
- Configuration
- **Contrail Analytics**
  - Network Performance Analysis
  - Rainfall Intensity Analysis
  - Time Series Export
  - Event Data Export
  - Mass Balance Rainfall Analysis
- **Contrail TDMA Manager**
  - ALERT2™ network design & provisioning
- **Services**
  - Scheduled Reports via Email
  - Database Backups
  - Data Exchange
- **Support**
  - Business Hours Email & Phone Support
  - Software Upgrade and OS Support
  - 24/7 Full Software Support

+ Available as an additional option / price.
Contrail®

Implementations that ensure system resiliency, high availability and real-time monitoring to support your critical mission

OneRain’s Contrail is an enterprise level software solution designed to support your mission-critical responsibilities in early flood warning, emergency management, dam safety, reservoir and hydropower operations and stormwater management.

Are you ready for those challenging situations?
When faced with challenging situations such as major rainstorm or flood events, Contrail must be able to maintain its availability and provide real-time information to the right people when and where it is needed. To ensure the highest level of availability and optimized performance, OneRain’s Contrail application can be deployed with redundant configurations and a core network architecture that maintains at least two continuously replicated databases.

Flexible configurations to achieve required reliability
A resilient system provides geographic redundancy, eliminates a potential single point of failure, and will continue to provide service even if there is a system failure at one end—the data feeds and essential agency operations can continue uninterrupted. OneRain understands that different agencies have different demands. Our products and solutions are designed to meet the day-to-day operations as well being a critical resource when the situation demands.

Example of a locally installed 2-server Contrail Base Station implementation.
The secondary Contrail Base Station provides public URL web access and specific user level privilege views of the data. Although both servers are hosted by your agency’s facilities, they should be in *geographically disparate locations* for the purpose of survivability of local system failures.
Example of a 2-server Contrail Base Station implementation.

The primary Contrail Base Station is installed locally with a secondary base station, Contrail Server, hosted by OneRain. The secondary Contrail Server provides public URL web access and specific user level privilege views of the data.

Chances of bad things happening to your Agency and OneRain receive and dissemination activities simultaneously are slim, so reliability and survivability of local problems are very good.

Solutions for small to large scale...

Several configuration architectures are possible. Talk to us today to find out what best meets the needs of your organization.

OneRain’s professional services can help you achieve your goals by building solutions that effectively strengthen your monitoring and analysis capabilities and align technology with process to support data sharing, forecasting, early warning, disaster mitigation, and emergency response.
Contrail® Analytics

Suite of flexible integrated data-analysis tools that extends the power of Contrail

Contrail Analytics provides a comprehensive toolset that helps you quickly analyze Contrail data sets, identify and highlight trends and changes, and gain true insight into the performance of your hydromet sensor network.

HIGHLIGHTS

- Reduces mountains of data into a simple, visual display
- Discover trends in precipitation events with rainfall frequency and distribution information
- Provides the analyses you need to make better decisions and improve the management of your hydromet network
- Presents complex information in easy to analyze visual charts and graphics
- Insightful views reveal the essential information you need to manage your sensor network
- Bulk event data exporting
- Time-Series Export

Powerful Data Analysis and Reporting Tools

Contrail Analytics delivers powerful web-based data analysis and reporting tools including hydro-meteorological trends, telemetry system activity and maintenance performance:

- **Rainfall Intensities**: rainfall event analysis reports classify the amounts of accumulated rainfall by recurrence intervals over time
- **Mass Balance Rainfall Analysis**: plots and compares multiple rain gauges
- **Sensor Network Monitoring**: sensor activity and performance over time
- **Bulk Exporting**: event data
- **Time Series Data Export**: rainfall and other sensors

Identify Patterns, Trends and Extreme Storm Events

It’s easy to generate sensor-level snapshots of hydro-meteorologic activity over periods of interest to quickly answer questions such as:

- How much did it rain this spring?
- What were the high and low temperatures at this site last year?
- Which stream showed the greatest change in stage last July?
Rainfall Intensity Reports

The frequency analysis of rainfall data are of great importance to engineers and others involved in flood plain management, the design and operation of structures such as storm sewers, dams, reservoirs and hydropower operations that can be affected by heavy rainfall events.

- **Duration** - The length of time over which precipitation occurs (hours).
- **Depth** - The amount of precipitation occurring throughout the storm duration (inches).
- **Frequency** - The recurrence interval of events having the same duration and volume.
- **Intensity** - The depth divided by the duration (inches per hour).

Contrail Analytics derives the maximum rainfall intensities for a set of user-specified storm durations (e.g., 5-min, 15-min, 30-min, 1-hour, 2-hour, 3-hour, 6-hour, 12-hour, 1-day, 2-day, 4-day…), and presents the results in an easy-to-read graphic output that color highlights the recurrence interval for those peak intensity events (e.g., 5-year, 10-year, 25-year…).

Contrail Analytics comprises deep data mining reporting engines that analyze, extract and organize large amounts of data in a form that is informational—compiling intensive query-based searches into specialized reports, charts and exportable data files. This suite of data analysis tools provides a framework to support a variety of “number-crunching” processes on Contrail data.

Double Mass Analysis compares each rain gauge to the five closest neighboring gauges.

Sensor Network Performance Monitoring

Knowing how your network and sensors are performing now and over time is critical to operating any automated data collection network. Most base station software gives you a view of what is up or down right now. Wouldn’t it be desirable to have real insight and see at a glance which sensors are having problems, which have gaps in reporting, and which are over-reporting?

Contrail Analytics provides a sensor-level snapshot of hydrometeorologic activity over the period of interest. Insightful views provide the essential information you need to understand the behavior of each component of your network.

Contrail Analytics provides a thumbnail view of how your sensors are working by digesting large amounts of information into easily understood monitoring system performance measures. Contrail Analytics serves four primary functions:

- **Analyze:** Quickly sift through archived data
- **Explore:** Identify issues with sites and sensors
- **Predict:** Enable you to extrapolate trends easily
- **Summarize:** Provide reports on data quality and system performance

Save, Export and Share your Data

Contrail Analytics provides a convenient way to perform time series exports and bulk event data exports to standard data exchange format CSV files.

Contact Us

For more information about OneRain’s Contrail products, visit onerain.com or call 1-800-758-RAIN (7246) or 303-774-2033.
Plan Predictive Maintenance

Contrail Analytics uses data analysis to track system performance and plan predictive maintenance. By monitoring gauge and telemetry performance, maintenance planners are able to analyze trends in performance and provide awareness of irregularities before they affect operations.

Preventive maintenance is a common activity for remote measurement stations. Frequency based maintenance helps us to know that things are working as designed. Unfortunately, preventive maintenance doesn’t catch all problems and breakdown maintenance becomes a necessity. Breakdown maintenance can be time consuming, costly and causes increased risk while the site is down.

Effective predictive maintenance uses many techniques, some which are field activities and some based solely on telemetered data. Contrail Base Station keeps a history of sensor data available to conduct performance analyses that support predictive maintenance activities.

Contrail Analytics uses three different approaches to analyze environmental monitoring data, including hydro-meteorological trends, telemetry system activity and maintenance performance. These analyses generate graphs and reports on data source availability and data trends that enable you either to have confidence in your system and maintenance provider, or to know that neither the system nor provider are performing as they should.

Contrail Analytics helps to detect both common and rare failure modes before problems occur. By distilling the data into manageable reports and presenting the critical metrics of a system’s health, Contrail Analytics improves performance, increases system confidence and reduces costs.
Contrail® Inventory plus
Centralized Web-based Asset Tracking and Maintenance Management Tool for Real-time Monitoring Networks

Contrail Inventory plus helps you manage, maintain, and keep track of your gauge sensor network equipment via your desktop or mobile device from anywhere you have an Internet connection.

**HIGHLIGHTS**
- Manage inventory and maintenance in one place
- Multi-user, password protected access
- Centralized updates - everyone works off the same data
- Detailed visibility of inventory adjustments and life cycle history
- Store site and hardware images for easy identification
- Add support documentation so it’s available when you need it
- Powerful search options to help you find things easily
- Useful built-in reports and audit tracking
- Export data options

**Supports All Field Maintenance Operations in One Place**
Contrail Inventory plus is ideal for people tasked with maintaining and operating real-time monitoring networks. It functions as either a web-based desktop application, or can be accessed via your smartphone without any special client software to install.

**Equipment Tracking**
Knowing all the relevant information associated with a gauge sensor—its location (geo-mapping), configuration, firmware, cables, spare parts, repair and maintenance records, etc.—can be invaluable to your field maintenance operations. Contrail Inventory plus supports mobile information collection for your field service technicians and engineers to track and manage inventory in the field, and updates back to the centralized database.

*Included only with Contrail Base Station and Contrail Server (not available with Contrail Web)*
Equipment Maintenance Management
Contrail Inventory plus links your inventory management and maintenance together.

The Maintenance Management module with Contrail Inventory plus handles the creation of Work Orders, Tasks, and scheduling of routine, preventative and emergency maintenance activities of any inventory item in the system, giving you the ability to manage all of your maintenance operations in one place.

- Web access via Desktop or Mobile: Easy to use interface provides flexible office or remote access with secure login/password protection.
- Add, manage and track all inventory located at each field site, including manufacturers, part numbers, serial numbers, and software/firmware versions loaded, cable lengths, etc.
- Supports field maintenance efforts to know exact field configurations prior to visiting sites.
- Image/Photo Upload: Images can be added to manufacturers, models, site locations, and inventory assets.

Contact Us
For more information about OneRain’s Contrail products, visit onerain.com or call 1-800-758-RAIN (7246) or 303-774-2033.
Contrail® Inventory plus User Experience

Contrail Inventory’s web-based adaptive and responsive design is compatible with the widest range of devices, desktop PCs, laptops, tablets and smartphones.

We’ve tried to walk in your shoes as we redesigned Contrail Inventory’s accessibility to create the best experience possible to match up to your needs. Now, whether you’re in the field, or at your desktop, you’ll be able to accomplish virtually all your Contrail Inventory management tasks (review, edit, add, upload photos, etc.) anywhere at any time.

Users can get to the information that’s important to them fast with easy to understand content priority, workflow and viewpoints:

- Easy to navigate whether on smartphone, tablet and desktop devices
- No special mobile app. required
- Adaptive between mobile and desktop for content, features, viewpoints
- Responsive design fluidly changes and responds to fit any screen or device size

“Everything you need to manage inventory and maintenance is at your fingertips.”
Contrail® ALERT2™ TDMA Manager™

Visualize and design your network, tracking capacity, available capacity, and data latency

**HIGHLIGHTS**

- Manage and design one or more networks in a controlled workspace
- Aids in the proactive planning of your network capacity and demands
- QA/QC verification optimizes transmission capacity
- Real-time tracking of live network and ability to create "what if" alternative network designs
- Visibility of other agency’s networks
- Reduces potential for conflicts or mistakes
- Import and export network designs

Time Division Multiple Access (TDMA) is a frequency use protocol in which each transmitter is assigned specific times to transmit so that two transmitters on the same frequency do not transmit at the same time, and eliminates data loss due to more than one transmitter on a frequency talking at the same time. ALERT2 supports both the ALOHA and TDMA transmission protocols, but preferably uses the TDMA protocol to reduce or eliminate data loss.

**Why use Contrail ALERT2 TDMA Manager?**

Contrail ALERT2 TDMA Manager provides multi-user shared access via web interface and enables information sharing that reduces potential for conflicts or mistakes. It gives a complete view of your infrastructure in one place. Multiple agencies can share access.

Contrail ALERT2 TDMA Manager features **Capacity Planning** and **QA/QC Verification** – ensuring the optimization of transmission capacity across all parts of the network. It provides a controlled workspace so that users for an agency can edit/maintain agency TDMA designs, and can see, but cannot edit other agency TDMA designs.
### GENERAL TERMS

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>ALOHA is a frequency use protocol in which transmitters transmit at any time when they have something to say, and can potentially collide with other transmissions and lose data. The probability of success of ALOHA transmissions can be calculated, assuming that all transmissions are random. ALERT uses the ALOHA transmission protocol. ALERT2 can use the ALOHA transmission protocol, but preferably uses the TDMA protocol to reduce or eliminate data loss.</td>
</tr>
<tr>
<td>A specific radio frequency (RF) is a resource used by ALERT and ALERT2 for both transmission and receive of signal. Frequency is usually defined in terms of MHz and is divided into 0.0250 MHz ranges.</td>
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<td>An ALERT frequency is shared by many transmitters which transmit ALOHA messages, and have potential for collisions and data loss.</td>
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<tr>
<td>An ALERT2™ frequency used for TDMA is defined by a frame length, block length, and slot lengths, that is divided into TDMA slots, which are then allocated to transmitters on the frequency.</td>
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<tr>
<td>A network is a combination of frequencies, receivers, transmitters, transceivers used for ALERT and/or ALERT2. A network serves one or more agencies.</td>
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<tr>
<td>Base Station, receives on one or more radio frequencies.</td>
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<tr>
<td>Is comprised of both a receiver and a transmitter. A transceiver receives on one or more radio frequencies and transmits on a single radio frequency. They typically are repeaters that listen to data content on their receiver, and then retransmit that content on their transmitter.</td>
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<tr>
<td>Frame Length is used to define the transmission repeat for transmitters on a frequency. For example, a transmitter on a 20 second frame would have an assigned TDMA slot with a predefined offset from the top of the frame, and be able to transmit every 20 seconds.</td>
</tr>
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<td>The block size is the minimum time interval possible for an ALERT2 transmission. In the ALERT2 specification, it is 250 milliseconds (ms), and is the smallest time that can be used for subdividing a frequency’s frame into individual TDMA offsets and slots.</td>
</tr>
<tr>
<td>It is the allocated division of time for a transmitter within a TDMA plan for a frequency. This is one or more whole units of block length. The TDMA plans we currently have use 500 milliseconds as the standard slot length, which with ALERT2 allows up to 75 bytes of information to be transmitted.</td>
</tr>
</tbody>
</table>

**ALERT2™ TDMA Terminology**

(ALERT2™ is a trademark of the National Hydrologic Warning Council (NHWC))
Contrail® Training Program

Contrail is a dynamic product with many features and capabilities. Our on-site training for Contrail Base Station and Contrail Server ensures you gain the maximum value from your OneRain software and products and enables you to confidently use the product in its entirety. OneRain provides in-depth end-user, system administrator and server administrator training with your own system and data. Contrail Inventory plus training is provided via live Webinar at an appropriate time after core system training. Users also have access to ongoing scheduled live web-based training sessions.

Part I
Contrail System Administration
Detailed training on server access and usage. Full description and details of the architecture of the system, how all the components interface, and details of each component. Troubleshooting and problem solving processes are covered. This advanced training is designed for those responsible for maintaining the servers, applying software upgrades and performing system failovers...

Part II
Contrail Administrator Interface
Contrail Administrator Interface: Setting up users and authorizing privilege levels, establishing sites and sensors, creating validation formulas, setting thresholds and creating alarm rules and notifications, acknowledging and clearing alarms, accessing alarm logs, accessing standard maintenance reports. How to modify and customize web themes, adding content and links...

Part III
Contrail User
Explores all the end user features of Contrail. Understand the navigation of user interface, menu options, viewing data with map view and site lists; drilling down to sensor data. Learn the use of single and multiple graphs. How to retrieve historical data and export data. Overview of detailed help system...
ONGOING TRAINING AND EVENTS

In addition to on-site training, OneRain offers a variety of online training sessions for our software and solutions. Web-based training is a great way to learn more about Contrail, whether you choose our monthly complimentary Training Series for Contrail Administrators, or Customized Training sessions that are exclusively tailored for your agency or organization. Our on-line instructional sessions are great for:

- New customer user training
- Learning about new features and enhancements
- Refresher sessions for your employees
- Basic training for new employees
- Administration training

Complimentary online live training series for Contrail Administrators
OneRain offers live web-based training sessions to our valued customers! Each live session is aimed at new or experienced Contrail Administrators who want to refresh or expand their knowledge of the software. These sessions also provide the opportunity to learn about any recent updates and enhancements. Note that the training schedule may change from time to time due to holidays or other conflicts. Check our website to learn more about upcoming webinar dates and to register.

Customized Training
Do you need training tailored to your needs? For more in-depth training with your own system and data, we can come to you! Contact us to arrange customized training for groups of 4 or more at your site.
Software Maintenance and Technical Support

OneRain’s software maintenance and technical support is designed to provide you with latest software enhancements and technical support for your product licenses. We offer two levels of software maintenance and technical support to meet our clients’ needs—Standard and Extended 24x7. The first year of Standard support is included with your new product licenses. As an additional option, we offer Extended 24x7 that includes all the benefits of Standard support plus around-the-clock critical technical support.

**BENEFITS**

- Complete support protection
- Access to new features, updates, enhancements and fixes
- Unlimited telephone and email support during normal business hours M-F with standard maintenance
- Access to ongoing scheduled live web-based training sessions
- Most cost-effective way to ensure you’re always up-to-date
- Protects your investment: Know that your systems are current
- Predictable budget planning

**Standard Software Maintenance**

The initial purchase of a OneRain Software License includes the first year of standard technical support. Thereafter, on each annual anniversary, Licensees may purchase standard technical support at an annual price equaling 25% of the current software license fee. It includes both product upgrades and technical support as follows:

- **Subscription and Support**: Under our Standard Software Maintenance agreement, OneRain provides continuing subscription to and support of the most current release of the software during the annual term. Subscription and support include correcting material or substantial defects in the software or deviations from the published software specifications.

- **Telephone Consultation**: Standard Software Maintenance and Technical support also includes reasonable telephone consultation for your organization on the use of the software during OneRain’s normal business hours (8 a.m. to 5 p.m. Mountain Time). OneRain strives to respond to normal support calls (or emails received) not later than one business day after receipt of the Licensee contact. Customer outages are treated with the highest priority. OneRain has no obligation to provide on-site support or remote administration of Licensee systems.
Extended support provides additional peace of mind for your organization’s critical operations with day and night, weekend and holiday round-the-clock technical assistance.

Extended 24x7 Software Maintenance

If around-the-clock support is required to meet your critical mission needs, OneRain offers coverage and assistance beyond our normal support hours, as well as Remote Diagnostic Support, Automated Monitoring and Technical Support for your data collection system. Licensees may elect to purchase Extended 24x7 Technical Support (12-month term) at the prevailing list price at any time, provided that your subscription to OneRain’s Standard Software Maintenance Agreement is valid. In addition to the Standard Technical Support described earlier, OneRain’s extended level of service includes the following:

- **24x7 Telephone Consultation.** Our Extended 24x7 Technical Support provides phone support 24 hours a day, seven days a week. OneRain provides an Extended Customer Support HOTLINE telephone number to call requesting service of the covered product. The Extended Customer Support HOTLINE operates outside of normal business hours and during statutory holidays.

- **Remote Diagnostic Support*.** OneRain maintains a staff of support personnel with two people on call at any given time. Upon any interruption of processing detected by the monitoring, OneRain sends out alarms to both the client’s designated support contact and OneRain’s on call staff. OneRain’s staff attempt to remotely log into the client’s base station(s) and begin the process of diagnosing and trying to fix the problem. We make every effort to get you operational as soon as possible. If the problem cannot be fixed remotely, OneRain works with the customer’s designated support contact to solve the problem.

- **Automated Monitoring*.** OneRain sets up automated monitoring of the Licensee base station. For clients that use Contrail® Base Station, OneRain uses the alarm capabilities built into the servers to monitor their health. OneRain will monitor data feeds, check operating system processes and scan Licensee’s system network for failures or irregularities, and take remedial action. For clients using DIADvisor™, OneRain monitors the DIADvisor backup feed for receipt of new data within a specified time frame, and an alarm is triggered should that feed stop sending data to OneRain’s enterprise. To enable automated monitoring of DIADvisor the Licensee must use OneRain’s free backup option.

*Remote Diagnostic Support and Automated Monitoring requires all OneRain on-call staff to have remote access to the client’s base station.