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Celebrating 20 Years of System 1

Jackie Tappan, System 1 Technical Product Manager

“Today, the focus of many of our customers is on the total management of their production assets. Our customers know that the assets in a modern industrial facility are not limited to rotating machinery. That’s why we’ve designed System 1 to do more than just machinery management”

- Orbit Magazine, 2001

Reading the above quote, you may think that this is a recent quote from Bently Nevada regarding the System 1 Platform. However, this statement was made almost 20 years ago, during the launch of System 1. Two decades ago, Bently Nevada redefined the [asset management](#) space when we envisioned and then delivered a software platform for holistic [asset monitoring](#), with the supporting connectivity, analytics, and visualization capabilities required to identify and diagnose asset health conditions.

Over the past 20 years, System 1 has been a critical tool for customers in Oil & Gas, Power Generation, and General Industries, with more than 10,000 active users globally. In addition, our Services team leverages the platform to support end customers with [remote asset monitoring](#) and expert machinery analysis in real time 24/7. At Bently, we are very proud of the legacy of this product and its continued evolution to meet new use cases and solve new customer problems.

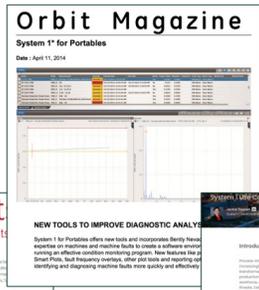
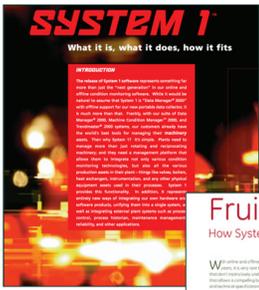
This article will provide an overview of the evolution of System 1 - from Classic to Evo - and a preview of what lies ahead for this Asset Management platform.

10,000+
System 1 users

20 years
Delivered value

12
Remote
Monitoring
Centers

300
Field & Diagnostics
Engineers provide
unparalleled support



The Evolution of System 1 has been well documented within Orbit Magazine, starting from the initial product release announcement in 2000 to quarterly updates on the latest Evo platform

System 1 Classic

The Vision of “One System” is Born

Plant Asset Management, or PAM, is a holistic asset management concept introduced in the late 1990s, with a focus on maximizing the performance and availability of production assets while minimizing their life-cycle costs. As documented by ARC Advisory Group in 2000, *“End-users in nearly every process industry across the board are increasingly adopting asset management as a strategy to improve process efficiency and enhance their return on assets (ROA).”*¹

Over its 60+ years, Bently Nevada has always led the industry with its innovative solutions. As such, it is not surprising that the company was an early leader in the PAM space, introducing System 1 to the market in 2000.

The wait is over ... System 1™ is here.

For over a year now, we've kept you abreast of our progress as we developed our most ambitious and exciting software program to date – System 1™. We also told you it was worth waiting for. We're pleased to announce that System 1™ is here.

Released officially on June 23rd, System 1™ is the host software for our Snapshot™ for Windows® CE portable data collector. However, in the coming months we'll keep you apprised of our continued progress as we integrate Bently Nevada's online systems

into this powerful software platform, creating true integration between the online and offline worlds. You see, as the name denotes, System 1™ is *one unified system* for managing all your machinery and related assets. Start with System 1™ as the basis for your portable data collection program, and then grow from there, knowing that connectivity to your Bently Nevada online hardware lies ahead.

For more information on System 1™, visit us on the world wide web at www.bently.com, or contact any one of our over 80 sales and service centers around the world. ☺

Announcement of System 1 v1.0 in 2Q 2000 Orbit Magazine

With System 1, Bently Nevada developed a platform with a rich set of connectivity, analytics, and visualization capabilities, including:

- Data collection interfaces, with an emphasis on data types beyond vibration
- Flexible software alarms that could be configured on any measurement in the system
- Analytics to automate diagnostics and provide new insights
- Comprehensive trend plots, enabling data correlation regardless of source

¹ Plant Asset Management and Condition Monitoring Worldwide Outlook, Market Analysis and Forecast through 2005, published May 2001 by ARC Advisory Group, Dedham, MA (www.arcweb.com)

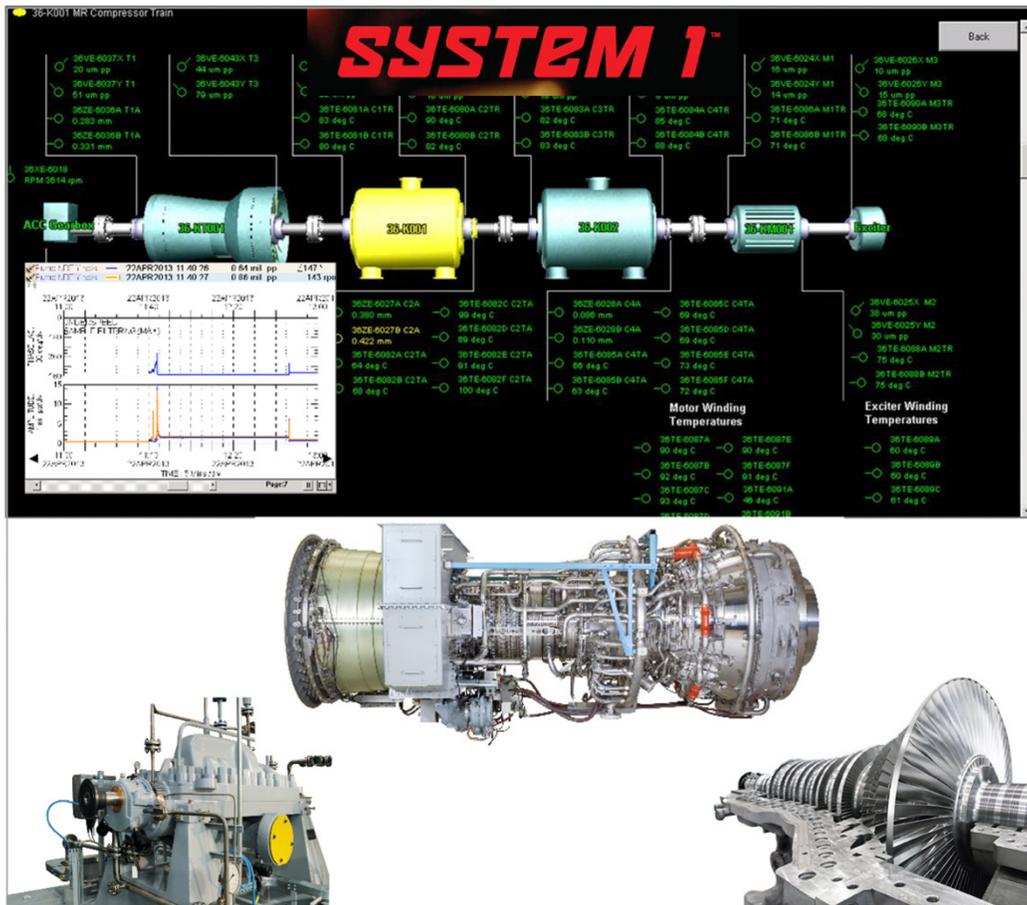
Any user of System 1 Classic can appreciate that pages could be filled documenting its rich capability set. However, widespread adoption of a solution extends beyond just technology, and must also consider the Personnel and Work Processes in which the tool will be integrated. The need to innovate beyond technology was documented in the 3Q 2001 edition of Orbit magazine:

“Successfully managing plant assets requires not only the right tools, but also the behavioral changes necessary to embrace and use new methods for conducting business. To quote noteworthy management consultant, Ollie White, “You need clubs to play golf, but skill is in the hands of the user.”²

While an extremely capable tool, in many ways the vision of System 1 preceded the maturity of our customers, their network architectures (including remote connectivity), and Bently’s own plant-wide device offerings.

- The **User Experience** did not seamlessly support the **Condition Monitoring** processes of our users, many of which were being established or actively evolving in the early-2000s. This resulted in more limited adoption – mostly by expert engineering personas.
- As cybersecurity standards became more stringent, System 1’s deployment on the Process Network restricted **Accessibility**, preventing its utilization as a proactive Condition Monitoring platform and therefore restricting wider adoption within the customer’s organization.
- Finally, the Bently Nevada **Plant-Wide** portfolio did not mature for Critical and Less-Critical assets, preventing holistic asset management with the platform.

System 1 Classic has been and continues to be a critical tool for many of our customers. However, in our continuous effort to provide innovative offerings, Bently Nevada set out to develop the next generation of the System 1 Platform with the goal to address our learnings from the past and fulfill the original vision laid out in the year 2000.



System 1 Classic has been well adopted for monitoring of high-criticality rotating and reciprocating assets, but did not reach the sought-after level of integration into customer work processes as part of holistic asset management

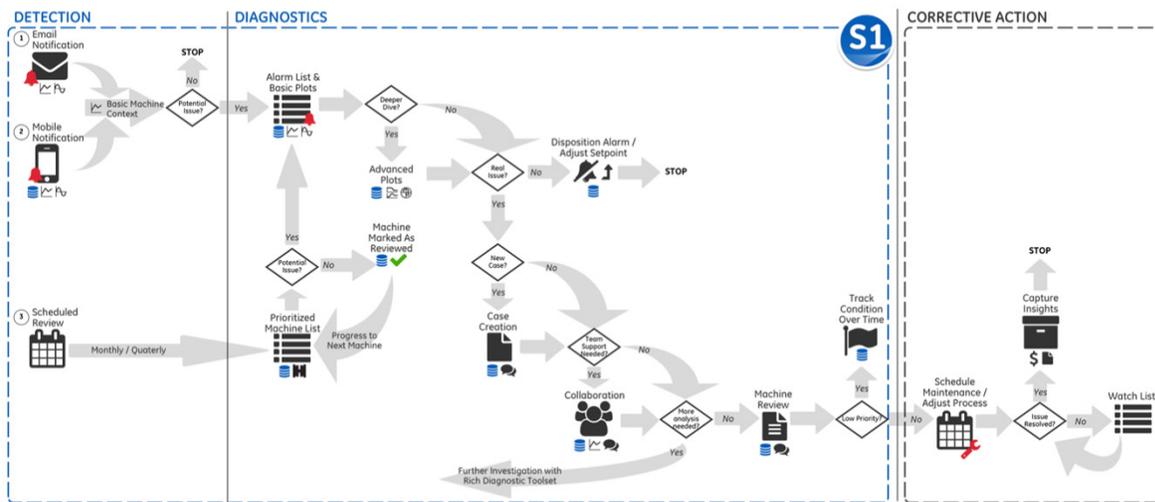
²System 1: What it is, what it does, where it fits, published 3Q 2001 by Orbit Magazine, Minden, NV (www.bently.com)

System 1 Evo

The Plant-Wide Vision is Realized

When embarking on the next generation of System 1 (informally referred to as Evo), the Product Management team engaged in customer workshops across many industries and regions. Through research in 25 countries with more than 500 end users, we studied our customers' team dynamics, site processes, and technology suites to determine how System 1 can best support plant-wide asset monitoring.

As a result of this research, we created the Condition Monitoring Workflow (shown below), highlighting how People, Process, and Technology come together to perform asset management. Interestingly (and thankfully), this flow of Detection, Diagnostics, and Corrective Action is consistent across industries, enabling the System 1 Team to develop a **User Experience** that seamlessly supports Condition Monitoring users and their processes. Every new feature is integrated in a manner that enhances one or more customer use cases, while maintaining consistency in interactions and visual patterns.

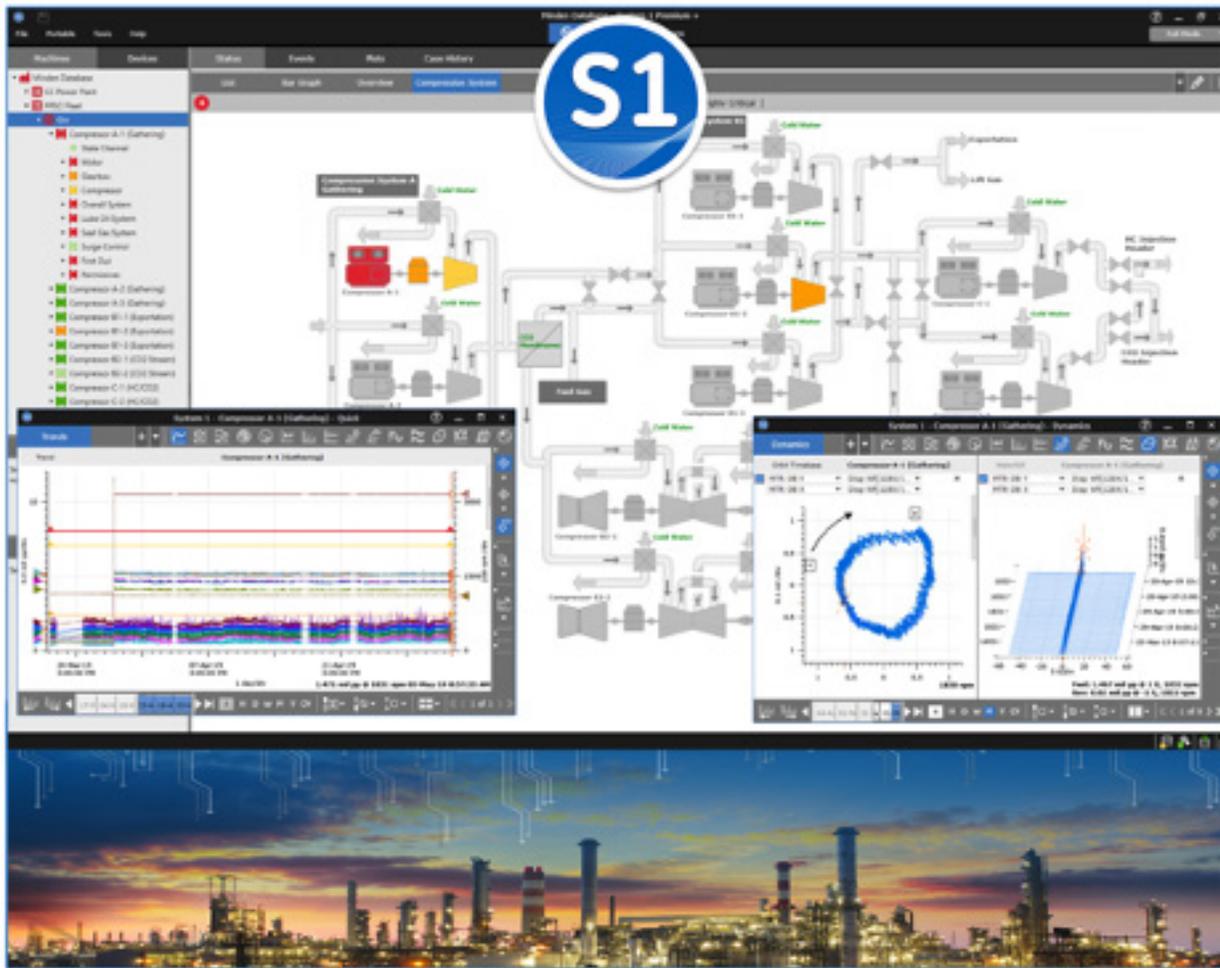


The development of System 1 Evolution has been focused on People + Process + Technology, ensuring that Condition Monitoring capabilities are integrated to support the workflow of our customers

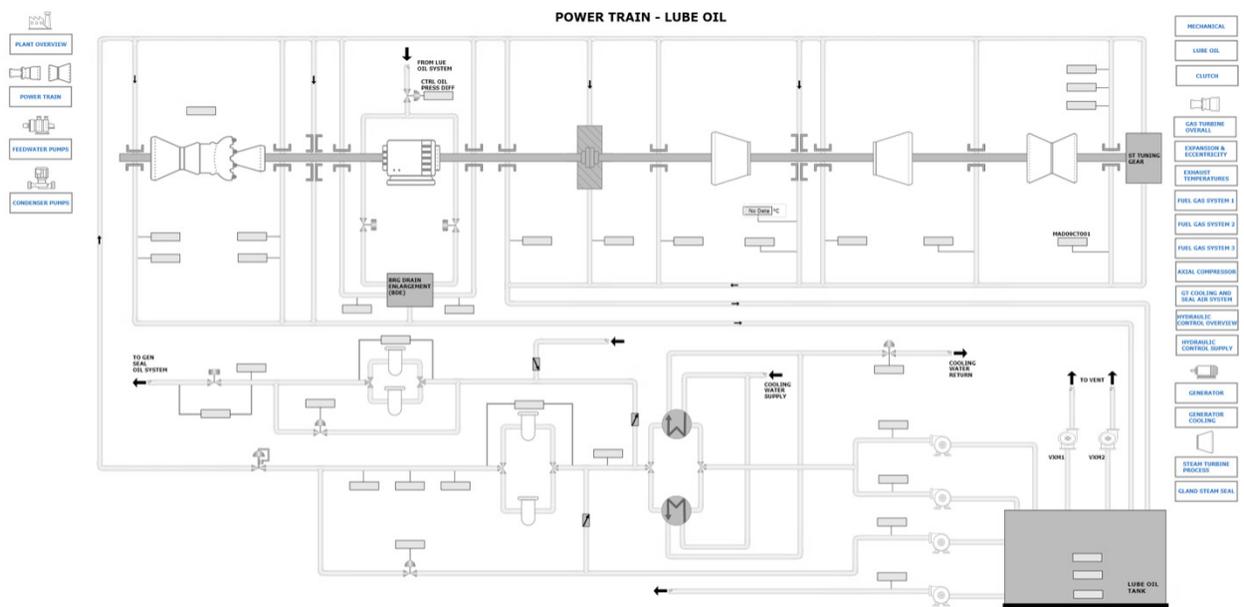
Our engagements with users drove many key platform capabilities that have successfully extended System 1's focus beyond its previously narrow "vibration" view, including external interfaces for importing process and control system data, a high-speed data store to historize all data at rates of up to once-per-second (and 200ms Modbus storage), and data replication to enable **Accessibility** to this rich data set on the Business Network. The parallel evolution of Bentley Nevada's plant-wide hardware offerings, such as Ranger Pro and SCOUT, ensures that our solution connects, analyzes, and visualizes data for all **Plant-Wide** assets.

At the same time, our understanding of user workflows ensured that the deep visualization capabilities that were present in the original System 1 offering were maintained, with enhancements to the built-in capabilities to construct Plant, Unit, and Machinery-level HMI views.

By combining its Connectivity, Analytics, and Visualization capabilities, System 1 Evo is positioned as the premier Edge Historian and Condition Monitoring platform of all Industrial Operators.



System 1 Evolution, with an intense focus on plant-wide device integration and Condition Monitoring workflow, is a holistic asset management platform combining vibration, process, control, and emissions data



An HMI view of a Power Train's Lube Oil system in a Combined Cycle Power Plant, modeled within System 1 Evo

The Future of System 1

Re-Inventing Asset Management, All Over Again

“Bently Nevada is one of the Condition Monitoring firms that can rightly claim they invented the whole concept of Asset Management in the first place”

- Control Magazine, April 2000

In process-intensive industrials, a major component of the current digital revolution is the adoption of Asset Performance Management (APM) tools, which seek to optimize the availability of operational assets.³ The potential for more informed decisions is driving Industrial Operators to seek out a single asset management tool that spans all Asset Levels – from machine case to entire facilities – and incorporates analytic insights.

When reflecting upon the original vision of System 1, it becomes evident that Asset Performance Management (APM) is an evolution of the Plant Asset Management (PAM) concept that Bently Nevada helped to pioneer over 20 years ago – they even share the same three letters! Both seek to enable holistic asset management, using data capture, integration, analytics, and visualization to improve operations and maintenance timing, and to identify which maintenance and inspection activities to perform on industrial assets. So, how does Bently Nevada continue to innovate in this evolving asset management space?



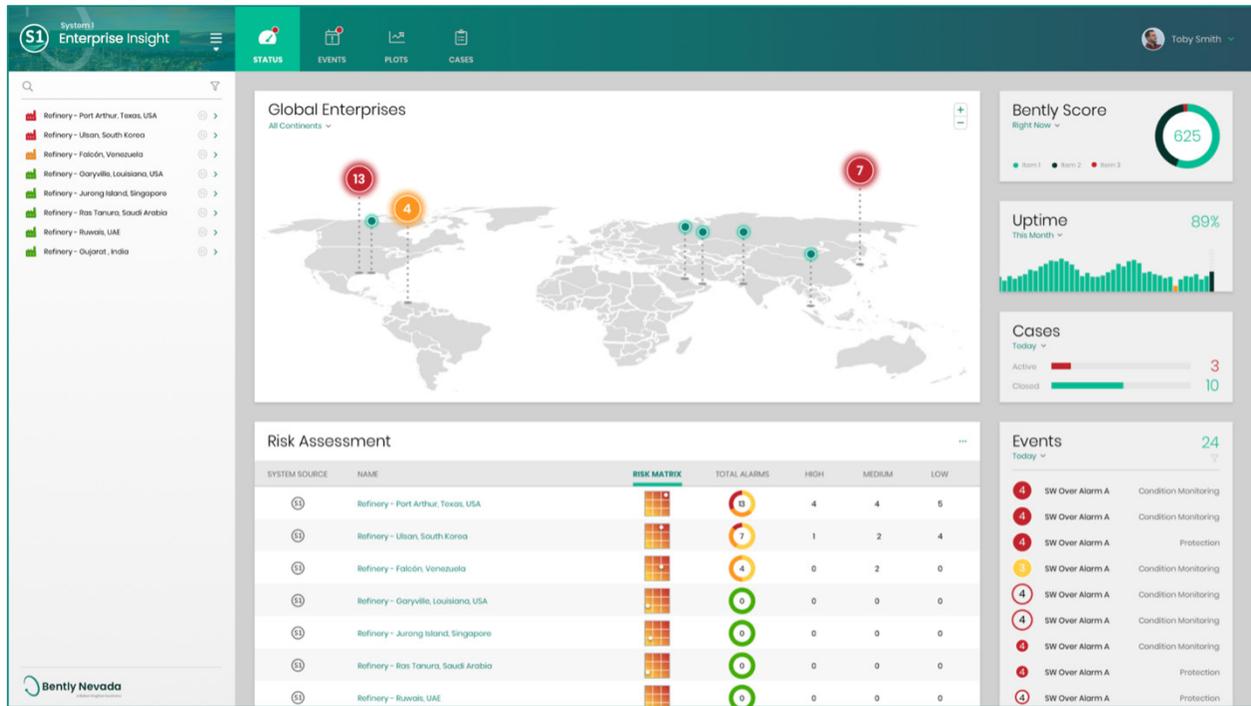
First, we build from our unparalleled edge data acquisition – 100,000+ assets under management, 6,000,000+ installed sensors, and 300,000+ Bently Nevada Edge Devices deployed globally. This data can be connected to System 1 Evo, along with process and control system data, for comprehensive plant-wide Condition Monitoring. This full-stack asset management offering is **available to our customers today.**



Next, we are harnessing our domain expertise established over the last 60+ years of innovation and embedding that knowledge into our offering as analytic insights. System 1 Decision Support is our condition-based analytic workbench, with direct integration into System 1 Evo, supporting failure mode identification, and new insights into machine and process conditions. Bently Nevada is partnering with our Machinery Diagnostic Engineers and customer partners to chart a vision for Decision Support, extending its condition-based and predictive analytic insights over time. **The first release of Decision Support will be available in August 2020,** with a supporting Orbit article in 3Q 2020.

Finally, we are working on elevating System 1's visualization and workflow capabilities across the entire asset fleet. Those customers with many assets and System 1 Databases will be able to prioritize assets using Key Performance Indicators (KPIs) provided by Decision Support, perform first line analysis of asset health supported by a plotting toolset, directly interface with System 1 Evo for deeper diagnostic analysis, track and manage asset health over time, and interface with Enterprise Asset Management systems for sharing insights across external systems. This **concept is in the early stages of development without a committed availability date.** However, Bently Nevada is passionate about adding this product to our asset management offerings.

³Foust, N., & Steenstrup, K. (2019). *Market Guide for Asset Performance Management (ID G00388410)*. Gartner, Inc.



Concept of System 1 Enterprise Insight, which will enable enterprise-wide insights across all assets

Technology + Expertise = Best-in-Class Solutions

Within process-intensive industrials, Bently Nevada's Condition Monitoring solutions have long been regarded as best-in-class. This is largely in part to the talented and passionate Bently Nevada team that works tirelessly to deliver products and services that not only meet customer needs, but exceed their expectations.

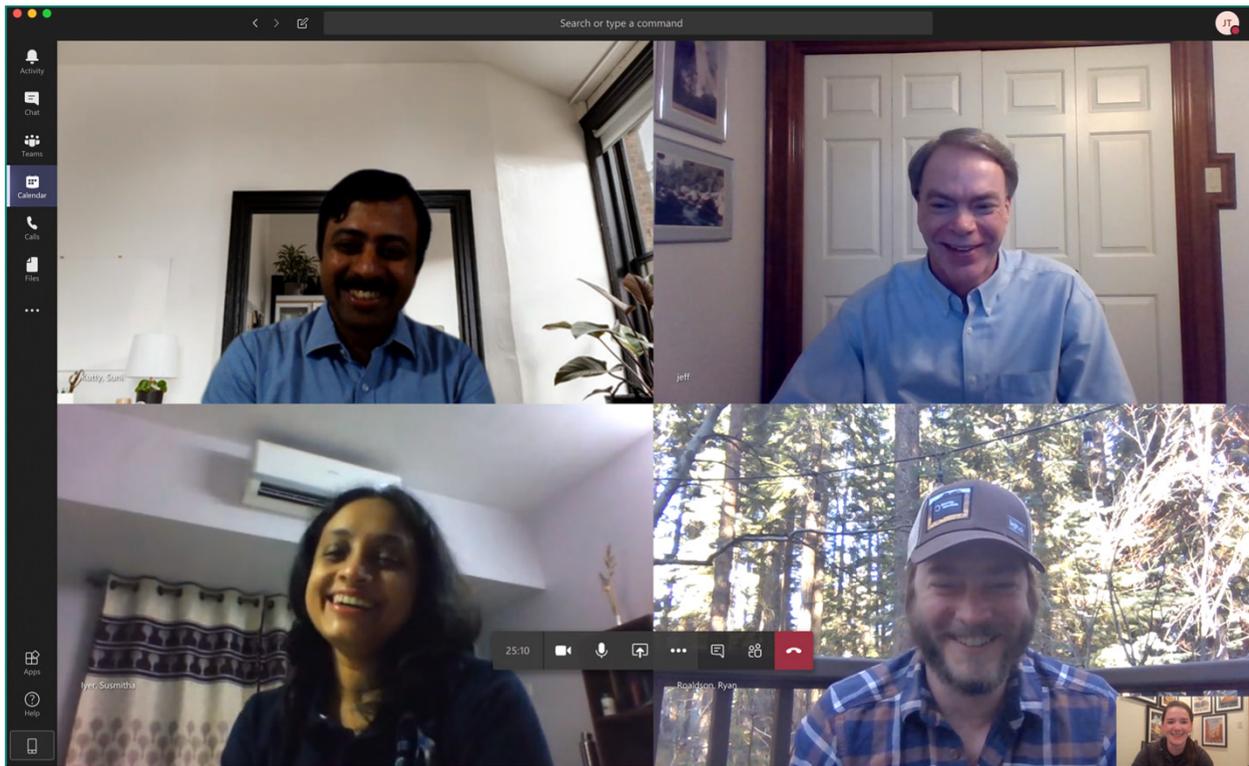
Speaking for myself, I have had the great fortune of learning from many of these experts throughout my 8-year career. I was mentored by both Ken Ceglia and Bob Spriggs, two of the original three masterminds behind the System 1 Classic platform. In addition, I have been lucky to work day-in and day-out with an experienced and dedicated Leadership and Development team guiding the evolution of System 1 from Classic to Evo, all of whom are steadfast in delivering the world's best asset management platform for all industries.

Finally, my "on-the-job" learnings have largely come outside of Bently Headquarters, when researching asset management work practices and to collect feedback for product improvements. It is during these sessions that I have benefited from the vast knowledge of both our Regional Bently Experts and our end customers, whom we view as our partners. I realized from this experience that to truly innovate you have to collaborate!

With our team, I look forward to continuing to guide Bently Nevada's asset management solutions over the next 20 years. If our past and present are any indication, the future looks bright!



Laying the foundation for System 1 in the Bently Software Lab, 2000. Left to right: Ken Ceglia (Principal Software Engineer), Randy Chitwood (Vice President of Engineering), and Bob Spriggs (Software Engineering Manager)



System 1 Leaders discussing 2020 roadmap via Microsoft Teams, 2020. Left to right, top to bottom, and inset: Sunil Kutty (Director of Software Engineering), Jeff Sipek (Analytics Product Manager), Susmitha Iyer (System 1 Program Manager), Ryan Roaldson (Bently Nevada Product Line Leader), and Jackie Tappan (System 1 Technical Product Manager)

Join Us On Our Continued Journey

If you are not yet a System 1 user, reach out to your Bently Nevada representative to understand how you can begin your digital transformation journey with System 1. If you are already a System 1 user, we thank you for trusting and leveraging our Condition Monitoring platform to monitor all of your industrial assets.

Regardless of whether you are a long-time user or a new customer, we look forward to our continued partnership in holistic asset management.