

News Release Press Contact: Jennifer Maguire +1 610 458 2695 jennifer.maguire@bentley.com Follow us on Twitter: @BentleySystems #YII2017; #GoingDigital

# *Going Digital*: Bentley Systems' New *OpenRail* is First to Advance BIM for the Full Rail and Transit Lifecycle – Systems Engineering from Planning Through Performance

Through OpenRail's Connected Data Environment (CDE), Digital Components and Digital Context Converge for Digital Workflow Benefits for Rail Infrastructure

SINGAPORE — The Year in Infrastructure Conference — 10 October 2017 — Today, Bentley Systems' CEO Greg Bentley introduced the *OpenRail* solution, comprising applications and services for the comprehensive planning, engineering, project delivery, and operations of rail and transit infrastructure. *OpenRail*'s foundation is Bentley's *connected data environment (CDE)*, shared by *ProjectWise* collaboration services and *AssetWise* operations services, and which for *OpenRail* now brings together digital components and digital context, through digital workflows. *OpenRail* applications will include *OpenRail ConceptStation*, now available for conceptual railway planning and design; *OpenRail Designer*, available early in 2018, for detailed engineering and 3D design of track, overhead line, tunnels, bridges, and related civil infrastructure, and *AECOsim Station Designer*, for the comprehensive modeling of rail and transit stations.

Mr. Bentley said, "Bentley Systems has a proven record in providing industry-leading solutions to improve project delivery and asset performance for the most challenging rail

and transit projects around the world. Most of our applications portfolio is used on rail projects, and we've advanced BIM for rail, in particular, with our *Rail Track* offering, rail corridor maintenance optimization through *Optram*, and via *ComplyPro* for railway requirements progressive assurance. However, the conception of these specific tools for specific purposes preceded the aspiration for what we now call digital workflows, where engineering deliverables are meant to be reused throughout the asset lifecycle.

"Moreover, our railway engineer users have been persuasive in making the case that a railway—more so than any other infrastructure asset—is a system of connected components, meriting a systems engineering approach from the outset. So, rail has become our company priority for putting everything together—industrializing BIM for project delivery and leveraging digital DNA for asset performance. At this point, while there are still scheduled stops ahead on our *OpenRail* application journey, every rail project and asset can benefit now from *OpenRail*'s CDE and digital workflow services—starting their digital railway infrastructure advancement at any *OpenRail* 'station' and at any time."

#### **Connected Data Environment**

*OpenRail* is based on a connected data environment, comprising the shared services of *ProjectWise* and *AssetWise*, as configured specifically for rail systems engineering workflows. During project delivery, *ProjectWise* facilitates the collaboration among distributed engineering teams, coordination of structured workflows, and connected project visibility. For *OpenRail*, *AssetWise* provides asset lifecycle information services for linear, network and geospatial referencing, corridor maintenance decision support, inspection workflows, and reliability and change management.

*OpenRail* CDE services include *Components Center* for digital components, *ContextShare* for digital context, *ComplyPro* for progressive assurance, and *ConstructSim Completions* for accessing operational readiness. *ComplyPro* is the established market leader in rail globally for governance of collaborative assurance systems of technical and safety requirements from concept to project handover. *OpenRail* extends this scope to progressive operations assurance and regulatory compliance. *ConstructSim Completions* automates the inspections process to accelerate systems progress and validate system readiness for efficient project turnover and closeout.

## **Digital Components**

*Components Center* is an Azure cloud service of libraries which align, across disciplines and applications, the semantic content of catalogued components, potentially including vendor data, fabrication details, component requirements (for example, electrical specifications and connections), reliability characteristics, and representational views required for documentation (for example, 3D, plan, schematic). A digital component is reused across BIM workflows in design modeling, analytical modeling, construction modeling, and asset registries—from catalogued component, to engineered component, to installed component, to operated component.

The *OpenRail Components Center* is being initialized with libraries of generic rail components with appropriate intelligence, and libraries from significant providers such as Siemens, but is intended to be maintained and extended by user organizations.

## **Digital Context**

Reality modeling incorporates digital context in the rail infrastructure workflow. Bentley's *ContextCapture* processes digital photography and/or laser scans, from UAVs or hand-held or train-mounted devices, to produce an engineering-ready "reality mesh" accurately representing the continuously surveyed conditions of a railway corridor, site, or station.

Throughout detailed design, the reality mesh, for example, can be used to consider sight lines for signal siting. Because the reality mesh can be captured continuously, construction progress can be tracked and compared to the expected progress of the detailed design. In operations, the reality mesh can be used to compare the as-operated 3D model with the as-designed model, and serve as an immersive 3D environment with hyperlinks to equipment sensors for operations visibility and emergency response training.

## **OpenRail ConceptStation**

*OpenRail ConceptStation*, enabled by the combination of *OpenRail*'s digital components and digital context, uniquely extends BIM capabilities to rail conceptual planning and layout. Working in the 3D design environment of the geo-coordinated reality mesh as the digital context of the rail corridor, the user can access *Components Center* to drag and drop digital components into the design to quickly lay out rail lines, bridges, overhead lines, signals, tunnels, etc. With the context of the terrain, and the intelligence of the digital components, *OpenRail ConceptStation* can quickly calculate quantities of railway elements such as track, ballast, sleepers, contact and catenary wire, equipment, bridge decking, concrete, and steel, as well as the cut-and-fill earthwork required for the conceptual design, and interactively produce a preliminary cost estimate to evaluate feasibility. All the design information, components, and context in the conceptual design can be reused in a digital workflow to *OpenRail Designer* for detailed design of the railway infrastructure.

## **Digital Workflows**

In digital workflows, data captured or created for one purpose is accessed by computer programs for other purposes, saving time, minimizing rework, and improving data quality over the asset lifecycle. Digital workflows can also converge the work of different disciplines for additional advancements in project delivery and asset performance. Examples enabled by digital workflows include *conceptioneering*, *constructioneering*, *inspectioneering*, and *operationeering*. Each of these workflows represent new opportunities for engineers and their work to add value beyond their traditional role in design, to include contributions to construction, inspections, and operations.

The advancement of digital workflows in *OpenRail* will help users to achieve faster delivery, system-wide visibility, assured compliance, and better decisions in design, construction, and operations of rail infrastructure.

#### Learn more about OpenRail here.

## **Related Images:**

Image: OpenRail ConceptStation CONNECT Edition 1

**Caption:** OpenRail ConceptStation CONNECT Edition allows rapid exploration of multi-discipline design and engineering alternatives

Image: OpenRail ConceptStation CONNECT Edition 2

**Caption:** OpenRail ConceptStation CONNECT Edition leverages inbuilt design and clearance checks on existing and proposed infrastructure

Image: OpenRail ConceptStation CONNECT Edition 3

**Captions:** OpenRail ConceptStation CONNECT Edition creates innovative and inspiring designs including switches, crossings and related infrastructure

Image: OpenRail ConceptStation CONNECT Edition Costing

**Caption:** OpenRail ConceptStation CONNECT Edition allows understanding of financial implications as early as possible in the process

Image: OpenRail Designer CONNECT Edition 1

**Caption:** OpenRail Designer CONNECT Edition cant editor affords engineers and designers with the required control and flexibility

Image: OpenRail Designer CONNECT Edition 2

**Caption:** OpenRail Designer CONNECT Edition provides immersive rail and transit corridor modeling

Image: OpenRail Designer CONNECT Edition 3

**Caption:** OpenRail Designer CONNECT Edition allows rapid development of multidiscipline designs in context using 3D reality meshes

#### **About Bentley Systems**

Bentley Systems is a global leader in providing engineers, architects, geospatial professionals, constructors, and owner-operators with comprehensive software solutions for advancing the design, construction, and operations of infrastructure. Bentley users leverage information mobility across disciplines and throughout the infrastructure lifecycle to deliver better-performing projects and assets. Bentley solutions encompass *MicroStation* applications for *information modeling*, *ProjectWise* collaboration services to deliver *integrated projects*, and *AssetWise* operations services to achieve *intelligent infrastructure* – complemented by comprehensive managed services offered through customized Success Plans.

Founded in 1984, Bentley has more than 3,000 colleagues in over 50 countries, more than \$600 million in annual revenues, and since 2011 has invested more than \$1 billion in research, development, and acquisitions.

Additional information about Bentley is available at <u>www.bentley.com</u>. For Bentley news as it happens, subscribe to an <u>RSS feed</u> of Bentley press releases and news alerts. Visit <u>The Year in Infrastructure Conference</u> website for information on Bentley's premier thought-leadership event. To view a searchable collection of innovative infrastructure projects from the annual *Be Inspired* Awards, access Bentley's <u>Infrastructure Yearbooks</u>. To access a professional networking site that enables members of the infrastructure community to connect, communicate, and learn from each other, visit <u>Bentley</u> <u>Communities</u>.

To download the *Bentley Infrastructure 500* Top Owners ranking, a unique global compendium of the top public- and private-sector owners of infrastructure based on the value of their cumulative infrastructure investments, visit <u>BI 500</u>.

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