GRANTEK

Building Automation Systems from Grantek:
Going Beyond Compliance to Improve Operations

Overview

Building automation systems (BAS) are necessary and ubiquitous in today's smart manufacturing environment. Grantek helps our customers obtain current, actionable data needed to help ensure product quality and equipment integrity through the use of our BAS and BAS Lite monitoring systems.

Benefits of working with Grantek

- Our systems communicate over standard networking technologies, eliminating the need for running dedicated additional wiring.
- Maintenance costs are reduced by Grantek's use of non-proprietary, off-the-shelf sensors and equipment. Components can be obtained and replaced by the facility's maintenance staff, eliminating the time and cost needed to call a system vendor to perform a simple component replacement.
- Grantek systems provide a robust audit trail. While other BAS vendors may have adequate sensors and monitoring technology, they may not be able to meet the strict audit trail requirements and reporting necessary to comply with regulatory demands. Because of Grantek's extensive experience working in regulated industries such as pharmaceuticals and food/beverage production, our BAS designs offer trending reports and audit reports. Our system is 21 CFR Part 11 compliant, allowing generation and maintenance of an audit trail for every action taken on the BAS system.
- Grantek offers BAS that utilizes off-the-shelf components. Our systems accept inputs from any sensor that can be connected to a programmable logic controller (PLC). Grantek is vendor-agnostic, meaning we can incorporate sensors and equipment from any reputable vendor into our BAS. We can also incorporate sensors already present at the facility, eliminating the need to replace equipment that is still functional.

BAS Options from Grantek

Grantek offers two types of BAS:

Standard BAS

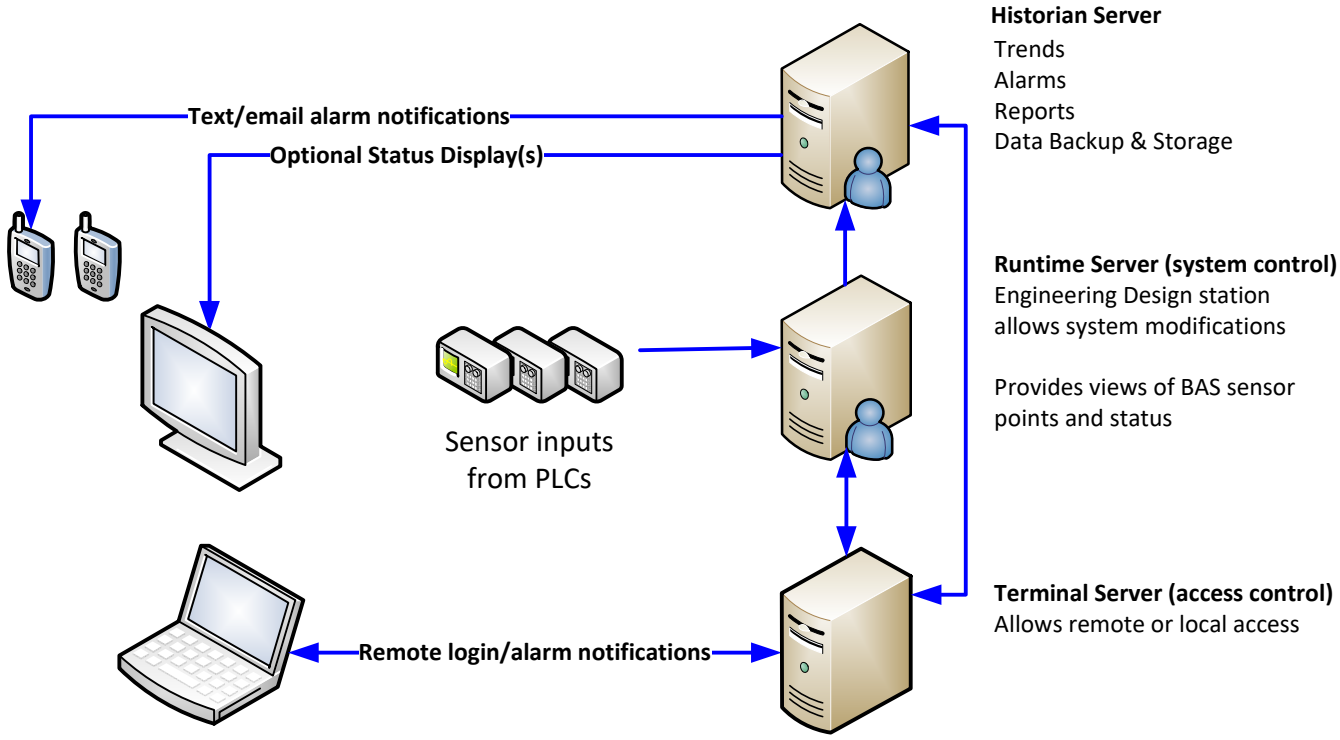
The standard BAS offers the broadest range of capabilities and can connect to any type of hardware. The standard BAS is normally premise-based but can also be configured to utilize the cloud for long-term data backup and storage. The system can also be configured to replicate to the cloud.

The standard BAS system has three servers: The Historian, Runtime Server, and RDP Server.

- The Historian provides system control and data storage capability. Complete audit trails are maintained and all system activity is logged. A simplified diagram of the standard premise-based BAS is provided below.

- The Runtime Server allows system configuration changes to be made via the engineering design station. This saves time by allowing the facility's staff to reconfigure the system if needed and reduces system maintenance costs by allowing facility staff to make configuration changes instead of requiring Grantek to do it.
- The RDP Server controls access to the system through user logins. The system is 21 CFR Part 11 compliant and tracks all activity to produce a complete audit trail.

Standard BAS Premise-Based



BAS Lite

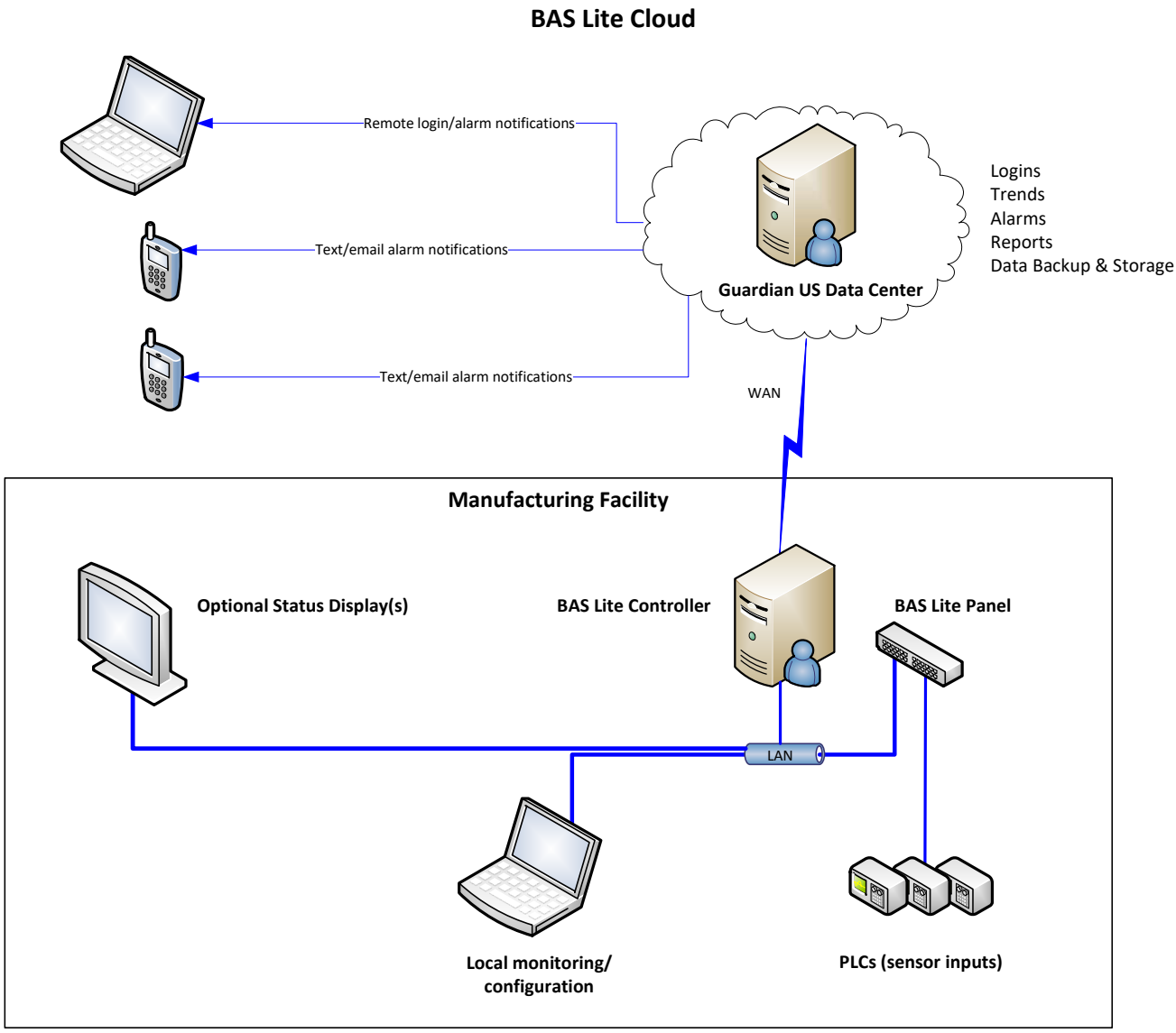
BAS Lite is our cloud-based product. It is a basic software-as-a-service (SaaS) system that sends facility data to the cloud. Its primary focus is data. The basic system function is the same, but the Historian server resides in

the cloud. The BAS Lite consists of a monitoring panel, PLC, and BAS Lite controller onsite. These components compress data and send it to the cloud.

The BAS Lite controller acquires data from the PLC and sends it to the Historian server in the cloud. System information is available to authorized users via a webpage, made available from our Guardian US-based data center, that provides floor plans showing sensor status. Authorized users log in to view the data.

The system alerts technicians via text messages or email.

If external network access is intermittent or down, data is stored locally onsite, then sent to the cloud when network connection is reestablished. (Standard BAS also offers an option for cloud data backup if desired.) A simplified diagram of the cloud-based BAS Lite is shown below.



System Options

Sensors from most vendors are compatible with Grantek's BAS offerings. We obtain the appropriate I/O cards for the controller interface. The system can incorporate 4-20 mA sensor, resistive temperature devices (RTD), and most commonly-available sensors.

Grantek's BAS can pick up any sensor input, including steam pressure, purified water pressure or temperature, characteristics of water for injection (WFI), monitoring loop temperature of purified water, humidity, and differential air pressure. Air pressure is a concern in some manufacturing environments where the corridor is pressurized to prevent product dust within the production area from entering corridors or other non-production spaces. Pressure monitoring is also important in pharmaceutical manufacturing, to prevent contamination of the product from outside air, and to prevent cross-contamination.

The typical BAS monitors temperature, moisture, and pressure, but can be expanded to also monitor characteristics of purified water, chilled water, compressed air, and provide power monitoring for the plant. The BAS provides one centralized point for all facility monitoring. Anything that connects to a PLC can be an input for a Grantek BAS.

Audiovisual indicators within the facility may also be incorporated to inform floor personnel that an alert or alarm condition exists. Grantek can equip and configure BAS or BAS Lite to include audible and visual indications of alarm conditions where needed within the facility using stack lights, horns, and other audiovisual devices, if desired.

Grantek can also provide and configure display panels as required to locally monitor plant conditions. For example, status screens can be provided in the corridors. The items included in these displays are highly customizable to suit the needs of the facility. A large LED display can be configured to include multiple panels displaying information from different areas of the plant.

Planning and Implementation

Typically, a customer contacts Grantek if they are building a new facility, if they are no longer pleased with the performance of their current facility monitoring system, or they wish to expand the facility or the monitoring system to add additional sensors. Grantek can retrofit the facility to use off-the-shelf sensors, which prevents the problem of lost data if a proprietary sensor fails that is no longer commercially available, or has a long lead time because it must be obtained from a specific manufacturer. Grantek does not maintain relationships with specific vendors of monitoring/alarm equipment, allowing us to recommend the system that is the best fit for the customer, rather than one from one particular vendor. We recommend equipment that best suits the customer's needs, and the customer ultimately makes the purchasing decisions.

In planning, designing and installing a new BAS or an add-on to an existing BAS, Grantek works closely with other contractors and trades onsite to ensure that the facility design is adequately protected by monitoring equipment. We work closely with the other contractors to ensure that sensors are properly located and specified.

Because the BAS we design rely on standard Ethernet communications, very little additional wiring or cabling is required to implement the BAS. This allows retrofitting and system expansion to be implemented with minimal disruption.

Typically, a manufacturing facility has a separate system for building security and facility access. Building alerts are usually received by the BAS as well as by the building monitoring system. Building security may not be monitored around the clock, but the BAS will forward any alerts according to the predefined notification list regardless of whether an alert occurs during business hours.

Grantek's BAS can accommodate customer preferences for monitoring: some sites have a person monitoring the BAS at all times, while others may choose to send a mobile alert or an email to a technician instead. The technician can then can view and log into the BAS from their current location and deal with the alert/alarm appropriately. In North America, it is typical to send alerts to an on-call technician rather than have dedicated 24-hour monitoring.

If the first point of contact does not respond to an alert notification, the system allows alert notifications to be escalated according to predefined profiles, which are based on user groups, set up using standard Windows system management tools. Escalation continues until a user acknowledges the alert.

Grantek sets up the initial user group configuration and access based on the customer's preferences. For customers who have not yet decided on the best way to perform system monitoring, Grantek will set up generic user groups and instruct the customer on how to manage system users.

Grantek assists with determining the appropriate tolerances to set for sensors to help prevent nuisance alarms. We prefer to specify smart sensors that monitor themselves and alert to impending failure via the Internet of Things (IoT). The impact of IoT on sensor technology and system design is far-reaching, including smart sensors, smart controllers, and network-based PLCs. Annunciators and other alert indicators are now Ethernet-based, requiring no dedicated wiring to the BAS. The cloud- and premise-based BAS allows remote access via HTML5 by smartphones, laptops, iPads and other devices.

The system display shows the facility floor plan, typically with a separate screen for each floor. Users can drill down to view details about rooms and areas within a floor. Sensors that are within the acceptable limits are shown in gray, to avoid unnecessary distractions. Alerting sensors are shown in orange, and alarming sensors are shown in in red. In general, if an alarm condition is resolved (by shutting a door to clear a "Door Open" alarm, for example) the BAS alarm is cleared, but not acknowledged. A technician must log in to acknowledge the alarm.

A user cannot make changes or acknowledge an alarm until they log in. To provide a robust audit trail, alerts/alarms cannot be acknowledged except by a logged-in user. After acknowledging the presence of an alert/alarm, a technician generally goes to the location to investigate and resolve any out-of-limits condition. After investigating, the technician enters a comment in the system describing actions taken to clear the alarm or actions needed to correct the alarm condition, such as "repair broken refrigeration unit."

For general viewing in employee areas or hallways, Grantek can provide custom-configured displays using large LED TV monitors, split into multiple display panels to provide high-level and detailed monitoring on a single large, easily viewable display.

System Support

Each facility should have a disaster recovery plan in place that can help prevent product loss if equipment or sensor failures occur. Grantek can assist with BAS disaster recovery planning and recommends that facilities maintain a quantity of spare sensors as well as portable monitors that can be relocated to provide monitoring until a failed sensor can be replaced. Facilities should have a portable monitor to handle outages if there are no spare sensors available. Grantek will consult on disaster recovery to help customers plan for spare sensors, specify repair protocols, and obtain suitable portable monitoring equipment.

Grantek also offers support contracts that allow our engineers to log into the system remotely from our offices. In many situations, we can resolve issues without the need for an onsite service call, whether the BAS is cloud- or premise-based. We also provide training for your facility maintainers after we install your system.

For over 35 years, top manufacturers in Food & Beverage, CPG and Pharmaceuticals have called upon Grantek to solve their most complex business and manufacturing challenges. Grantek's team of professionals located in 17 offices across the globe deliver solutions to complex problems in Smart Manufacturing, Industrial Networking, Automation and Industrial Safety. Call 1.866.936.9509 or email info@grantek.com to learn more.