Presenting System 1* v18.1

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Bently Nevada is pleased to present System 1 Version 18.1. The added capabilities continue to strengthen our industry-leading Machinery Condition Monitoring & Diagnostics toolset for Turbomachinery, Reciprocating Compressors, and General Rotating Equipment.

Usability

Expectations of usability have grown substantially over the last decade and as a result, users of consumer and industrial technology now demand products that seamlessly support their life and work. So, we have designed System 1 around the condition monitoring workflow, rather than to individual features and functionality. Through user research in 12 countries with more than 200 users, we have studied our customers' team dynamics, site processes, and technology suites to determine how System 1 would best support their Condition Monitoring (CM) success. Every new feature is integrated in a manner that enhances the CM process, while maintaining consistency in interaction and visual patterns.

User engagement continues to drive upcoming System 1 releases. We have an active System 1 feedback community that is 750 people strong, where Sales & Service members share direct feedback gathered from their customers; this input drives the feature backlog priorities and helps to refine requirements for upcoming capabilities. In addition, our Product Management Team regularly travels to customer sites to shadow those users who have adopted the next generation System 1, identifying existing product strengths, as well as areas for continued improvement.

We remain laser-focused on delivering the world's premier plant-wide condition monitoring application with bi-annual product releases. The System 1 product capability-set has grown significantly over the last 3 years, with strong investment continuing.

Read on to learn about the features added in the 18.1 release and reach out to your local Bently Nevada Sales Team to learn more about planned feature additions throughout 2018 and into 2019.

What's New In v18.1?

Expanded Data Accessibility & Install Base Connectivity

18.1 Delivers…

✓ **S1 6.95+ Device Connector**
- Trendmaster DSM SPA & Direct Cards
- Essential Insight. Mesh
- 1701 (TDXnet)
- 2201 (TDXnet)
- 3300 (TDXnet, TDIXconnX, TDe)
- 3500, Encore, bopONLINE, TDISecure
- OPC Server
- MODBUS/GSM
- API Data Collector

✓ **Ranger Pro Connectivity**
✓ **Email Notifications**
✓ Server Administer User Profile

Maturing Turbomachinery and General Machine CM & Diagnostics

18.1 Delivers…

✓ **Configurable Machine Diagrams (HMI Views)**
✓ **Machine Audit Files (Small Archives)**
✓ Invalid Data Visualization on Plots
✓ Amp/Phase Overlay Trend Plot
✓ Full Spectrum Plot
✓ Improved Cascade & Waterfall Plot Data Visualization
✓ Comparison Data (SUSD, Baseline, Fault, etc.)
✓ Improved Alarm Plots & Add Measurement Dialog
✓ User Enhancements

Improved Reciprocating Compressor CM & Diagnostics

18.1 Delivers…

✓ **Vibration "Band Waterfall" Plot**
✓ **S1 v6.81+ Data Migration for /7x Series Monitors**
✓ Thermodynamic Performance Measurements
✓ Waveform Peak Band Measurements

EXPANDED Data Accessibility & Install Base Connectivity

System 1 v6.95+ Device Connector

System 1 version 18.1 introduces connectivity to every Bently Nevada hardware device & software connector supported by System 1 Classic (Version 6.95+). This new capability represents the commitment to our global customer base by supporting devices like 3300 and Trendmaster2000 that were first introduced 30 and 28 years ago, respectively.

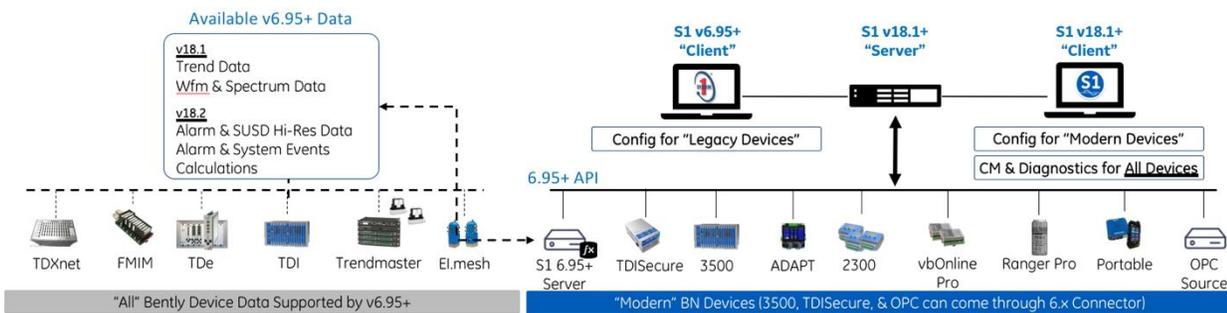Figure 1 shows a high-level physical architectural overview.

Figure 1: System 1 v6.95+ Device Connector Overview

Ranger Pro* Connectivity

System 1 v18.1 adds "native" connectivity to the wireless Bently Nevada transducer platform, Ranger Pro (Figure 2). Product details can be found at our website, www.bently.com. This device provides an economical way to expand your condition monitoring program on applicable machinery. Ranger Pro Devices are capable of supplying System 1 with trend, waveform, spectral, and system health data. Please review the latest Ranger Pro datasheet for detailed measurement & data rate specifications.

Note: Ranger Pro connectivity will follow the initial version 18.1 release by approximately 2 months.

Figure 2: Ranger Pro Device

Email Notifications

Figure 3: Example Alarm Notification

System 1 users can now easily manage machinery by exception, combining well-configured alarms with email notifications. The Notification Plan wizard is a great enhancement over legacy products, guiding you through the configuration process. The HTML-formatted notification matches both the content and visual presentation available in System 1 (Figure 3).

Upcoming Capabilities

- v18.2 – 6.x Connector Phase 2: Import 6.x software alarm setpoints, migrate historical alarm events
- v18.2 – Device Integration Software Development Kit (SDK): Formal documentation for third-party vendors to connect to System 1
- v18.2 – Replication: System Health Event to detect replication issues; 1 second data replication
- v19.1 – Enhanced Security Audit Logging
- 2019 – OPC Unified Architecture (UA) Phase 1: Targeting Events and Static Data

MATURING Turbomachinery and General Machine CM & Diagnostics

Configurable Machine Diagrams (HMI Views)

The first phase of configurable Machine Diagrams is introduced in System 1 v18.1. The default layout has been refreshed, creating a streamlined machine view. View customization (Figure 4) is controlled by users rights and includes the ability to:

- Add measurements to the view by dragging and dropping from the Measurement Window
- Re-locate the machine train image and/or point tables within the workspace
- Replace the default machine train image with a custom image
- Modify background and text color
- Ungroup tables into individual points for further layout customization

Figure 4: Customized Machine Diagram

Machine Audit Files (Small Archives)

Finally, System 1 supports Machine Audit Files (called Archiving in System 1 6.x). Audit files are supported for individual machine trains and can include Trend, Alarm and Transient data sets, as well as stored Reference Data (Compensation, Comparison) that has been saved for the Machine Train. This capability allows you to share data with your colleagues, as well as your local Bently Nevada Machinery Diagnostic Services (MDS) engineers who can provide an expert diagnosis of machinery condition.

Upcoming Capabilities

- v18.2 – Acceptance Region Alarms on Polar Plot
- v18.2 – Configurable Machine Diagrams: Multiple Views per Train, Add Shapes/Lines/Labels
- v18.2 – Plot Integration/Differentiation
- v18.2 – Fault Frequency Overlay on Waveform Plot
- v19.1 – Configurable HMI: Build HMI-style views within System 1 (e.g., First-Outs, Permissives)
- v19.1 – Software Alarm Time Delay
- v19.1 – Improved Alarm Setpoint Quick Configuration
- v19.1 – Decision Support Phase 1 Integration
- v19.1 – State Data Coloring: Color data on plots based on configured machine states
- v19.1 – Plot Data Export
- v19.1 – Manual Scale Support

IMPROVED Reciprocating Compressor CM & Diagnostics

Vibration Band Waterfall Plot

The Vibration Band Waterfall Plot is a new Bently Nevada plot type and is a great improvement over the Recip Waterfall plot that is supported in System 1 v6.x. The Band Waterfall Plot (Figure 5) is a surface plot that displays the following parameters:

- X Axis (horizontal): Crank Angle
- Y Axis (vertical): Amplitude of the 36 configured Crank Angle Band Measurements
- Z Axis (diagonal): Time

The plot can be rotated like the already supported Waterfall and Cascade Plots and the color corresponds to the rainbow scale for data amplitude (a legend is included in the top left of the plot).
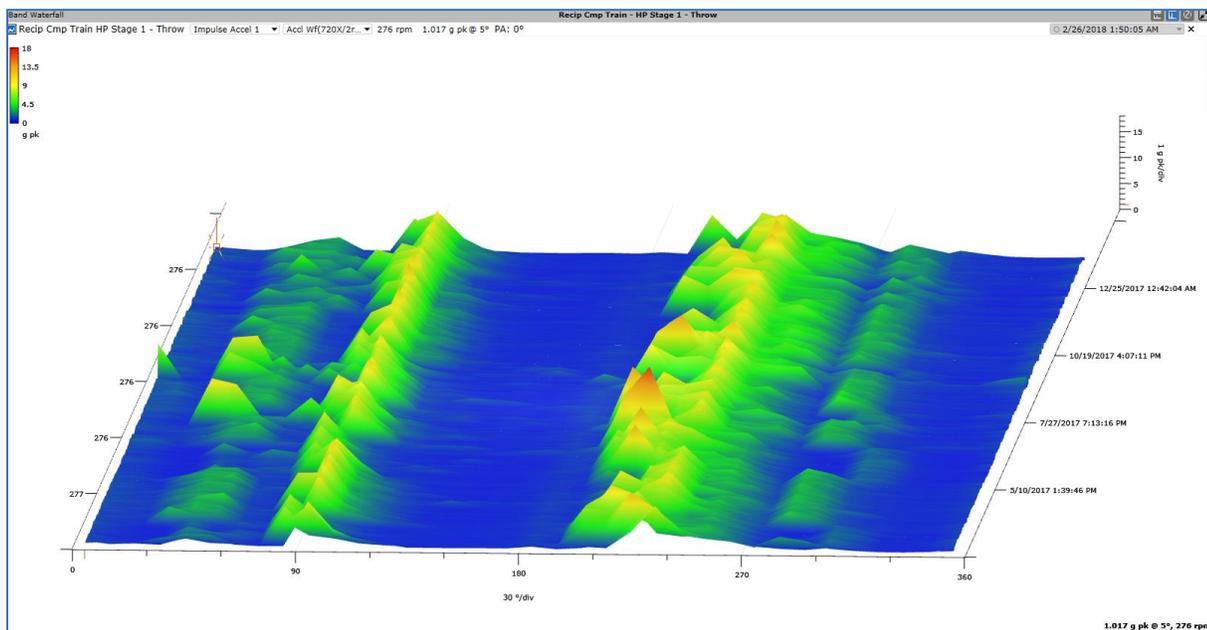

Figure 5: Vibration Band Waterfall Plot

System 1 v6.81+ Migration for Reciprocating Compressors

Historical data from the 3500 Reciprocating Compressor monitors (/70, /72, and /77) is now supported as part of the System 1 v6.81+ migration utility. With complete configuration support and an enhanced Diagnostic toolset, many legacy System 1 customers have the capability set required to migrate to the next generation platform.

Upcoming Capabilities

- v18.2 – Rod Position Channel Support
- v18.2 – Rod Position Plot (Polar Format)
- v19.1 – Bore Centerline Plot