

Bernoulli One™ Overview For IT Leaders

— Improving Patient Safety in Real-Time —



Early detection of a deteriorating patient condition saves lives. Designed on this truth, Bernoulli One™ is the most advanced real-time clinical surveillance solution for hospitals. The Bernoulli One software enables clinicians to monitor patient vital signs and manage alarms from a centralized location or across a dispersed network. It also monitors device data. Connected medical devices send patient vitals to the central workstation. These include ECG, heart rate, respiration rate and skin temperature, and more. The software in turn constructs a graphical display which provides clinicians with a current review of monitored rooms and patients, physiologic data, and alarms. Clinical alarms are customized so that clinicians are notified of meaningful events including worrying trends in vitals. This helps speed response to patient needs and eliminates excessive alarm noises.



Bernoulli Clinical Surveillance

Bernoulli One enables real-time patient health monitoring and clinical surveillance ensuring comprehensive 24/7 coverage across multiple geographically-dispersed facilities. Integrated with a wide range of clinical systems and medical devices, Bernoulli analyzes real-time data including:

- Physiologic patient data (i.e. patient vital signs)
- High-frequency, high-resolution data (i.e. waveform streaming)
- Settings (i.e. ventilator settings including mode, Vt, RR, FIO2, etc.)
- Alarms (i.e. from third-party software and Bernoulli-configured smart alarms)

Real-time data is combined with retrospective data from the EHR to provide greater granularity into a patient's condition. The intel is then shared with the appropriate clinicians via mobile communication devices and/or a central dashboard. Two-way video and audio capabilities further enable remote observation and supervision of critical care patients. FDA Class II clearance means it can be used for active patient monitoring as well as secondary alarm management.

Bernoulli Medical Device Integration

Long established as a leader in Medical Device Integration (MDI), Bernoulli has extensive integration capabilities. Our platform is designed to aggregate data used then to support continuous monitoring and clinical surveillance, real-time data analytics, and clinical research. Our software acquires data from nearly any source accessible including bedside medical devices, hospital laboratory gateways, or medical device gateways.

Bernoulli Alarm Surveillance and Data Analytics

Organizations like The Joint Commission, ECRI Institute, AAMI Foundation, and others are pushing hospitals to improve clinical alarm safety in their healthcare settings. Alarm fatigue problems mainly stem from alarm noise, alarm numbers, and alarm limits. Years after these problems surfaced, ECRI still lists alarm related safety issues in its annual Top 10 Health Technology Hazards report.

Bernoulli helps determine actual alarms by:

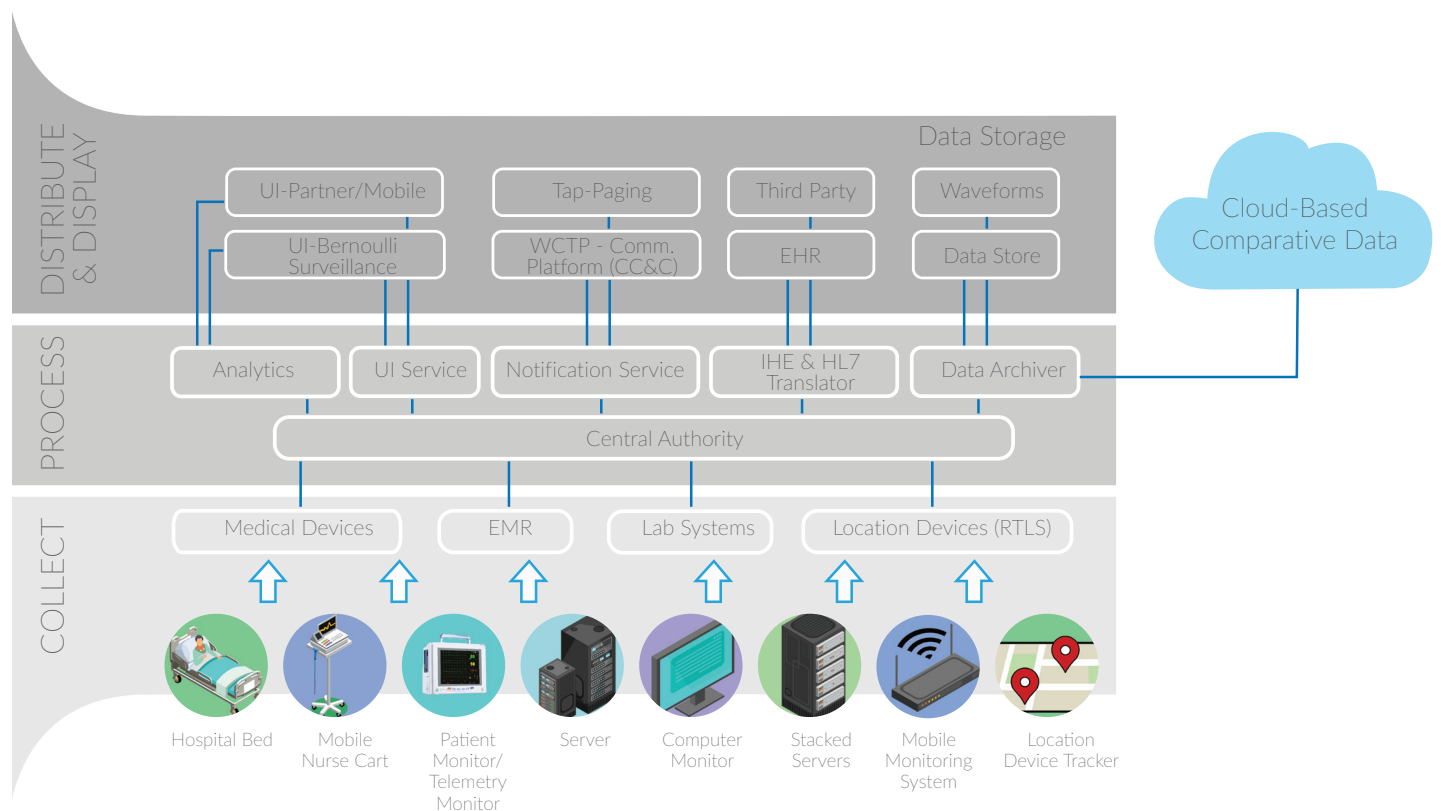
- Collecting and analyzing baseline alarm data and current threshold data - Enabled through extensive systems integrations
- Analyzing real-time and retrospective data - To detect deteriorating conditions, prevent urgent alarming conditions, and enable threshold settings on devices to be adjusted appropriately
- Notifying caregivers in real-time - Alarm notifications are sent to a central display or via third-party clinical communication/ alarm management software

in 2016, Bernoulli was recognized by KLAS as 'One of the Best Platforms for Alarm Reduction and Management'.

Architecture

Bernoulli is a single, flexible, and integrated architecture that enables all of our clinical surveillance applications. Bernoulli has also been designed to enable mobility. The architecture is service-based and uses network-based communication between instances which allows for deployments to be delivered across multiple servers. With an open architecture, Bernoulli is an optimal platform for interoperability and primed for rapidly incorporating future enhancements.

- The enterprise-grade system can receive data in the proprietary format of the device, or if receiving from networked systems via any version of HL7, IHE PCD profile, or text formats. It can also deliver the data in multiple formats inclusive of HL7, WCTP, XML, .CSV and .TXT file formats.
- As new standards (data formats, communication protocols, etc.) are adopted Bernoulli incorporates them and updates existing facility installations
- The Bernoulli One platform is a plug-and-play solution for wired and wireless IT network infrastructure



Scalability and Flexibility

Bernoulli maintains an extensive device library including a broad range of medical devices from every major manufacturer that includes detailed data schemes, functional assessment, and clinical support. Detailed device interface specifications and documentation (clinical as well as data-related) are continually added to support new versions, models, and manufacturers. Our system architecture allows us to easily and quickly add connectivity to new devices, or support new standards as needed. As the healthcare system expands the platform or add additional devices, the Bernoulli system can expand with minimal, additional IT resources and costs. Additionally, the platform can be deployed on-premise or virtually. Security.

Healthcare institutions are prime targets for cyber-attacks so system security is a must. Bernoulli's platform supports industry supports the latest IT standards with the highest level of encryption and user-set authentication rules, consistent with HIPAA privacy requirements.

Bernoulli User Interfaces

Every hospital is different. Whether you have a “war room” environment designed to monitor patients remotely or prefer mobile technologies, Bernoulli meet your needs. The Bernoulli user interface options are:

- Bernoulli Workstation - Bernoulli consists of centralized (or remote) computer display used to view patient/medical device data from anywhere on the network. The Bernoulli software enables clinicians to monitor beds, relevant device data, and alarm situations, usually in a centralized location.
- Bernoulli Web User Interface - Capabilities of the Bernoulli software include web browser access to a local area network (LAN) of medical devices for remote viewing. The use of a networked laptop allows caregivers to roam within a wireless network and have real-time data and trended reports at hand.
- Bernoulli Mobile Viewer - Enables patient data to be displayed on mobile devices. The application provides links (URLs) for each monitored patient when an alarm event is delivered. These links allow the display of the associated vital signs and waveforms in the context of the alarm event. Optional mobile devices, such as pagers, IP Phones, and laptops, are supported by the Bernoulli software. The mobile device is configured to receive data from a wireless local area network (WLAN) in the hospital setting.
- Third-Party Applications - The system can send alarm notifications through a separate clinical communication software (e.g. Connexall, Spok, Voalte, etc.)

Bernoulli Reporting

The Bernoulli software enables administrators to run a variety of reports that can be used for process and quality improvement. The system facilitates medical device and compound rules notification reporting. Typical reports generated by the system are:

- Snapshot report - a recording of all settings, patient values, and alarms that were present at the time the snapshot was taken. The system takes a snapshot of device data each time there is a scheduled or manual snapshot, settings change, activation of an alarm, or note generated.
- Flowsheet report - a tabular report of the medical devices' monitoring parameter readings and changes over time, including alarms.
- Log of events report - displays all medical device events for a patient throughout a selected time period
- Log of pager messages report - displays a list of all remote messages sent over a selected time period
- Shift alarm summary report - displays all shift alarm summary events over a selected period of time
- Trends report - displays a graphical chart showing measured parameters trended over a selected number of hours. Trend report information is captured from the measured values transmitted by the medical device.

Implementation

Bernoulli's professional services team provides comprehensive capabilities and experience, providing detailed project management, system design, system engineering, configuration, and deployment services for our solution. Our project management process divides projects into 5 distinct phases: Discovery, Design, Develop, Deploy, and Support. The goal of this process is to ensure efficiency and minimize the risks associated with project implementation from a timeline, financial, and usability perspective.

Bernoulli[®]



To learn more about how the Bernoulli One clinical surveillance, medical device integration, and real-time data analytics solution can help your hospital, please contact us.

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