iTwin Capture

Bentley®
Advancing Infrastructure

About Bentley:

Solutions for Project Delivery and Asset Performance

Bentley's mission is to provide

innovative software and services

for the enterprises and professionals who

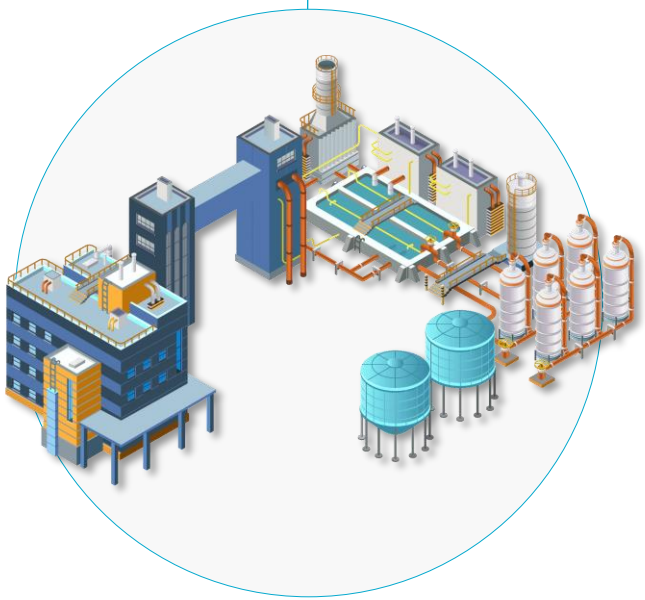
design, build, and operate

the world's infrastructure – sustaining the global economy and environment for

improved quality of life.

Infrastructure Digital Twins

Real-world



Living digital twin

Bentley

Physical Asset

Engineering

- Specs
- Drawings
- Documents
- Models
- Analyses
- Geotech
- OEM specs

Reality Capture

- Photos
- Panoramas
- Meshes
- Point clouds
- Thermal
- Radar

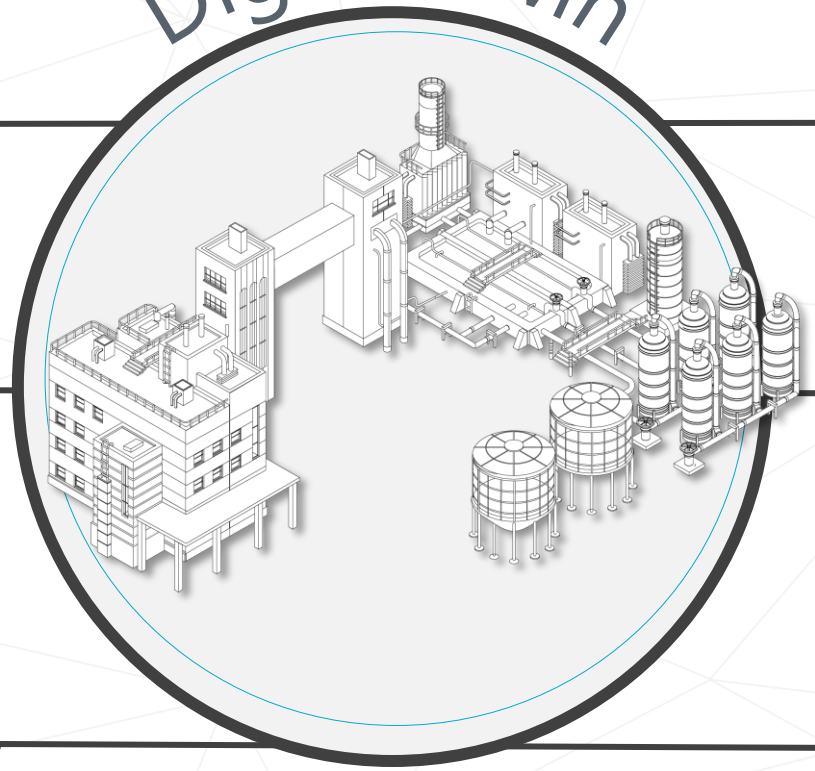
Information

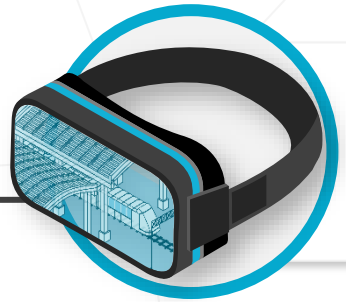
- Asset tags
- Work orders
- Maintenance records
- ERP
- Master Plans

Operations

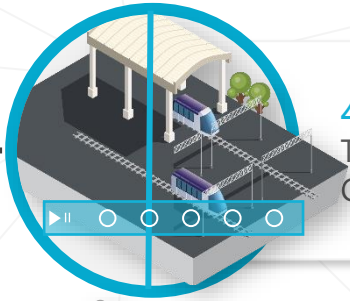
- IoT feeds
- Sensors
- Inspection records

Digital Twin





3D/XR
Immersive Visualization



4D
Timeline of Change

AI/ML
Analytics Visibility

Bentley®

Reality Capture and Digital Twins

Digital representation

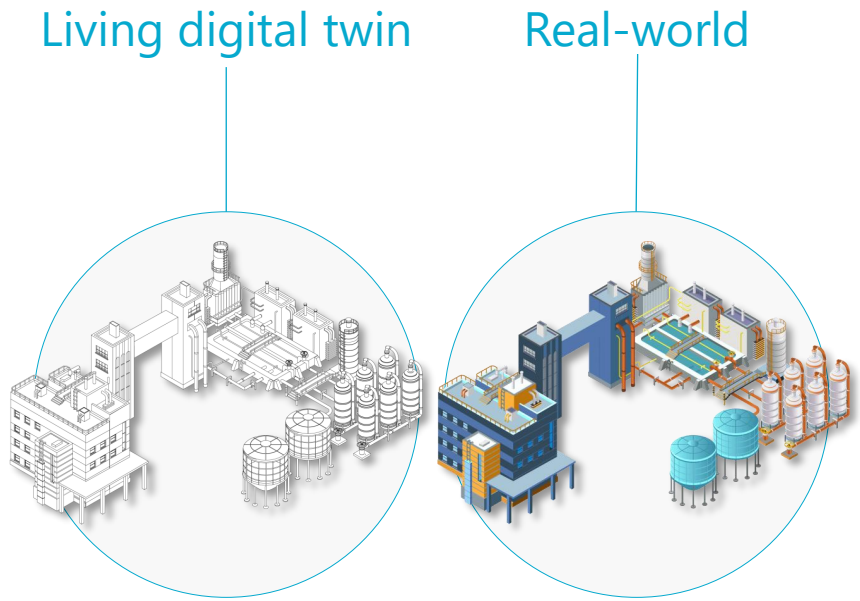
Digital representation of a physical asset, process, or system

Continuously surveyed

Continuously synchronized from multiple sources

Generate insights

Predictability and performance optimization



Bentley

iTwin Capture

Add Real-world Insights with Reality Capture to Your Digital Twins

Every digital twin should provide users immediate access to real-world insights across their workflows. iTwin Capture enables reality capture workflows from data creation and enhancement, to management and sharing, to insight extraction and delivery.

Image Courtesy of West Virginia Department of Transportation

iTwin Capture

Add Reality Data and Real-world Insights to Your Digital Twins

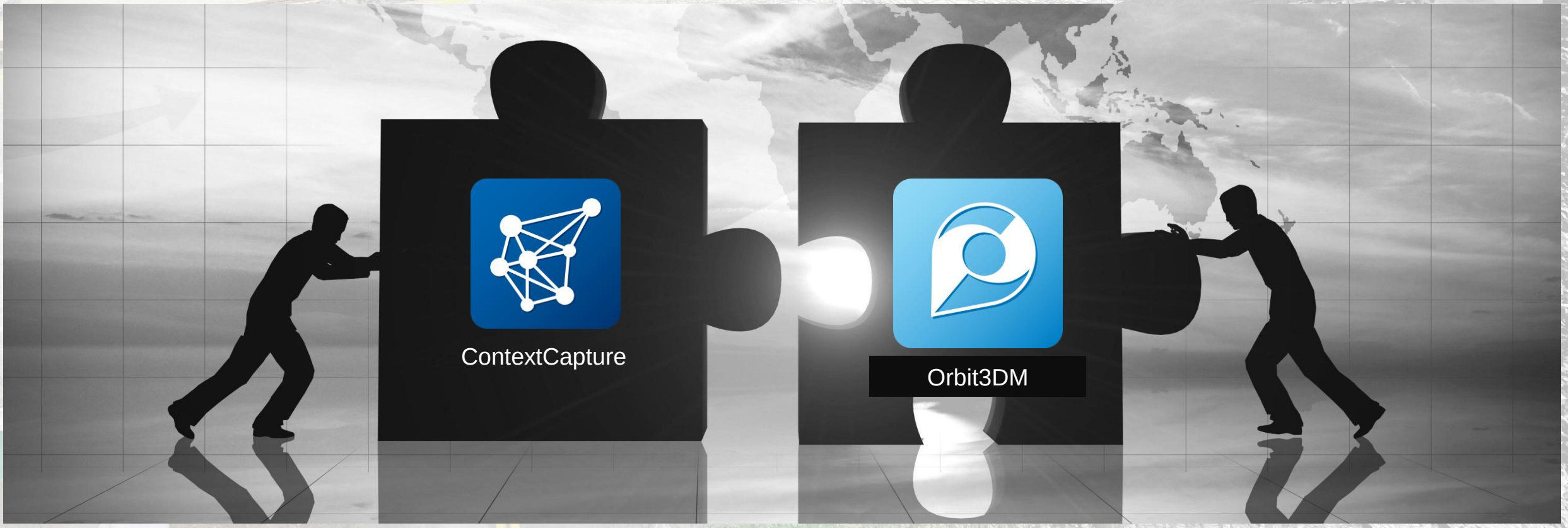


Image Courtesy of West Virginia Department of Transportation

iTwin Capture

Add Reality Data and Real-world Insights to Your Digital Twins

3 **Validate, Extract Insights, and Deliver**

2 **Manage and Share**

1 **Capture, Create and Enhance**

Image Courtesy of West Virginia Department of Transportation

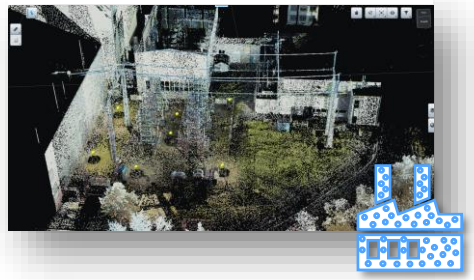
1 Reality Data Creation and Enhancement

How to integrate and enhance reality data

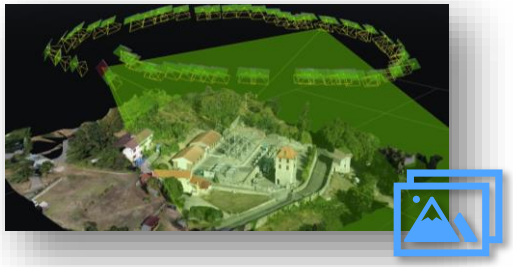
How to leverage modern photogrammetry and scanning at scale to create reality mesh

Reality Mesh

Point Clouds

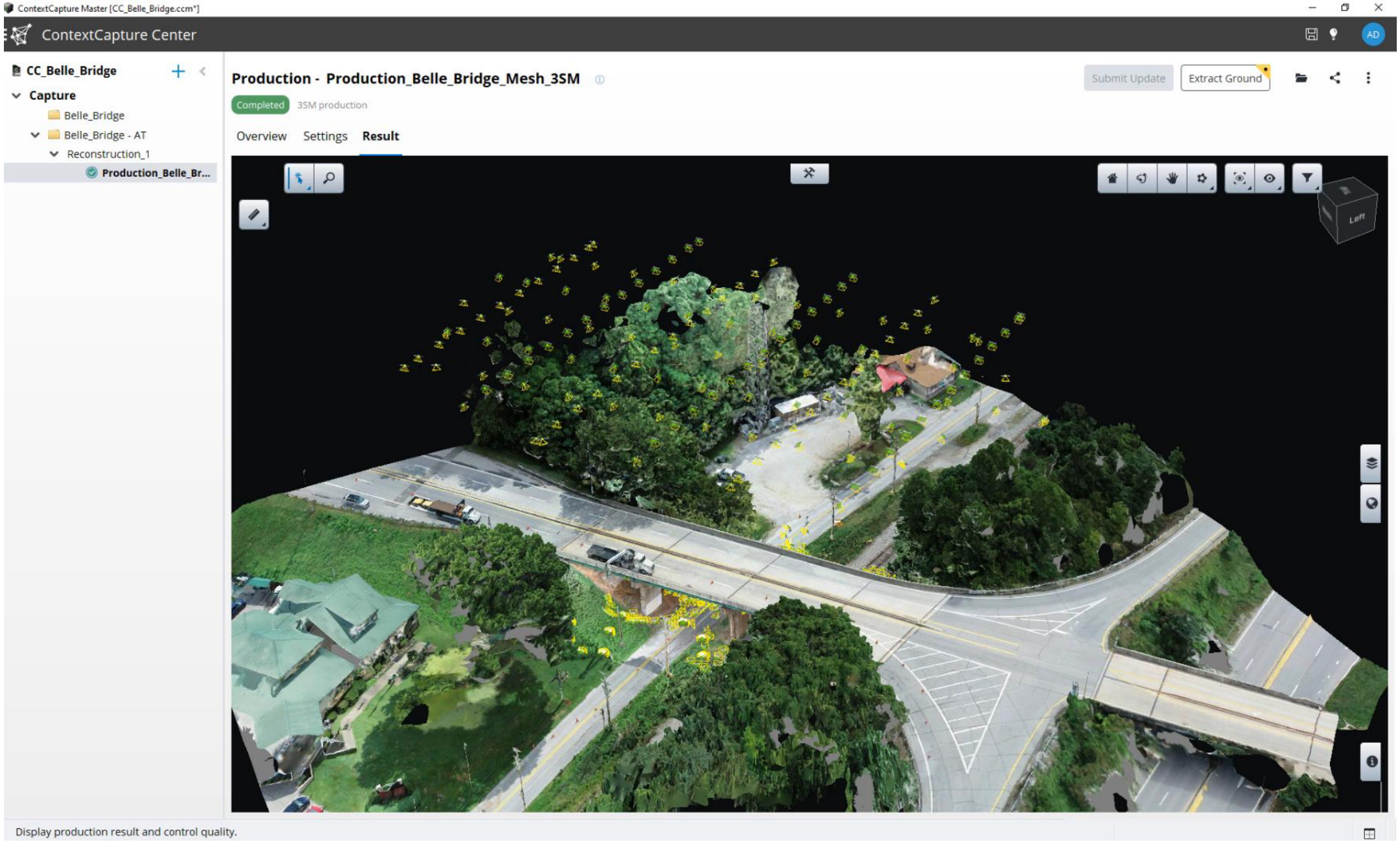


Images



Ortho Images


SIEMENS
SIEMENS POWER STATION
1,250 drone images
2,500 ground images
650 million points
Bentley in association with Topcon and Siemer




BIV.

iTwin Capture to **Create and Enhance** Reality Data

- Best reality mesh quality from the air, the ground, and very close range... All together
- Scalability (works for project of all sizes – biggest project requires CC Center)
- Reality meshes, orthophotos from photos and/or LiDAR point clouds
- Excellent support of coordinate systems
- Interoperability through many formats (Bentley and 3rd parties)
- On-prem (Windows and Linux) and Cloud service
- Highly customizable (SDK and APIs)
- Automatic enhancements of images and point clouds

2 Manage and Share Reality Data

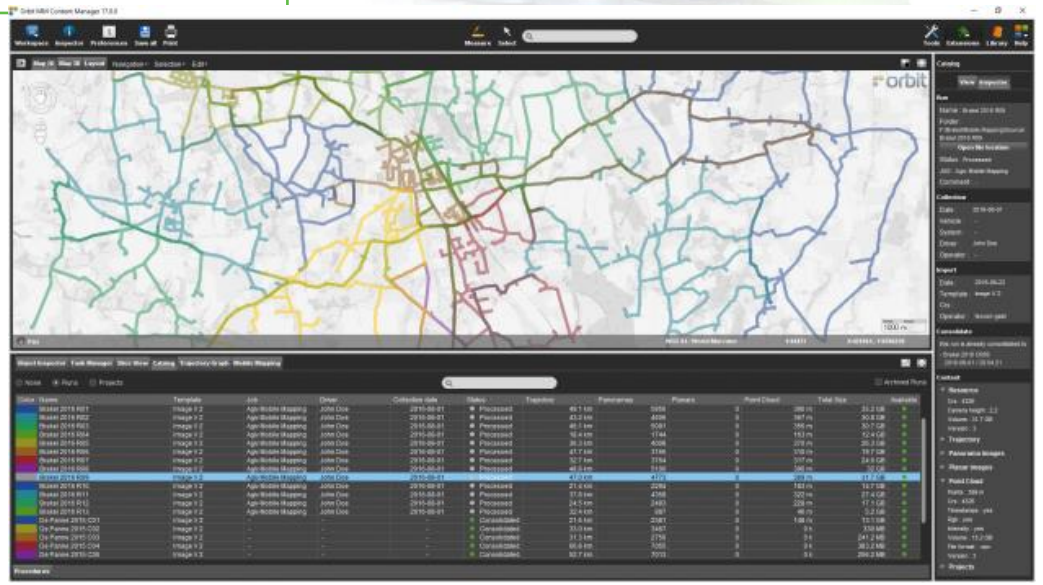
How to MANAGE the terabytes or petabytes of reality data captured over time?

How to deal with all types of reality data whatever the hardware provider or the type of device (photo, LiDAR..)

How to organize, optimize these data and make them searchable

How to share these data and support downstream consumption in a controlled and secured way.

We refer to a project in Flanders, Belgium, where the user was capturing with 4 mobile mapping cars the entire **64000 kms** of public roads in LiDAR and 360 degrees imagery. This ends up in a database of **80TBs of point cloud** datasets, and **12.4 million pictures**. How do we deal with such volumes?



Orbit 3DM Content Manager 20.4.0

Workspace | Preferences | Select | Search vector attributes | Measure | Tools | Extensions | Library | Help

Panoramas
Point Cloud
Envelope
Openstreetmap

Map 2D | Map 3D | Map GL | Navigation | Selection | Edit

Place Point | WGS 84 / World Mercator | 1/5879 | X:- , Y:- | 150 metre

Object Inspector | Task Manager | Catalog | Slice View | Mobile Mapping | UAS Mapping | Oblique Mapping | Trajectory Graph

Open View | Focus | Close all

BE Bruges - MMS by Image-V

2016-05-26 07:39:20
IMAGE-V_01_20160526_11_000936

Heading: 58.5
Tilt: 0.0
Field of view: 90.0

Procedures

Catalog

View | Inspector

Run

Name :
BE Bruges - MMS by Image-V

Folder :
F:\Data.Demo\BE Bruges\BE Bruges - MMS by Image-V

Open file location

Status : Added
Job : -
Comment : -

Collection

Date : -
Vehicle : -
System : -
Driver : -
Operator : -

Content

Resource
Trajectory
Availability Images
Panorama Images

Photo positions : 196691
Crs : 4326
Timestamps : yes
Timestamps min : 1148104830
Timestamps max : 1163229526
Original images : 0
Volume : 483 B
File format : .jpg
Processed images : 24086
Volume : 92.1 GB
File format : .omi

Planar images
Planars
Point Cloud

Points : 10002 m
Crs : 4326
Timestamps : yes
Timestamps min : 1148104831
Timestamps max : 1163229527
Rgb : yes
Intensity : yes
Volume : 466 GB
File format : .opc
Version : 3

DTM

iTwin Capture to **Manage and Share Reality Data**

- Works with all reality data types, from ground, to air, to hardware agnostic
- Scalability (works for projects with hundreds of terabytes)
- Physical and virtual data organization dedicated to downstream consumption
- Highly configurable with template-based system definition and SDK
- Interoperability through many formats (Bentley and third-party)
- Excellent support of coordinate systems
- Interactive quality control tools
- Support all iTwin/digital twin applications

Validate, Extract Insights, and Deliver

3

How to enable end user to visualize and validate reality data

How to allow user to extract insights such as survey and GIS features out of reality data

How to deliver reality data

Bentley

ProjectWise ContextShare | Reality Data Web Viewer

https://qa-connect-realitydataviewer.bentley.com/?id=06e57210-21a2-412e-94d5-b291f1c7b2a3&projectId=b5282cfe-e232-4da5-824c-63e9a3b07b56

Home | Bentley Systems Inc | Assets | Projects | rdv-4d-rm-qa
RDV 4D Navigation - Reality Mesh - QA

Pascal Cloutier

Reality Data Web Viewer | RDV 4D Navigation - Reality Mesh - QA > 2019-01_S13_Titiwangsa

No Reality Data with acquisition date

No Reality Data with acquisition date

Data Courtesy of MMC Gamuda KVMRT (T) Sdn Bhd

Messages 0

iTwin Capture to **Validate, Extract Insights, and Deliver**

Web and desktop applications

Reality meshes, point clouds, panoramas, and oblique imagery

High scalability with large datasets

Rich measurements capabilities

Advanced desktop tools with high automation (computer vision and AI)

APIs and SDKs

Bentley

Subscriptions and Products

Bentley
Advancing Infrastructure

New iTwin Capture Commercial Offering – June 15th

iTwin Capture Cloud
Account Consumption Contract

iTwin Capture Cloud Services and Apps

$1500 USD

iTwin Capture Modeler
Practitioner Subscription

iTwin Capture Modeler

$1500 USD

+

Mandatory

iTwin Capture Cloud Services and Apps

$1500 USD

iTwin Capture Suite
Practitioner Subscription

iTwin Capture Manage & Extract

iTwin Capture Modeler

$4000 USD

+

Mandatory

iTwin Capture Cloud Services and Apps

$1500 USD

Price Points and Discounts?

- Processing Units: 3.5 USD
  (1 Gigapixel or 10 Millions of Points)
- Management Unit: 0.14 USD
  (1 Gigabytes per Quarter)
- Minimum fee of 375 USD/Quarter

- Not EVD Eligible
- Not applicable to E365 contracts

Bentley

iTwin Capture Cloud Services and Apps

- The services:
  - iTwin Capture – Reality Modeling Service: create Reality Meshes & Ortho Images
  - iTwin Capture – Reality Management Service: host Reality Data on the cloud, stream to iTwin Apps, MicroStation Based products
- The Applications:
  - iTwin Capture – Reality Data View: perform QA/QC in Web environment
  - iTwin Capture Mobile: AR based supervised capture & connection to services
  - iTwin Capture Console: Desktop application to configure Reality Modeling project and submit them to iTwin Capture Cloud Services.
- Contracts, 2 options:
  - Included in E365
  - SELECT + CSS + QVIDIAN Order form

Bentley

iTwin Capture Modeler

- The Applications:
  - iTwin Capture Modeler (renaming of ContextCapture Desktop)
  - iTwin Capture Modeler Center (renaming of ContextCapture Center)
  - Depreciation of the module ContextCapture Editor.

- Licenses:
  - QTL, TL , Perpetual and E365 unchanged.
  - iTwin Capture Modeler included in “**iTwin Capture Modeler -** Practitioner Subscription””

Bentley

Additional Resources

Bentley
Advancing Infrastructure

iTwin Capture Manage & Extract

- The Application :
  - One application **iTwin Capture Manage & Extract**
  - Consolidation of Orbit Content Manager , Feature Extraction (Basic, Pro & Standard)

- Licenses:
  - QTL, TL , Perpetual and E365 consolidated on **iTwin Capture Manage & Extract** (legacy price of Orbit Content Manager).
  - iTwin Capture Manage & Extract included in "**iTwin Capture Suite**"

Bentley

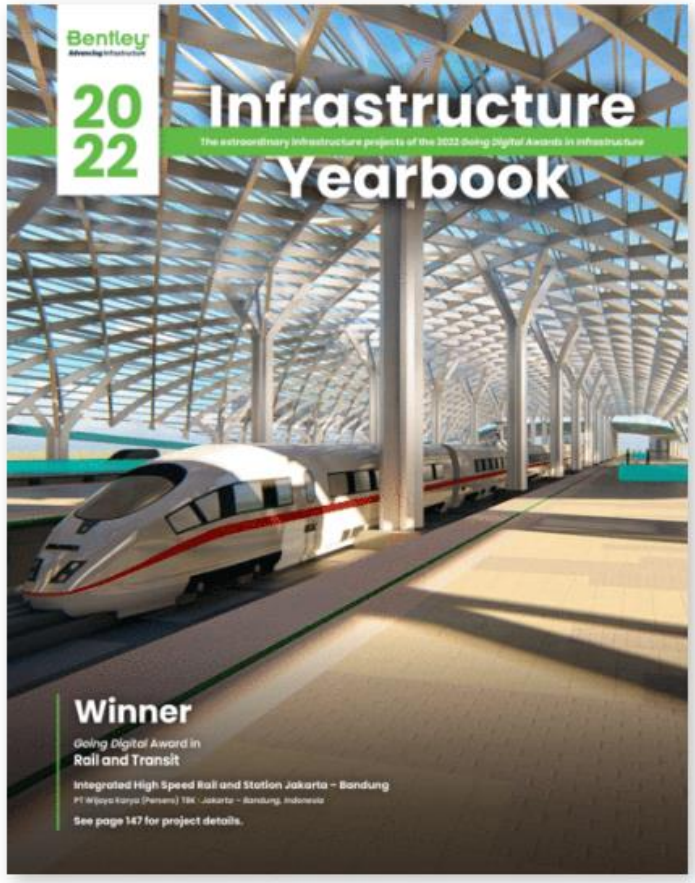
- iTwin Capture “Communities”
- Product Datasheet
- Product Video
- Product Page

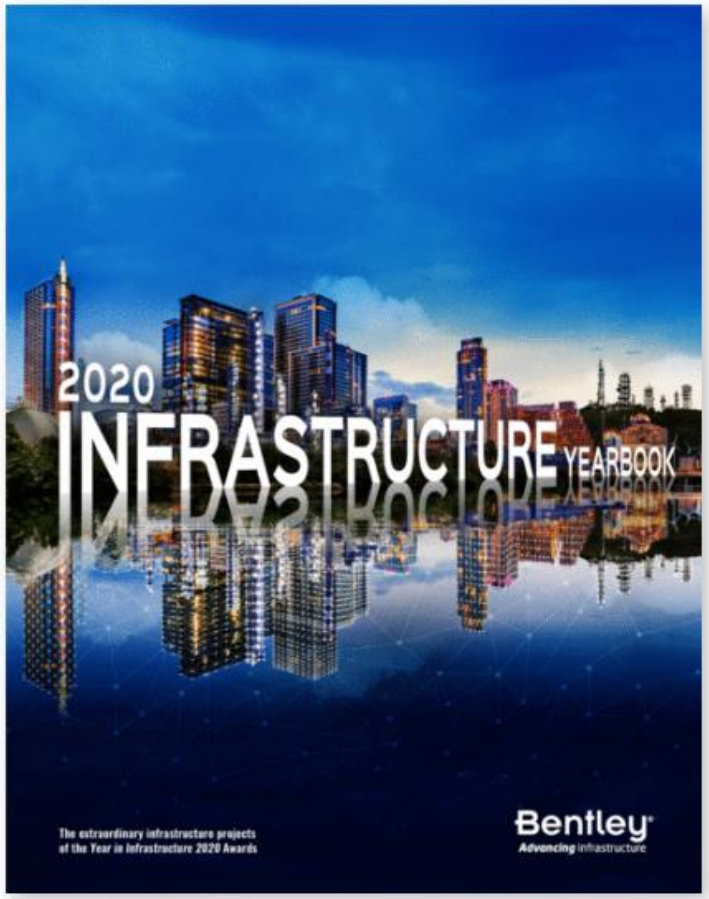
User References

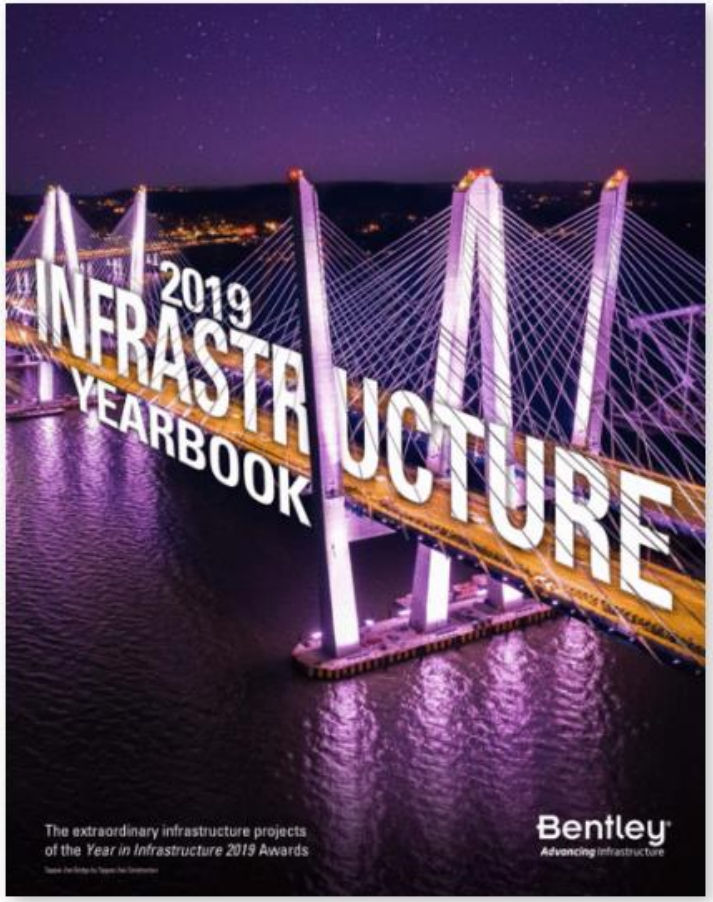
Bentley
Advancing Infrastructure

Additional Project References

- https://www.yearininfrastructure-digital.com/ Reality Modeling







Bentley

Glossary

Bentley®
Advancing Infrastructure

- **Reality Capture:** process and of capturing, managing and analyzing real-world conditions using reality capture sensor and automatic processing.

- **Reality Capture Sensors**: hardware devices, sometimes referred as remote sensing devices, that can be used to capture real-world conditions. The most common one are LiDAR, RADAR, digital camera, and thermal sensors. These can be handheld, mounted on static tripod or on mobile platforms such as drones, airplane, cars. These types of sensor usually output images and/or 3D point clouds.

- **Reality Modeling:** process of creating models such 3D meshes or orthoimages by combining and/or modifying data capture with reality capture sensors. Example: automatic photogrammetry creating reality meshes out of photos; meshing of laser scan data; meshing of InSAR data

- **iTwin Capture :** Bentley's iTwin solution and brand for reality capture.

- **iTwin Capture Modeler**: Desktop product under iTwin Capture brand which corresponds to the new generation of Bentley ContextCapture and which is dedicated to reality modeling.

- **iTwin Capture Modeler Center**: Enterprise Product under iTwin Capture Brand which corresponds to the new generation of Bentley ContextCapture Center and which is dedicated to Reality Modeling for large mapping use cases on user IT infrastructure.

- **iTwin Capture Cloud and Apps**: iTwin Capture Cloud services to perform reality modeling, reality data management, and reality data analysis. These services can be access through application programming interface through dedicated applications : iTwin Capture Mobile and Console. , as well as

- **Reality Data Management application:** iTwin product component providing a web interface to manage reality data under iTwin Capture and iTwin Experience. This is the new generation of ProjectWise ContextShare.

- **iTwin Capture Manage and Extract:** iTwin Capture desktop product used to catalog and organize reality data locally and on cloud as well as to perform feature extraction. This is the new generation of Orbit 3DM Manage and Extract, Content Manager and Feature Extraction products.

Bentley