



Bentley®

Advancing Infrastructure



Ciclo de Conferencias 2019
Colegio de Ingenieros Militares

Ing. Alejandro Donnadiou Cervantes, M.B.A., I.C.
Director Regional



Globalmente Comprometidos con México

La misión de Bentley es proporcionar *software y servicios innovadores* para las empresas y los profesionales que *diseñan, construyen y operan* la infraestructura mundial, dando sustentabilidad a la economía mundial y el medio ambiente para *mejorar la calidad de vida*.



BIM *Advancements*

Bentley®

Advancing Infrastructure



PROJECTWISE



Design Integration Visa
BIM Review Visa
BIM Standards Management Visa

Optioneering Visa
Construction Management Visa
Advanced Work Packaging Visa

CONNECTED DATA ENVIRONMENT

Connection Center
Automation Center
Components Center
Optioneering Center

ASSETWISE



Asset Lifecycle Information Management
Asset Reliability
Operational Analytics
Enterprise Interoperability



ProjectWise Explorer

Navigator

Structural Navigator

Open Roads Navigator



Worksite

Bentley Map Mobile

ProjectWise Edge

InspectTech Collector

CAMPUSES

- Map
- Descartes
- AECOSim
- RAM
- STAAD
- OpenRoads
- gINT
- SITEOPS
- ContextCapture
- LumenRT
- Haestad
- OpenUtilities
- Communications

MINING

- MineCycle
- OpenPlant
- STAAD
- Promis.e
- Map
- Descartes
- ContextCapture
- OpenRail
- gINT
- Haestad
- AssetWise APM
- Amulet

ROADS

- OpenRoads
- OpenBridge Modeler
- LEAP
- RM Bridge
- gINT
- Descartes
- SITEOPS
- ContextCapture
- LumenRT
- Map
- Haestad
- InspectTech
- SUPERLOAD

CONSTRUCTION

- Navigator
- ConstructSim
- ProStructures
- AECOSim
- Descartes
- OpenRoads
- SITEOPS
- EADOC
- ContextCapture
- LumenRT

UTILITY NETWORKS

- OpenUtilities
- Communications
- Substation
- Haestad
- STAAD
- Descartes
- SITEOPS
- ContextCapture
- LumenRT
- InspectTech
- Amulet
- AssetWise APM

WATER & WASTEWATER

- Haestad
- OpenPlant
- AutoPLANT
- AECOSim
- STAAD
- RAM
- gINT
- OpenUtilities
- OpenRoads

BUILDINGS

- AECOSim
- RAM
- STAAD
- ProStructures
- Hevacomp
- speedikon
- gINT
- OpenRoads
- OpenUtilities
- Communications
- Haestad
- ContextCapture
- LumenRT

RAIL & TRANSIT

- OpenRail
- OpenBridge Modeler
- RM Bridge
- LEAP
- gINT
- Promis.e
- SITEOPS
- ContextCapture
- LumenRT
- Map
- AECOSim
- STAAD
- RAM
- InspectTech
- Optran

SUBSURFACE UTILITIES

- OpenUtilities
- Communications
- Haestad
- OpenRoads
- gINT

WIND FARMS

- SACS
- MOSES
- MAXSURF
- ProSteel
- OpenPlant
- gINT
- ContextCapture
- AssetWise APM
- Amulet

CITIES

- Map
- Descartes
- OpenRoads
- OpenRail
- OpenUtilities
- Communications
- AECOSim
- ContextCapture
- LumenRT
- SITEOPS

COMMUNICATIONS NETWORKS

- Communications
- STAAD

POWER PLANTS

- OpenPlant
- AutoPLANT
- AutoPIPE
- Promis.e
- STAAD
- ProStructures
- AECOSim
- gINT
- Descartes
- ContextCapture
- OpenRoads
- AssetWise APM
- Amulet

NUCLEAR POWER

- AutoPIPE
- OpenPlant
- AECOSim
- STAAD
- SITEOPS
- AssetWise APM
- Amulet

BRIDGES

- OpenBridge Modeler
- RM Bridge
- LEAP
- OpenRoads
- gINT
- ProStructures
- ContextCapture
- LumenRT
- LARS
- SUPERLOAD
- InspectTech

PROCESS PLANTS

- OpenPlant
- AutoPLANT
- AutoPIPE
- PlantWise
- Promis.e
- AECOSim
- ProStructures
- STAAD
- gINT
- OpenRoads
- SITEOPS
- ContextCapture
- LumenRT
- AssetWise APM
- Amulet

OFFSHORE STRUCTURES

- SACS
- MOSES
- MAXSURF
- AutoPIPE
- ProSteel
- ConstructSim
- OpenPlant
- gINT
- ContextCapture
- AssetWise APM
- Amulet

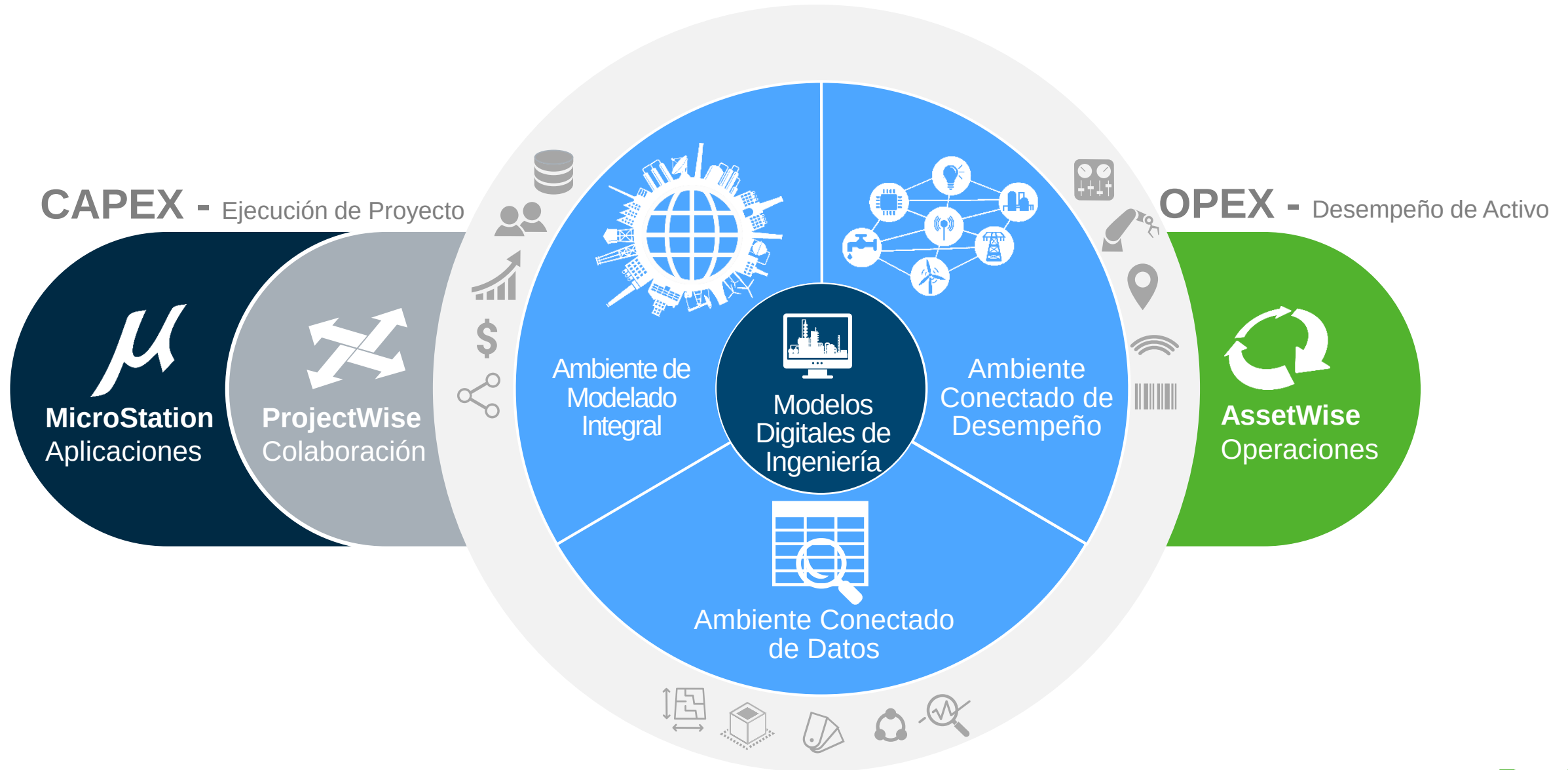
BENTLEY'S
APPLICATION
PLAYBOOKS

MICROSTATION



Bentley
Advancing Infrastructure

Avanzando BIM hacia *TOTEX*...



Bentley's Business

Design and Analytical Modeling



www.arcweb.com

Engineering Design Tools for Plant, Infrastructure, and Building Modeling 2017 (EDT/BIM Market Analysis)

#2 Overall

#1 in Water and Wastewater Distribution

#1 in Electric T&D and Communication Systems

Asset Reliability Software & Services 2017

#1 Overall (Software)

#1 in Electric Power T&D (Software)

#1 in Oil & Gas (Software)

#1 in Pharmaceutical & Biotech (Software)

#1 in Transportation (Software)

#1 in Water & Waste Water (Software)

GIS 2017

#2 Overall (GIS)

#1 in Software as a Service

Project Delivery



ProjectWise in the ENR Top Design Firms

44 of the Top 50
355 of the Top 641



Asset Performance



AssetWise in the Bentley 2016 Infrastructure 500

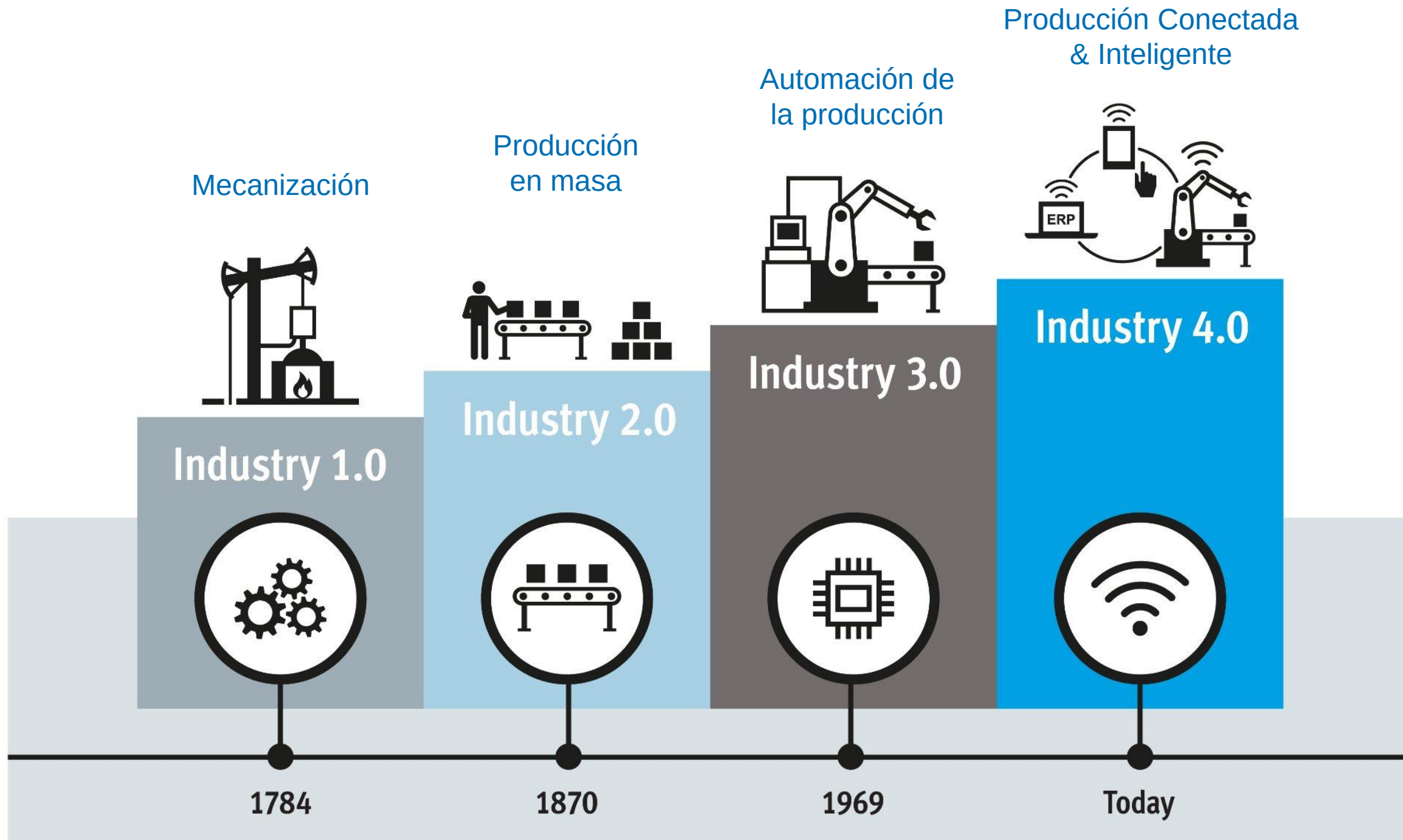
25 of the Top 50 Owners
117 of the Top 500 Owners



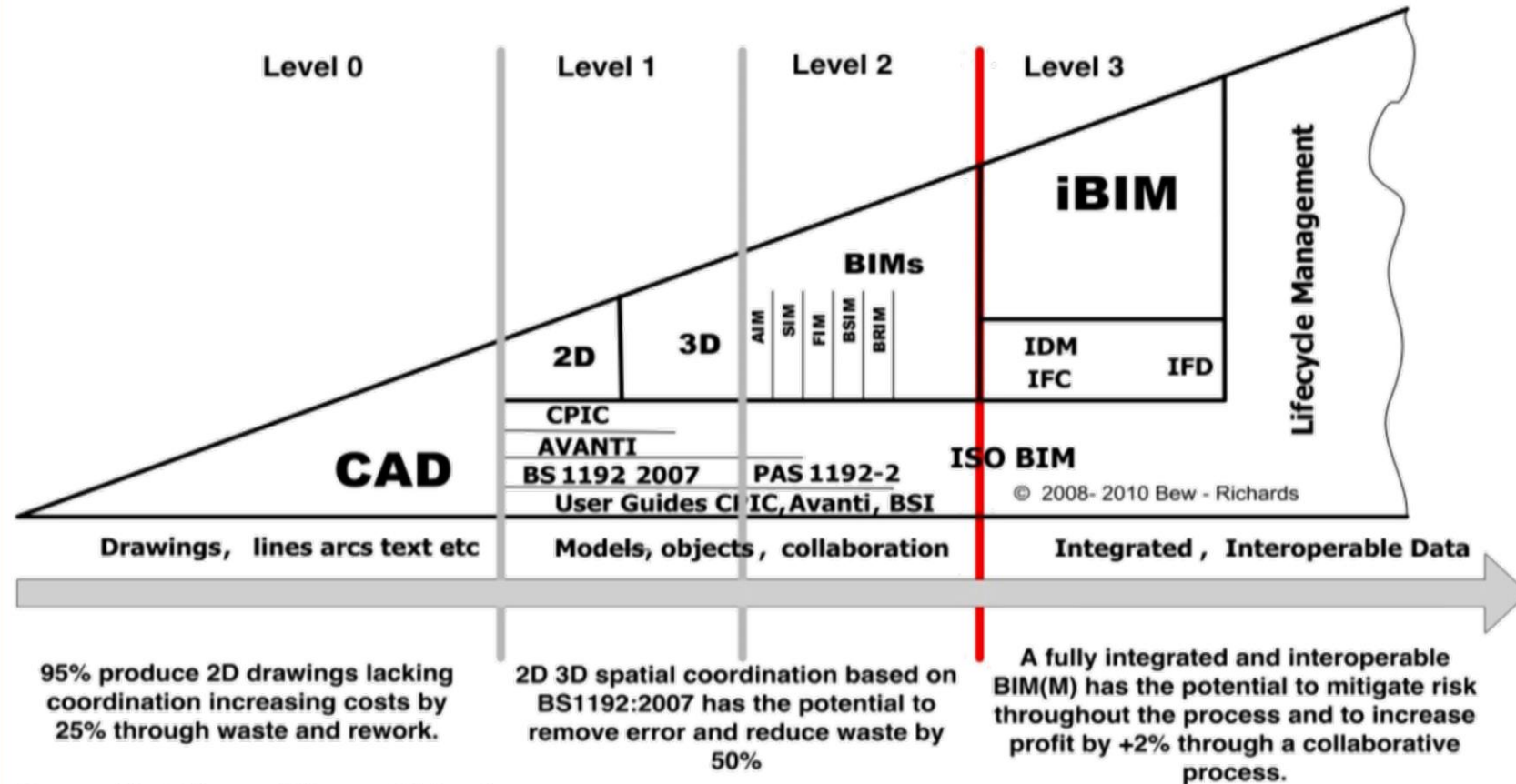
A hand in a dark suit jacket and white shirt cuff is pointing upwards with the index finger. The background is a composite image featuring a city skyline at night, with the Oriental Pearl Tower visible. Overlaid on the image is a blue digital grid pattern with glowing dots and lines, suggesting a data or digital theme.

Digitalización

Going Digital with Bentley



Haciendo Posible BIM Nivel 3



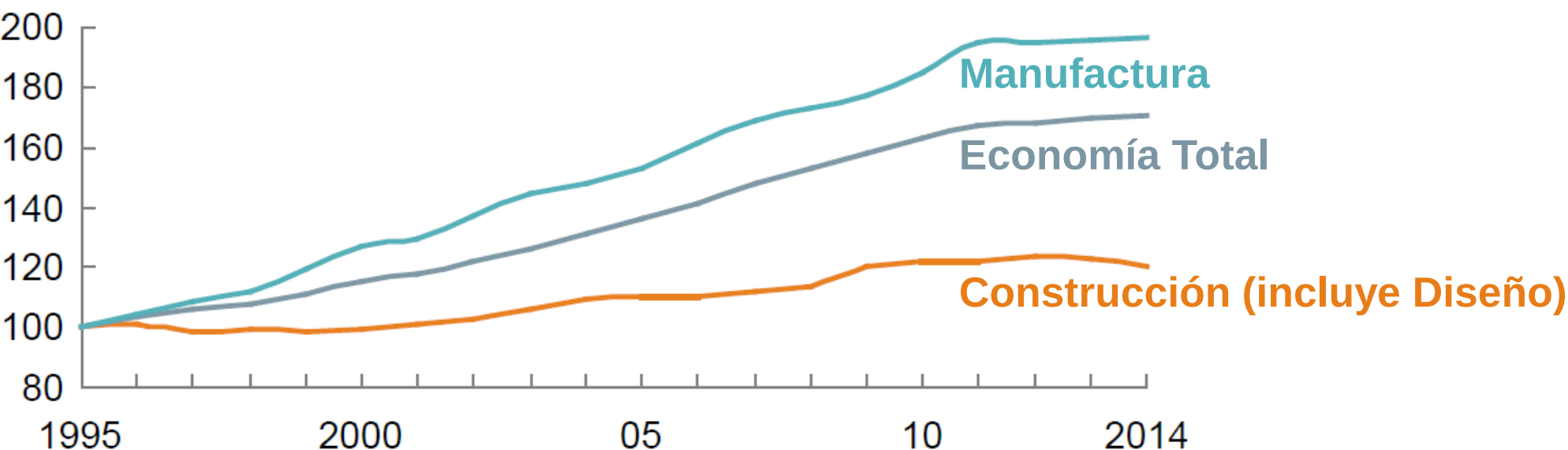
Source: Mark Bew and Mervyn Richards

Oportunidad para mejorar la productividad en construcción

Tendencias de productividad global¹

**Valor agregado real bruto por hora trabajada
por personas entrevistadas, 2005 \$**

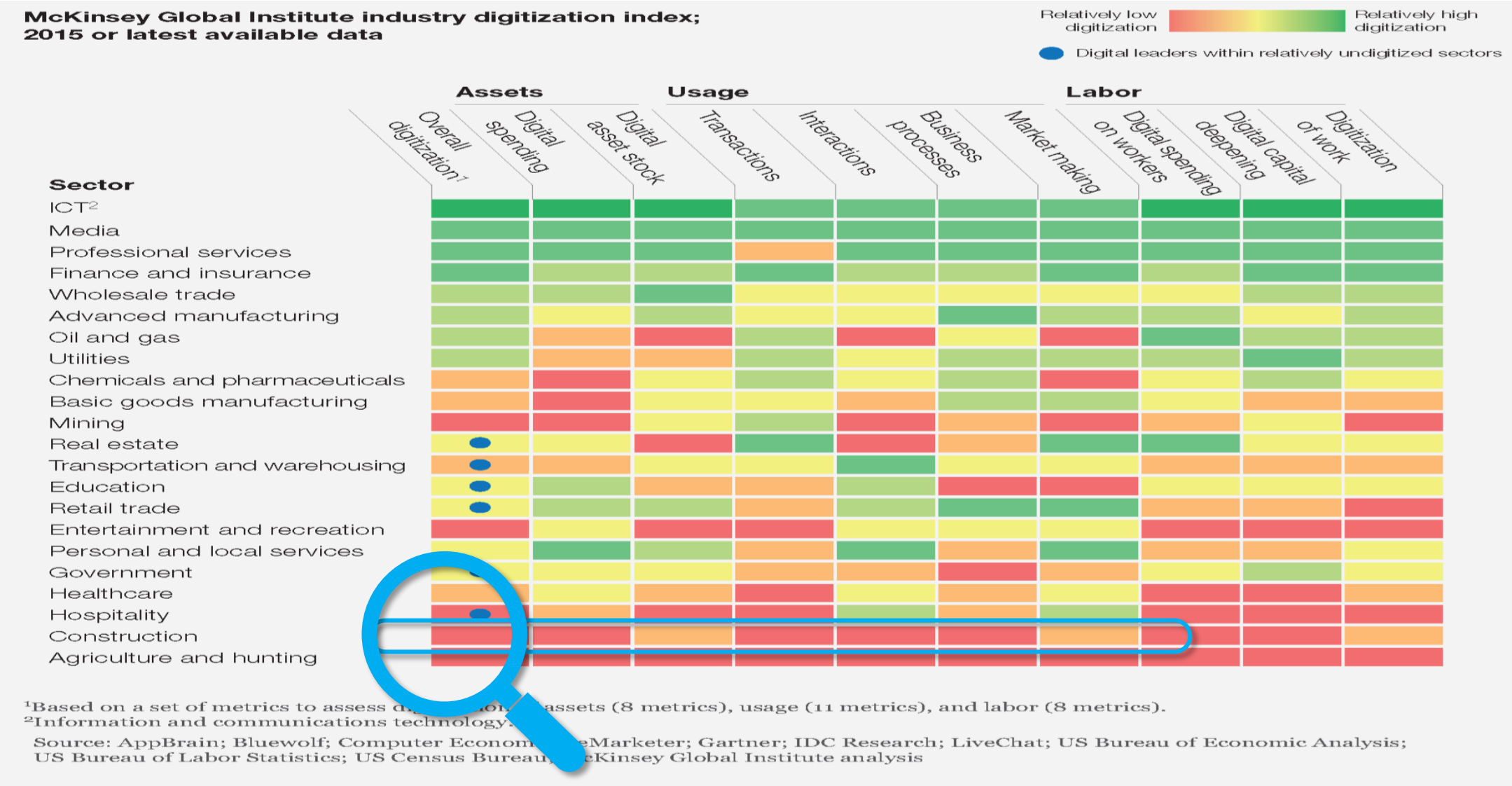
Índice: 100 = 1995



1 Basado en un ejemplo de 41 países que generan el 96% del PIB global.

Fuente: *Reinventing Construction: A Route to Higher Productivity*, McKinsey, February 2017

Falta de digitalización una causa raíz de la baja productividad

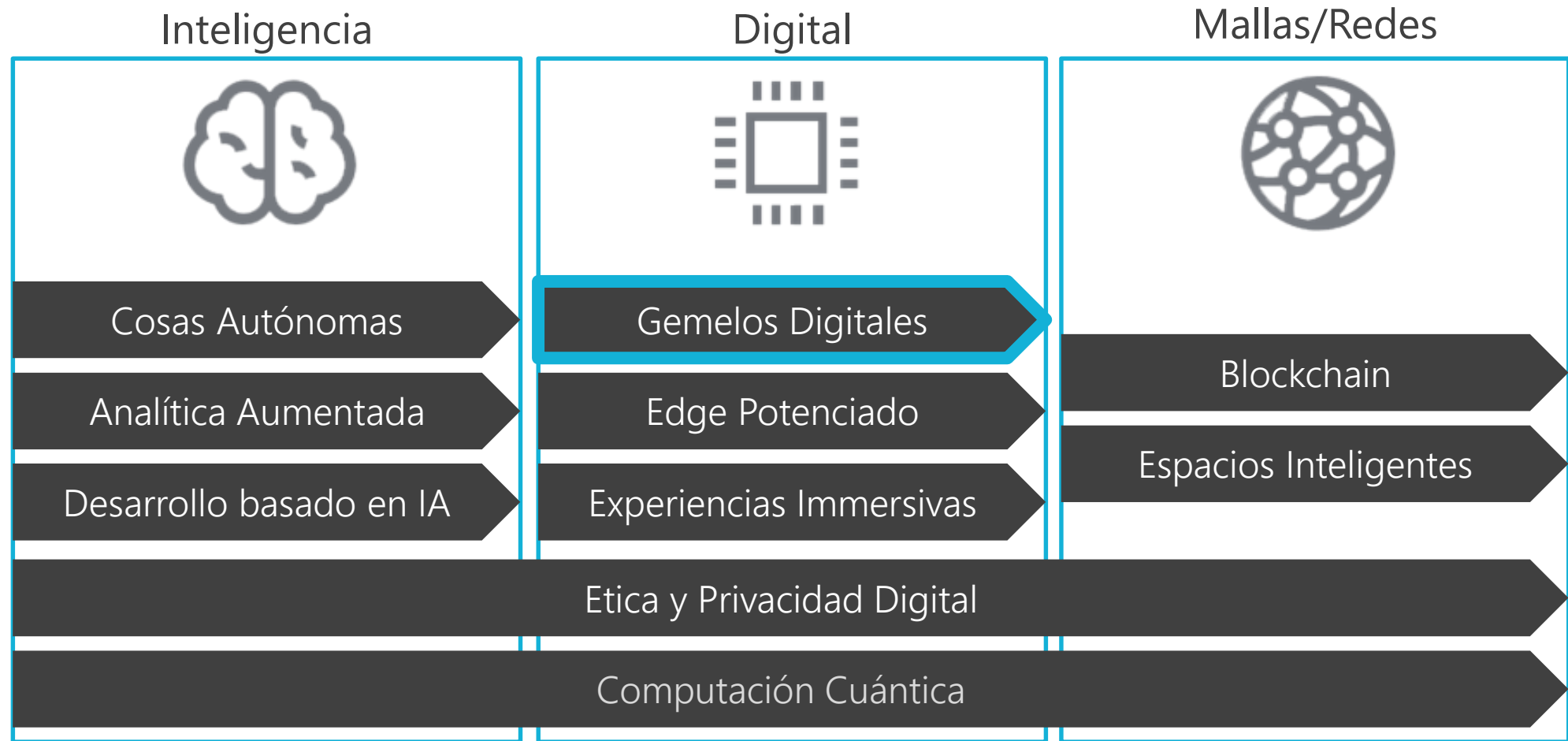


Digitalización: 5 tendencias en 2016



Fuente:
Imagining Construction's Digital Future
McKinsey, June, 2016

10 Principales Tendencias Tecnológicas en 2019



ID:374252

© 2018 Gartner, Inc.
Source: Gartner (October 2018)

A hand in a dark suit jacket and white shirt cuff is pointing upwards with the index finger. The background is a blurred cityscape at night, featuring the Oriental Pearl Tower. A semi-transparent blue grid pattern is overlaid on the entire image.

Gemelos Digitales

Going Digital with Bentley



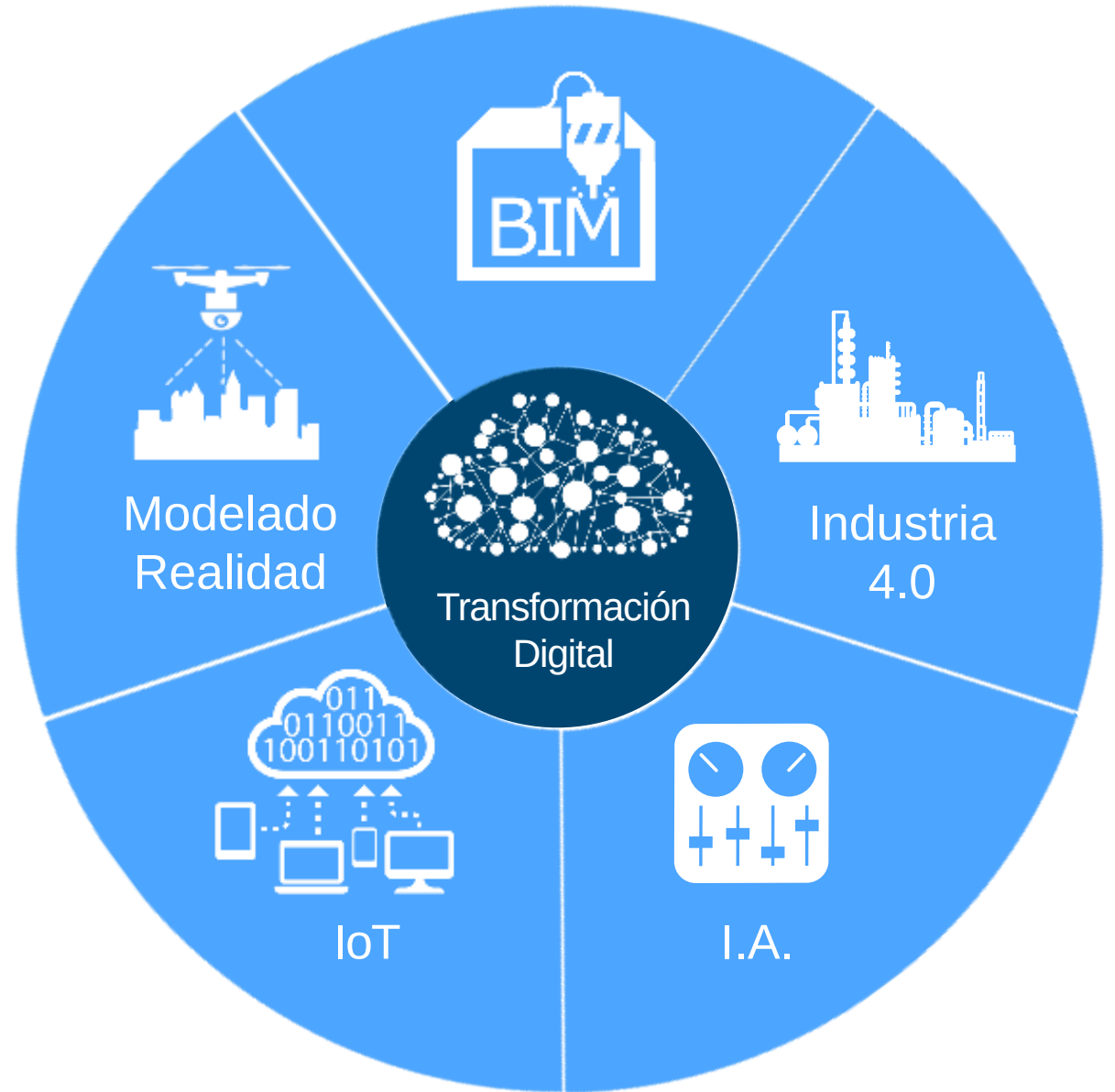
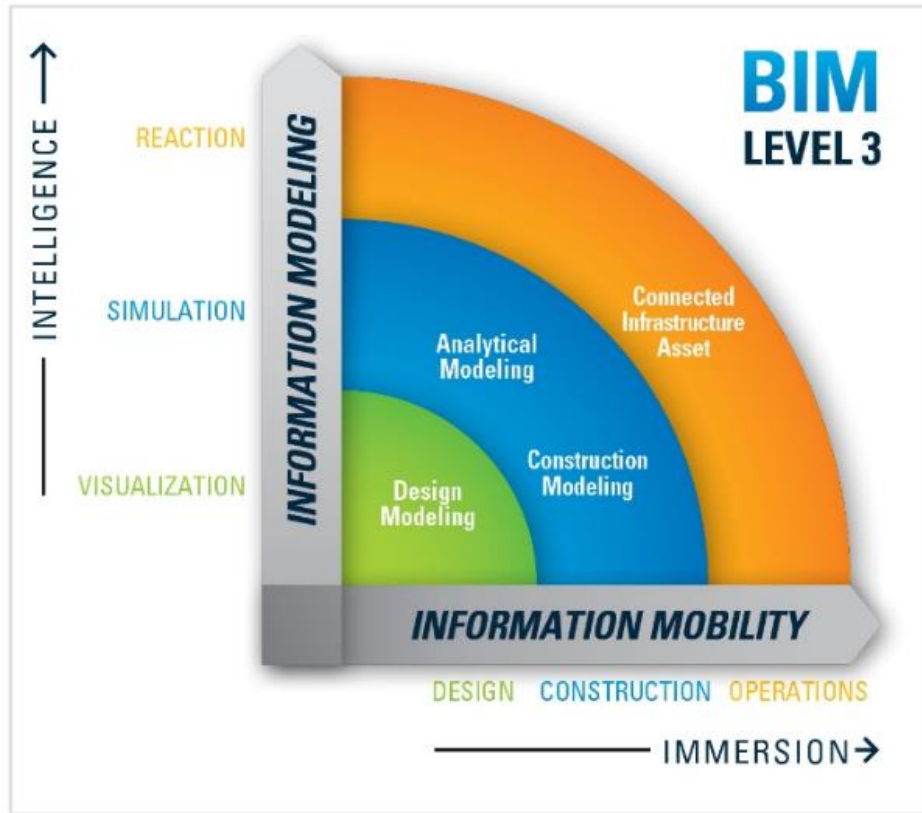
Un ***gemelo digital*** es una representación digital de un activo físico, proceso o sistema, incluyendo la información de ingeniería o técnica que nos permite entender y modelar su desempeño.

Típicamente, un ***gemelo digital*** puede sincronizarse continuamente de múltiples fuentes, incluyendo sensores y levantamientos constantes, que representen su estado, condición de trabajo o posición en tiempo casi-real.

Un ***gemelo digital*** habilita a los interesados a visualizar el activo, verificar su estado, analizarlo y generar inteligencia para predecir y optimizar su desempeño.



Digitalización...

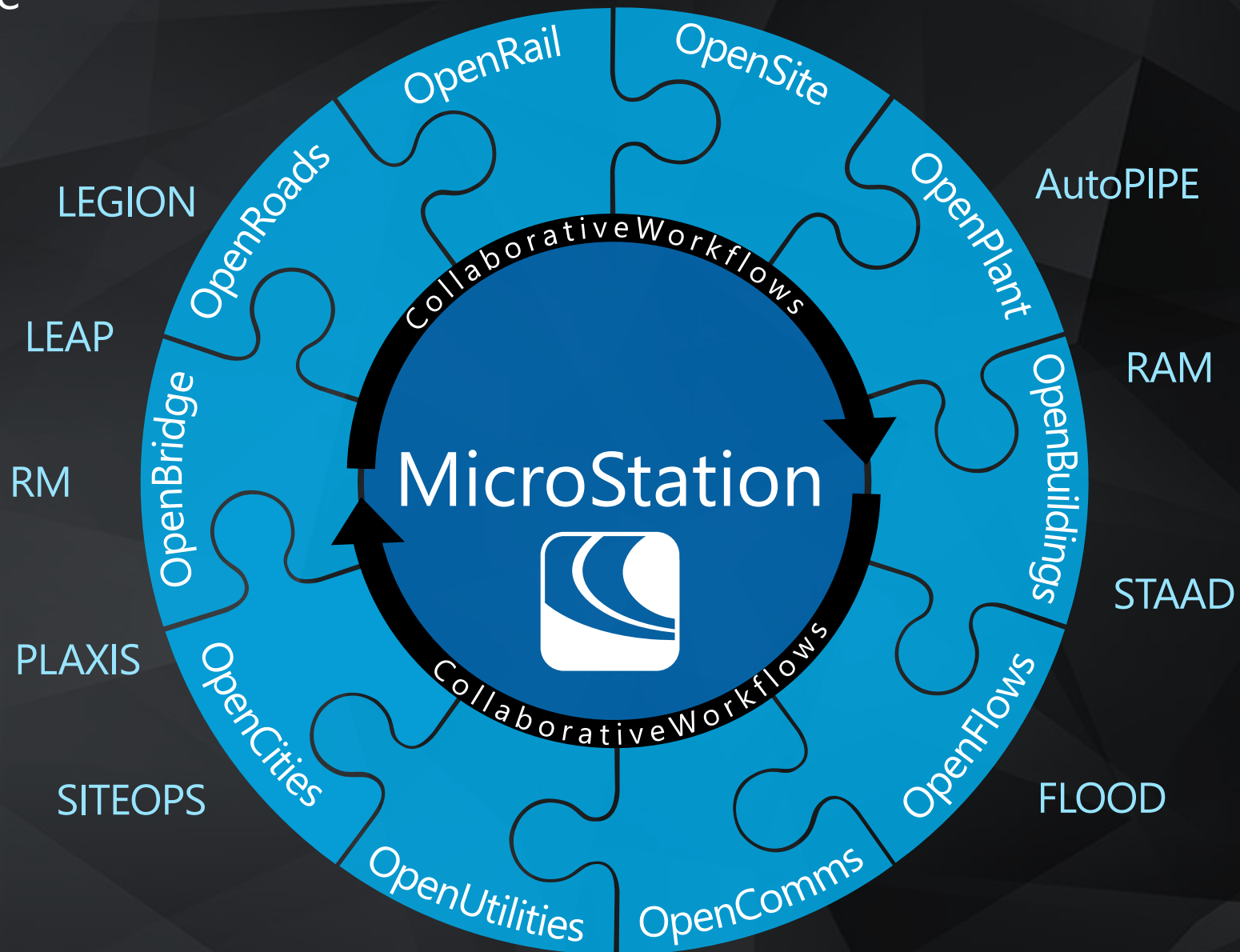
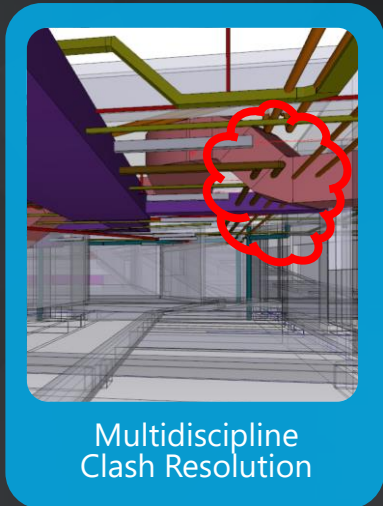


A hand in a dark suit jacket and white shirt cuff is pointing upwards with the index finger. The background is a composite image featuring a city skyline at night, with the Oriental Pearl Tower visible. Overlaid on the image is a blue digital grid pattern that resembles a wireframe or a data visualization. The overall color palette is dominated by blues and purples, with some warm city lights.

BIM - Modelación

Going Digital with Bentley

Comprehensive Modeling Environment





Éxito en todos los sectores

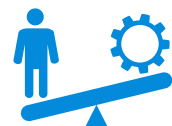
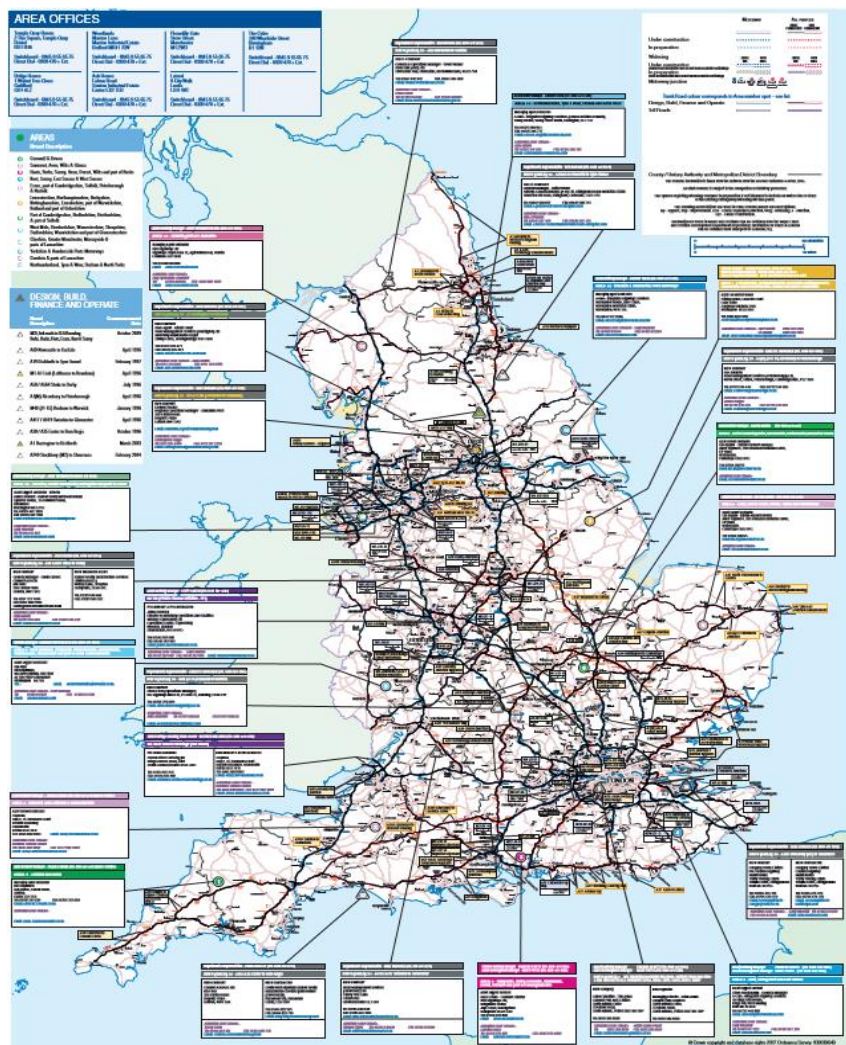
Going Digital with Bentley



Casos de estudio en Transporte

Tránsito, Carreteras y Puentes

El proyecto NOMS de Highways England permite la integración y el intercambio de información sobre activos



DESAFIOS

- ✓ Administre los cierres de manera más efectiva y reduzca los costos asociados
- ✓ Integrar con toda su información de ciclo de vida del activo
- ✓ Optimizar la colaboración y la comunicación de las partes interesadas en el negocio
- ✓ Mapa y visualización de cierres y activos relacionados



SOLUCIÓN

Solución completa de AssetWise que incluye:

- ✓ Administrar, controlar, distribuir y archivar toda la información relacionada con los activos de la infraestructura
- ✓ Habilitar espacialmente resultados para la visualización del mapa



BENEFICIOS

- ✓ Ahorrará GBP 7.02 millones para un ROI de 1,651 por ciento en el primer año.
- ✓ Reducirá las horas de recursos requeridas para abordar problemas de mantenimiento en 14,400 horas.
- ✓ Espera eliminar 10,824 toneladas de emisiones de carbono anualmente.



**GBP
7.02
MILLION**
cost savings
per year

**10,824
TONS OF
CARBON**
saved
per year

**14,400
HOURS
NIGHTTIME
WORK**
eliminated

**3,600
ROAD
EVENTS**
reduced
per year

Network Event Manager

Network Event Properties Last refreshed at 17:49

Event Number	00007220-01	Admin Unit	Area 09
Event Type	Ad-hoc Routine Works	Data Source	Manual Data Entry
Event Status	Work In Progress	Validation State	Valid
Planned Start	01/06/2020 20:00	Actual Start	
Planned Complete	02/06/2020 05:00	Actual Complete	
Description	M42 to M6 link north carriageway closure for overhead gantry replacement.		

Network Event Details

Attributes | Location | Impacted Network | Operational Impact | Schedule | Actions | Versions

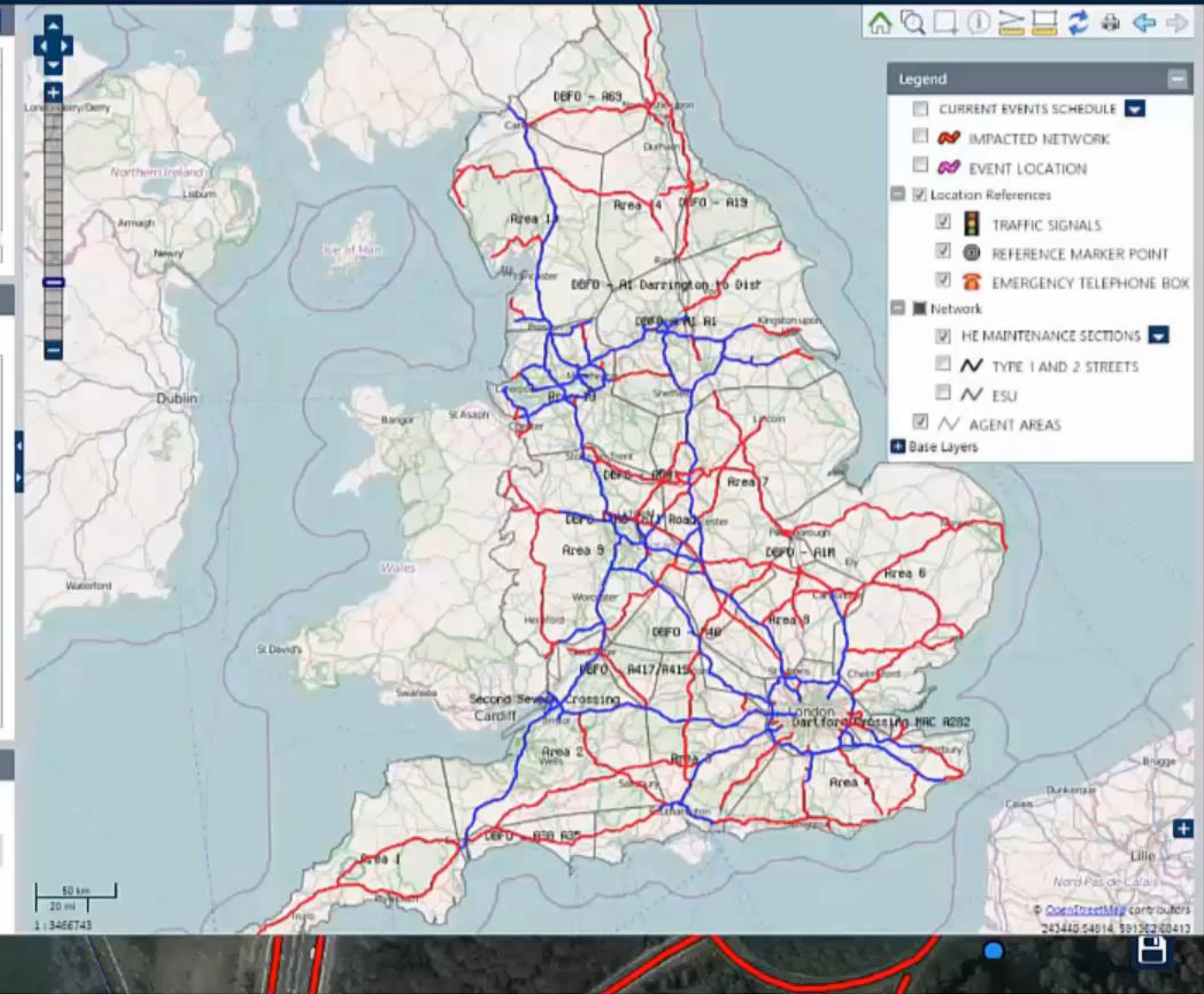
Planned Duration	2	Planned Duration Units	Days
Slippage	0	Distribute	Yes
Nature of Works	Gantry	User Responsible	Duncan Begam
Delay	Severe (more than 30 mins)	Agency Ref	HE2010-GHW8960023/005
Works Ref		TMA Works Ref	
Mobile Lane Closure	No	Alternate Route Used	Yes
SRW ID		Notes	

Contact Type	Contact Name	Reference	Telephone Day	Telephone Night	Notes
No Contacts found.					

Monitor and manage scheduled network maintenance events

Refresh

1 : 1,812 419691.9593, 286733.3256 m





Casos de estudio de Agua y Saneamiento

Hidráulica e hidrología

SA Water ahorra más de \$3M AUD el primer año Australia



RETO

- ✓ Maximizar la nueva planta de desalinización de alta capacidad y la tubería de interconexión norte-sur en términos de demanda y uso de agua.
- ✓ Predecir la demanda y optimizar el movimiento del agua.
- ✓ Reunir múltiples fuentes de datos.



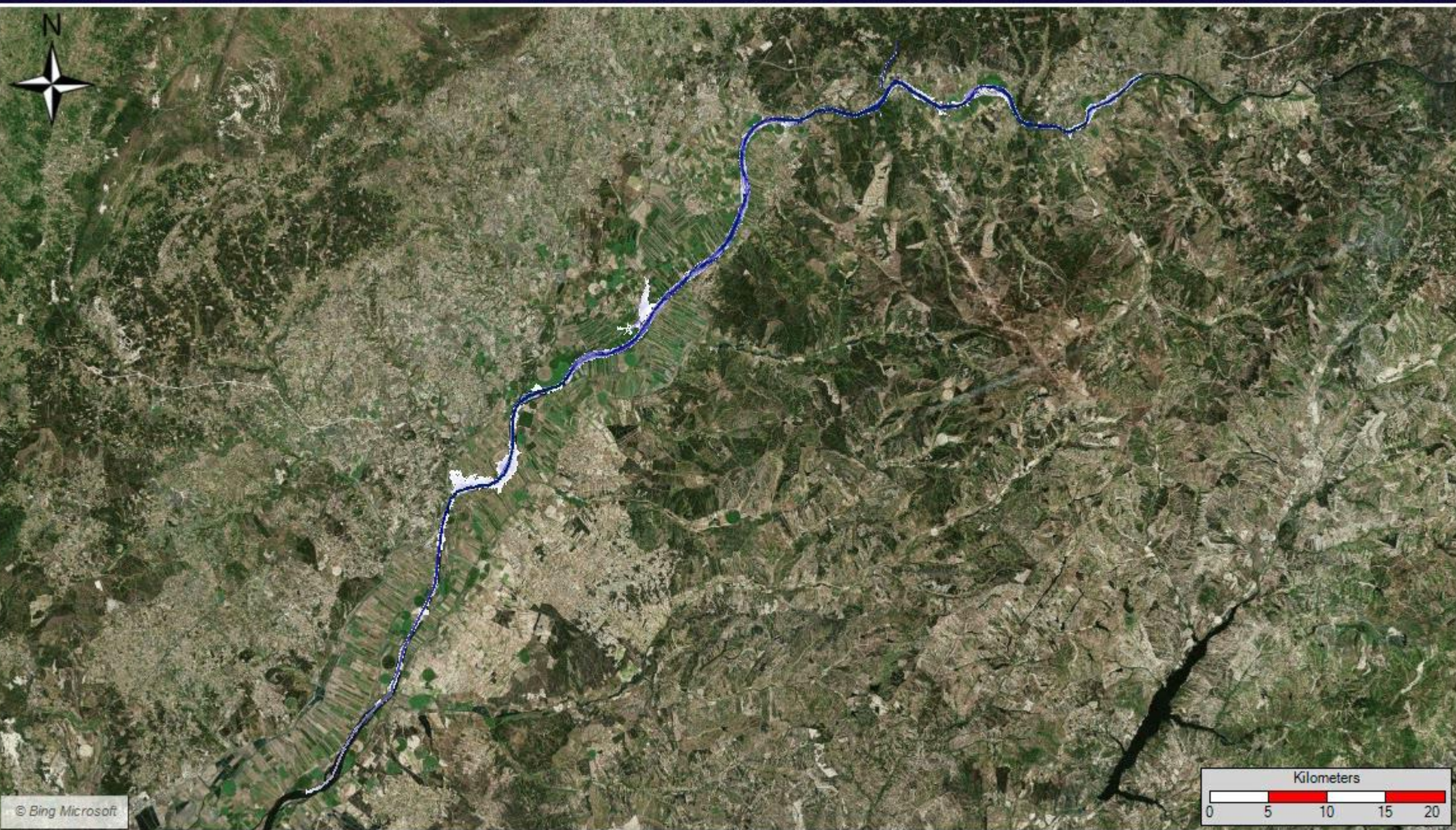
SOLUCION

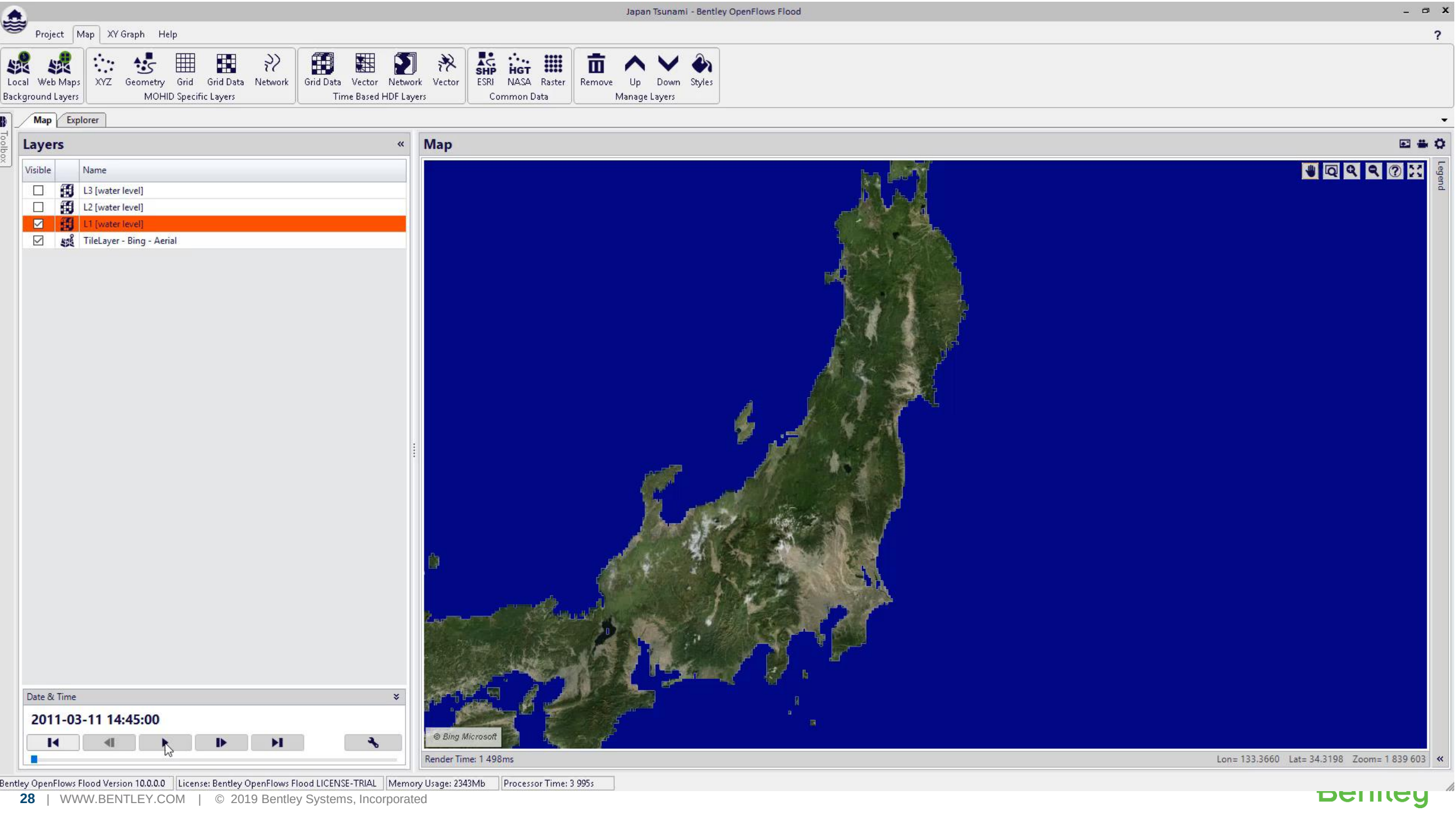
- Solución completa AssetWise que incluye:
- ✓ Pronóstico de demanda de uso de agua.
 - ✓ Optimización del suministro de agua y transporte.
 - ✓ Predicción de tarifas de energía.

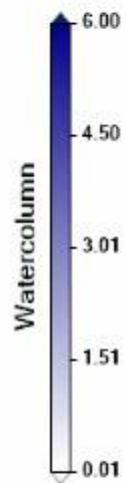


BENEFICIOS

- ✓ Reducción de costos de energía con la administración de tarifas (\$ 3M AUD y \$ 800K en costos operacionales)
- ✓ \$ 800K en ahorros operativos en gastos de red.
- ✓ Predecir niveles de demanda a corto y largo plazo.
- ✓ Reducción en problemas de reparación / paros.







Demonstration of Capabilities
Extreme Flood Event in the Center of Paris

0 days
00:00:00



Casos de estudio en Hospitales y Campuses



Centro Médico UCSF en Mission Bay

DPR Construction

San Francisco, California, Estados Unidos

Conectando Equipos de Proyecto

- Colaboración BIM
- Construcción Virtual
- Coordinación de contratistas
- Ahorros en tiempo y dinero
- ProjectWise
 - 350 usuarios
 - \$35,000 ahorros en Coordinación
 - 5% menos tiempo en gestión de referencias
 - \$65,000 en resolver interferencias



Innovación en Campuses

- 6 Paquetes de diseño
- 850 Modelos 3D
- 2,300 Planos
- GEOPAK
- Bentley Architecture
- Bentley Structural Modeler
- Bentley Building Mechanical Systems
- Bentley Building Electrical Systems
- ProjectWise
- Bentley Navigator

Complejo de Infantería

Barge Waggoner Sumner & Cannon
Ft. Stewart, Georgia



Innovation in Building

- BIM collaboration
- Building siting
- Sunshade configuration
- Contractor coordination

- MicroStation
- Bentley Architecture
- Bentley Navigator
- i-models
- i-model plug in for Revit

Hospital Infantil Nemours

Stanley Beaman & Sears

Orlando, Florida, Estados Unidos

Sutter Healthcare: Hospital Castro Valley



Designer



GC



Sutter Health
With You. For Life.

Owner



Casos de estudio en Industria Ferroviaria



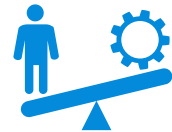
La urbanización impulsa las demandas de los sistemas de transporte

Proyectos a tiempo ... **Mejor desempeño de activos**



Agencia de tránsito del metro de Nueva York

Viaje a la Excelencia en la Gestión de Activos



DESAFIOS

\$ 1 billón en activos (trenes, autobuses, puentes, túneles, vías, etc.):

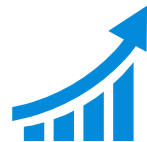
- Necesidad de administrar los costos, reducir el riesgo, mejorar la seguridad, la confiabilidad, el servicio y el rendimiento



SOLUCIÓN

Estrategia de mejora de la gestión de activos :

- ✓ Alineación con el marco del Líder de Confiabilidad Certificado, ISO 55001 y BIM
- ✓ AssetWise CONNECT Edition incl. Desarrollo de la Estrategia de Confiabilidad, Monitoreo de la Salud de los Activos, Gestión de Inspección, Soporte de Decisión de Activo Lineal, Interoperabilidad Empresarial con Infor, ALIM



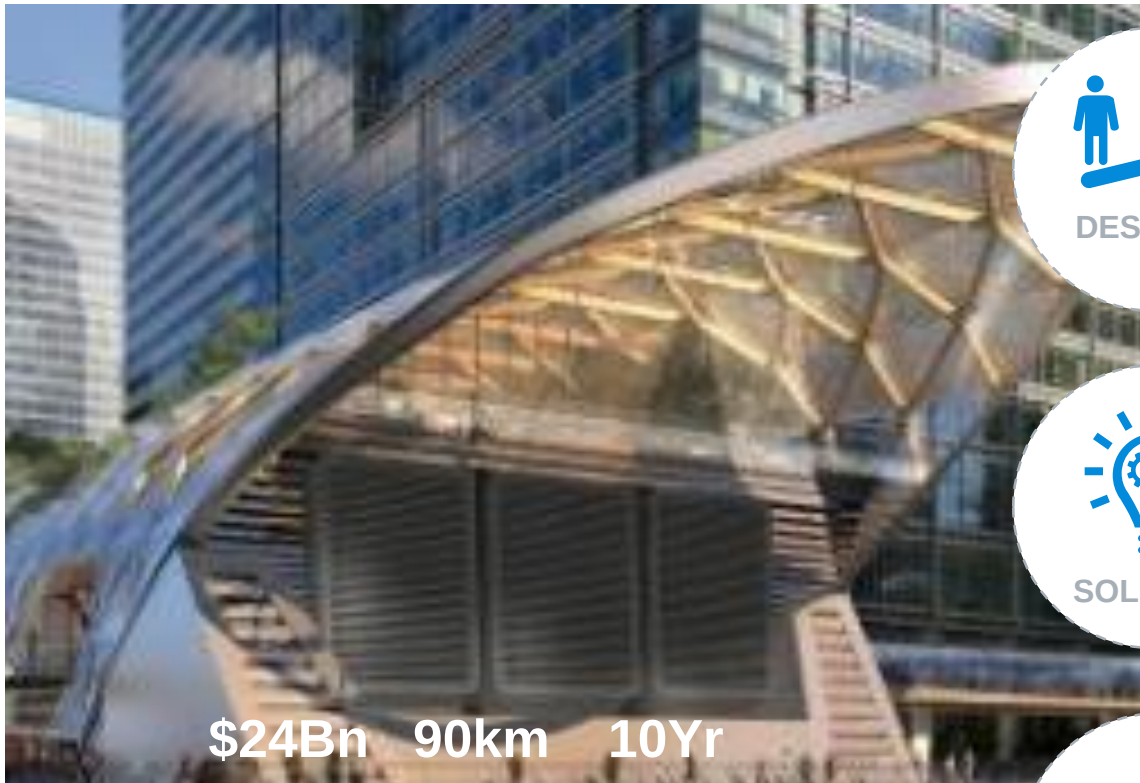
BENEFICIOS

Resultados anticipados :

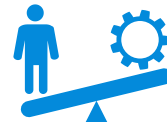
- Cumplir con las regulaciones gubernamentales
- Decisiones precisas, transparentes y basadas en la evidencia
- Vuelva a invertir los ahorros en el Programa Capital de MTA

Crossrail

Administrar activos de información a lo largo del ciclo de vida



\$24Bn 90km 10Yr



DESAFIOS

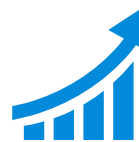
- ✓ La información no era confiable: incompleta, inexacta, desactualizada
- ✓ La información no estaba relacionada con los activos físicos y las configuraciones
- ✓ El impacto del cambio fue difícil de manejar al hacer obsoleta la información
- ✓ Transferencia efectiva de información a las operaciones



SOLUCIÓN

Solución completa de AssetWise que incluye :

- ✓ Información de activos
- ✓ Gestión del cambio
- ✓ Gestión de etiquetas
- ✓ Gestión de configuración
- ✓ Control de documentos
- ✓ Gestión de registros



BENEFICIOS

- ✓ Ahorre £ 0.5 millones en costos salariales adicionales
- ✓ Las eficiencias esperadas en todo el proyecto de 1% producirán un beneficio de casi £ 100 millones
- ✓ Ahorro de £ 50 millones anuales en operación, £ 1 - 2 mil millones sobre la vida útil de los activos
- ✓ Asegurar la satisfacción del cliente
- ✓ Asegurar el cumplimiento de las normas



AssetWise Adopción probada de la industria ferroviaria y de tránsito



Massachusetts Bay
Transportation Authority



Long Island
Rail Road



TRAFIKVERKET



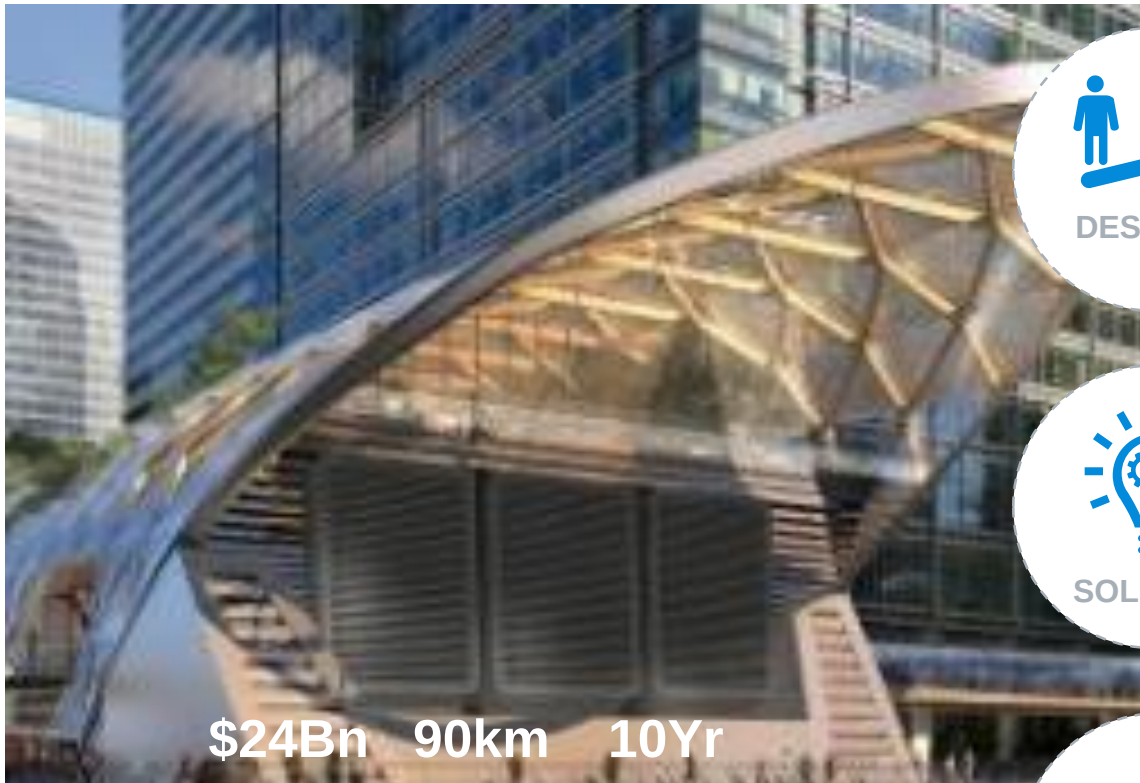
A person in a dark suit and tie is pointing their right index finger towards the left. The background is a composite image featuring a city skyline at night, with the Oriental Pearl Tower visible. Overlaid on the image are blue, dotted patterns that resemble data or digital signals. A semi-transparent dark blue horizontal band is positioned across the middle of the image, containing the main title and subtitle.

Éxito en la Industria Ferroviaria

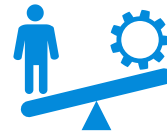
Going Digital with Bentley

Crossrail

Administrar activos de información a lo largo del ciclo de vida



\$24Bn 90km 10Yr



DESAFIOS

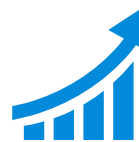
- ✓ Confiabilidad: incompleta, inexacta, desactualizada
- ✓ La información no relacionada con los activos físicos y sus requerimientos
- ✓ Dificultad en el manejo de cambios
- ✓ Transferencia efectiva de información a las operaciones



SOLUCIÓN

Solución completa de AssetWise que incluye :

- ✓ Información de activos
- ✓ Gestión del cambio
- ✓ Gestión de etiquetas
- ✓ Gestión de configuración
- ✓ Control de documentos
- ✓ Gestión de registros

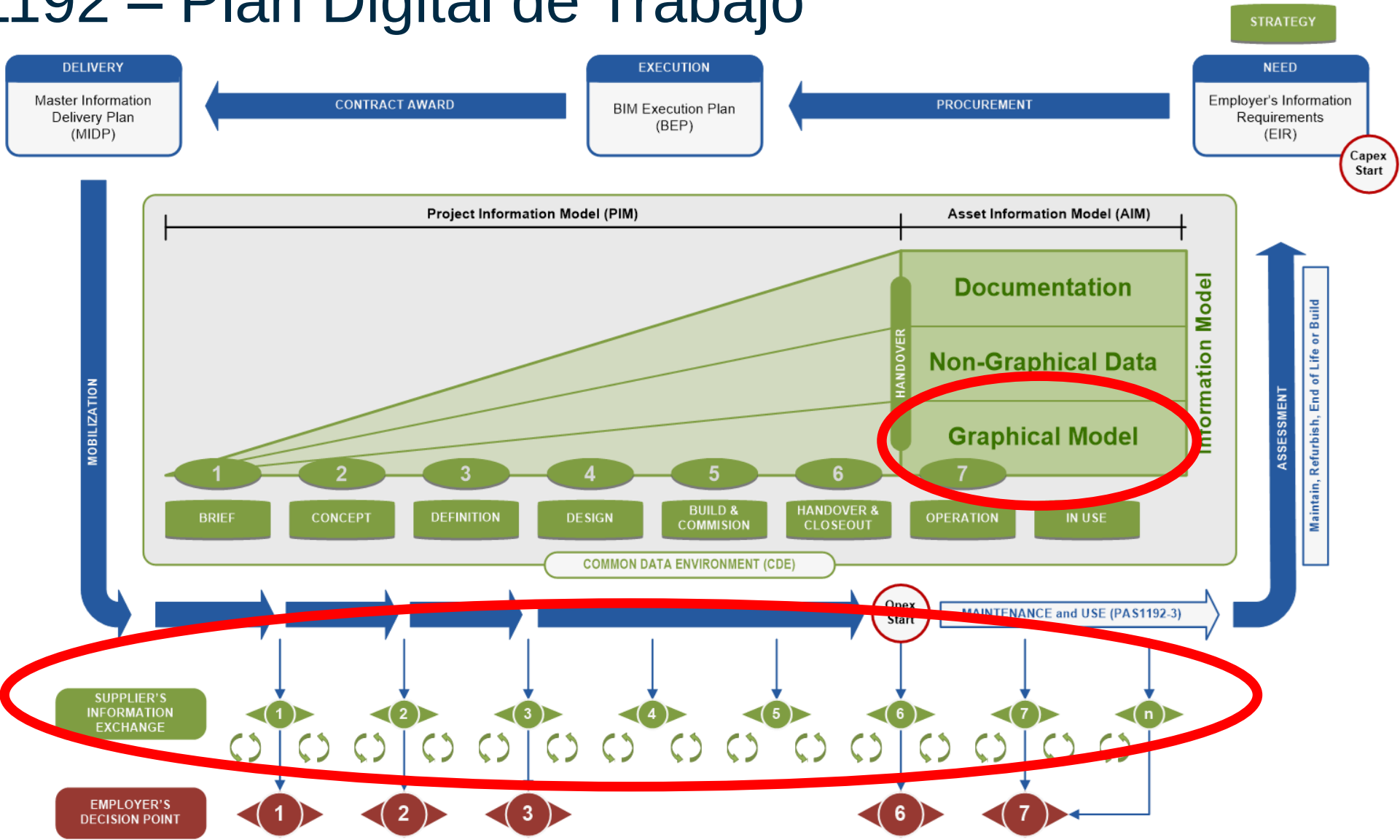


BENEFICIOS

- ✓ Ahorro £ 0.5 millones en costos salariales adicionales
- ✓ Las eficiencias de 1% en todo el proyecto producirán un beneficio de casi £ 100 millones
- ✓ Ahorro de £ 50 millones anuales en operación, £ 1 - 2 mil millones sobre la vida útil de los activos
- ✓ Asegurar la satisfacción del cliente
- ✓ Asegurar el cumplimiento regulatorio



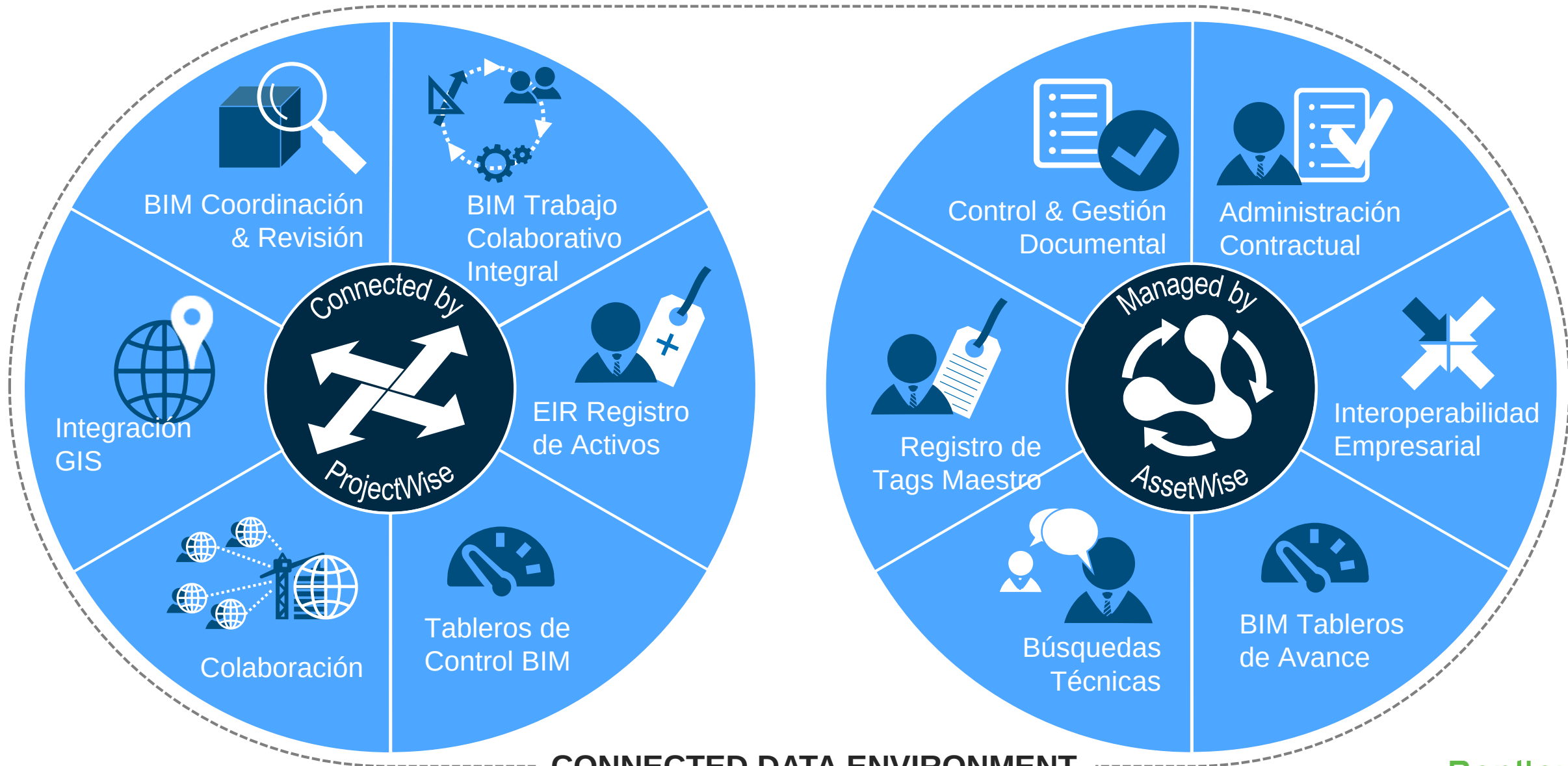
PAS1192 – Plan Digital de Trabajo



PAS1192 – Plan Digital de Trabajo

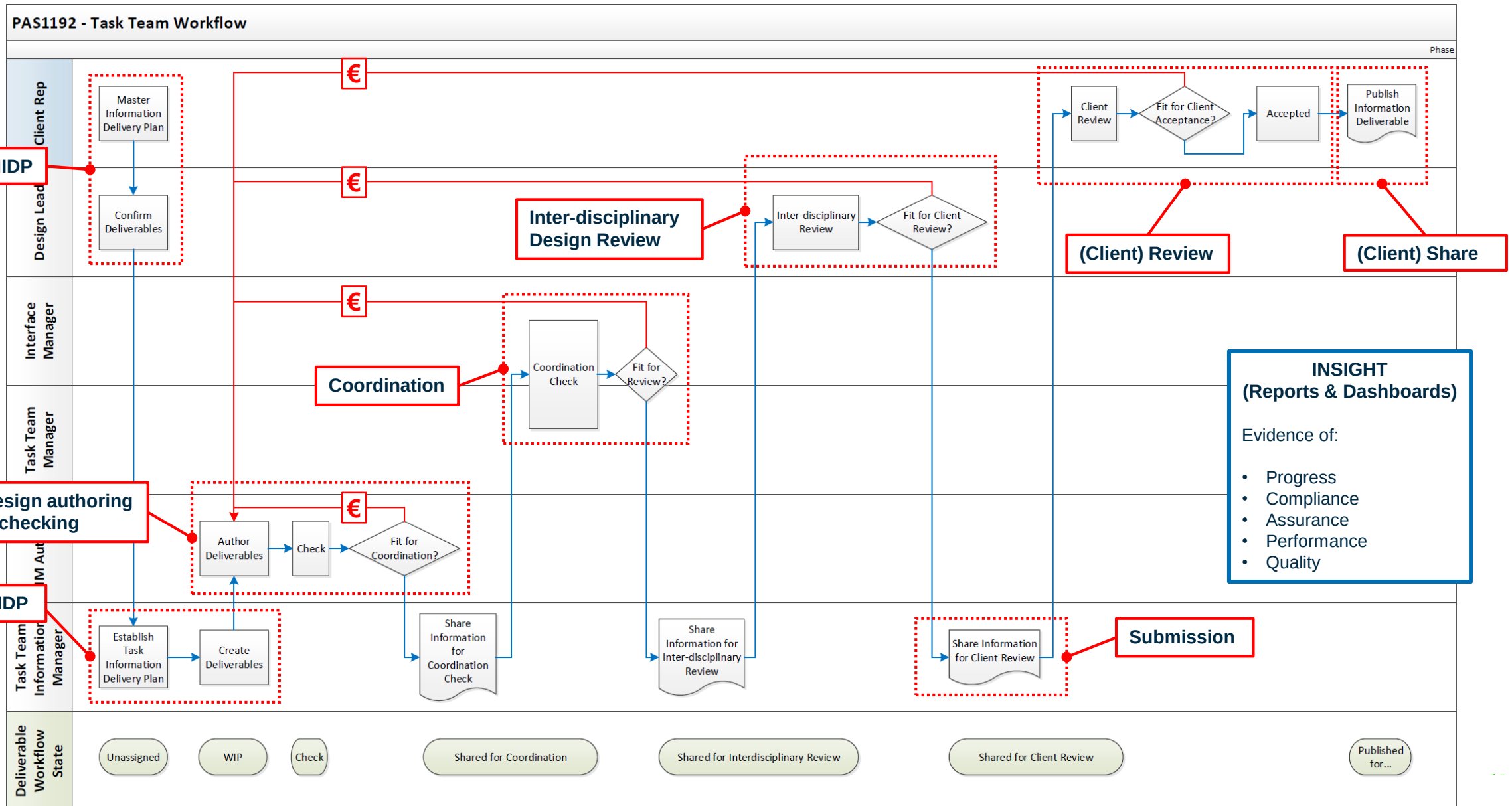


Entorno de Datos Conectado (CDE)

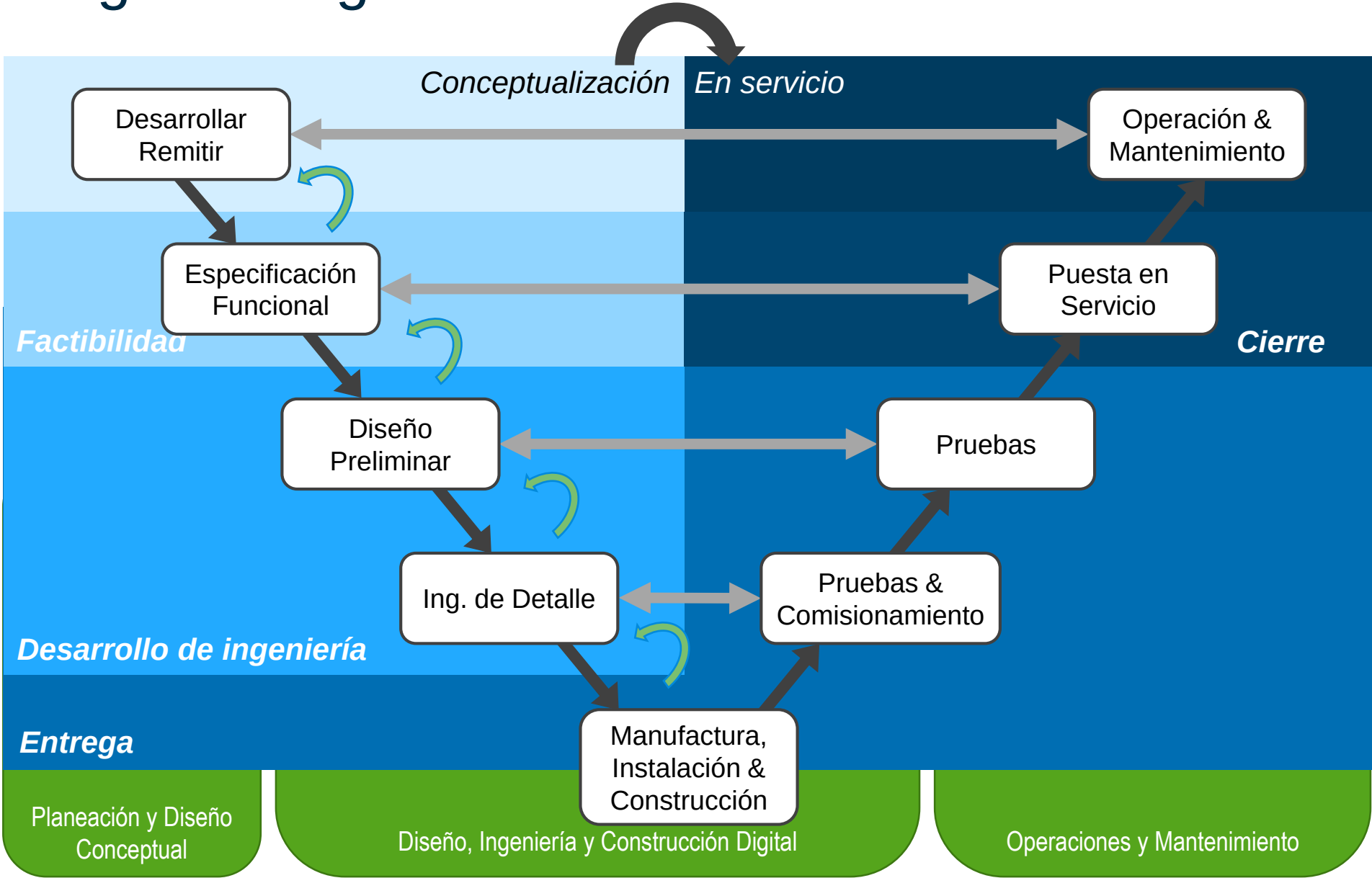


CONNECTED DATA ENVIRONMENT

Típico Flujo Digital (PAS1192) - Simplista

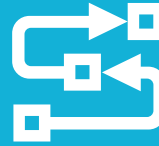


Metodología de Ingeniería de Sistemas





Contexto
Digital



Flujos
Digitales

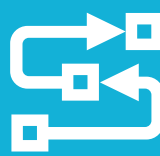


Componentes
Digitales

Entorno de Datos Conectados



Contexto
Digital



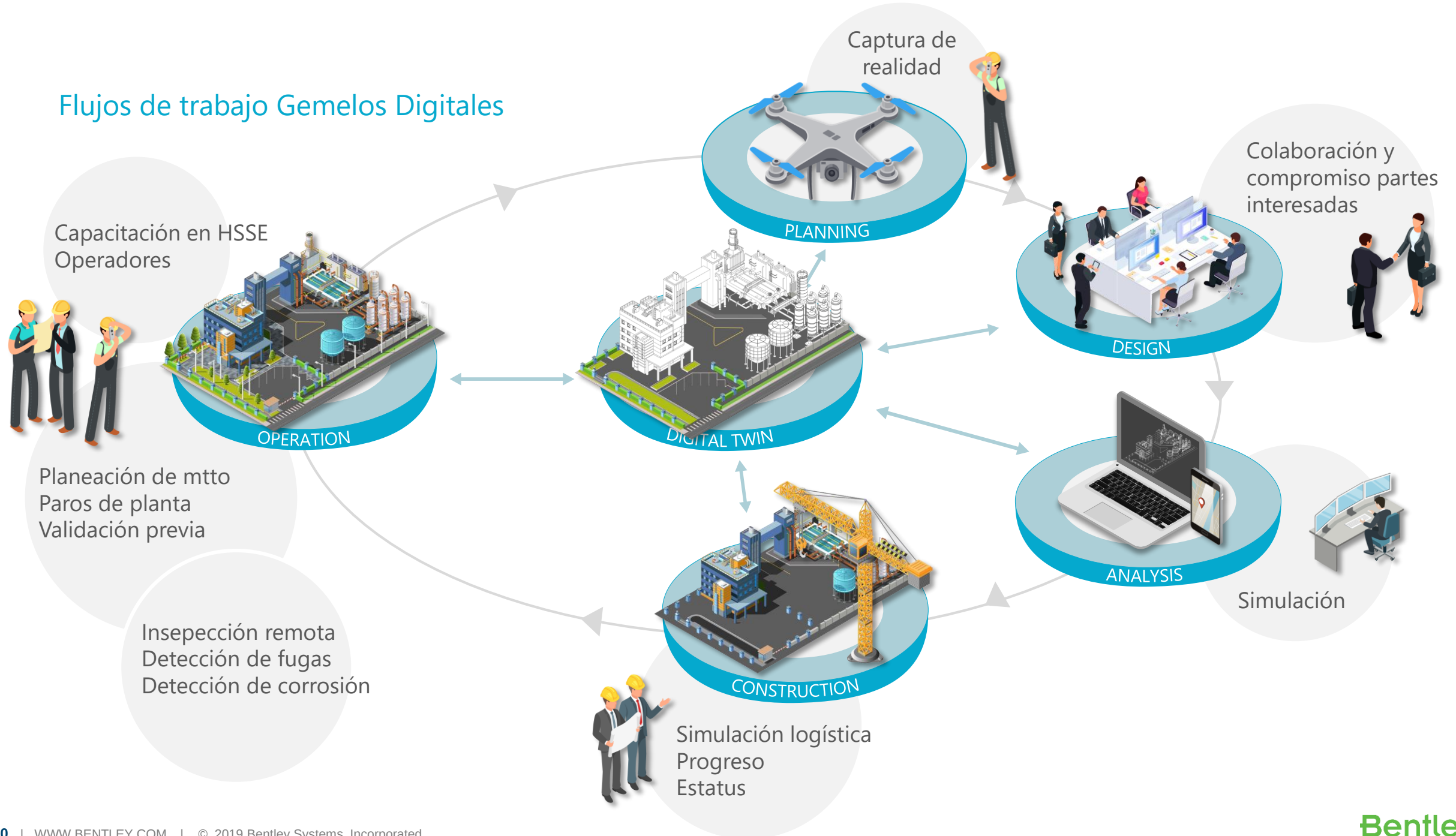
Flujos
Digitales



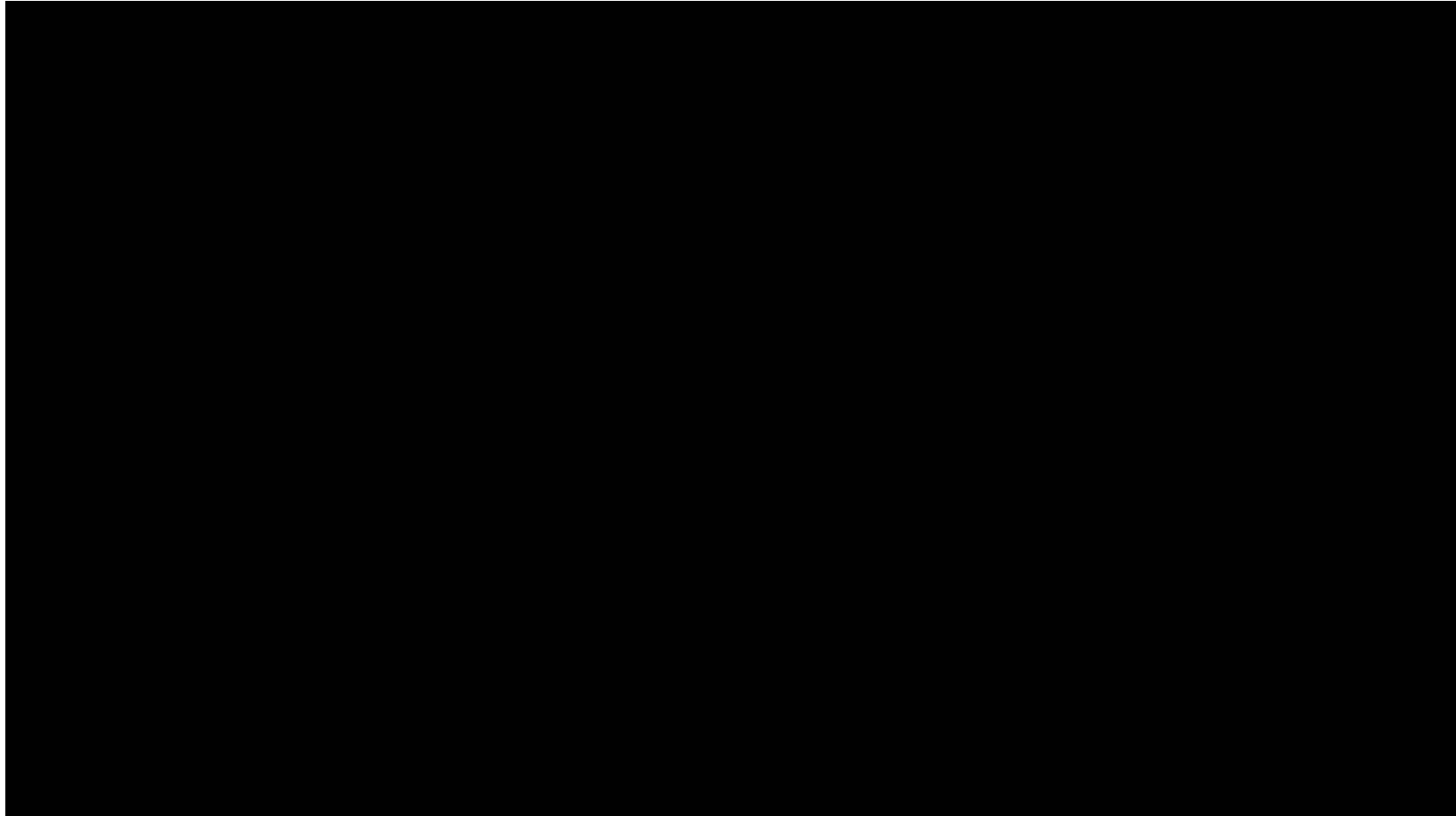
Componentes
Digitales

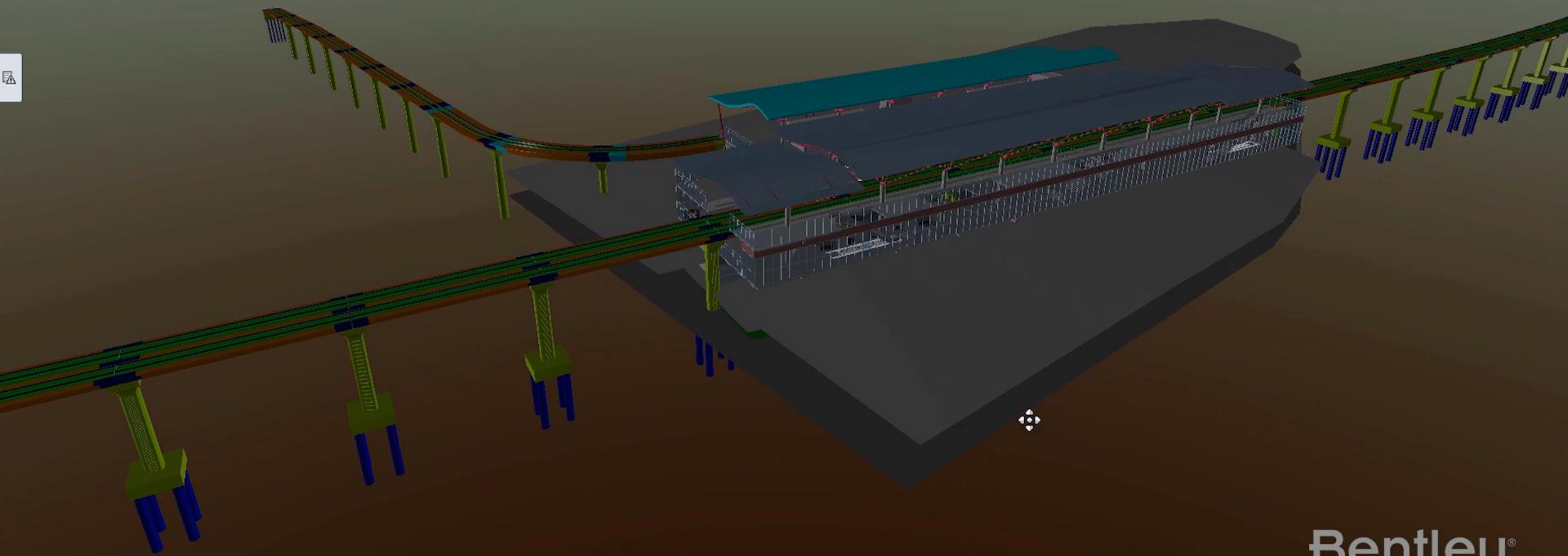
Entorno de Datos Conectados

Flujos de trabajo Gemelos Digitales



Aprovechando el *Contexto Digital*

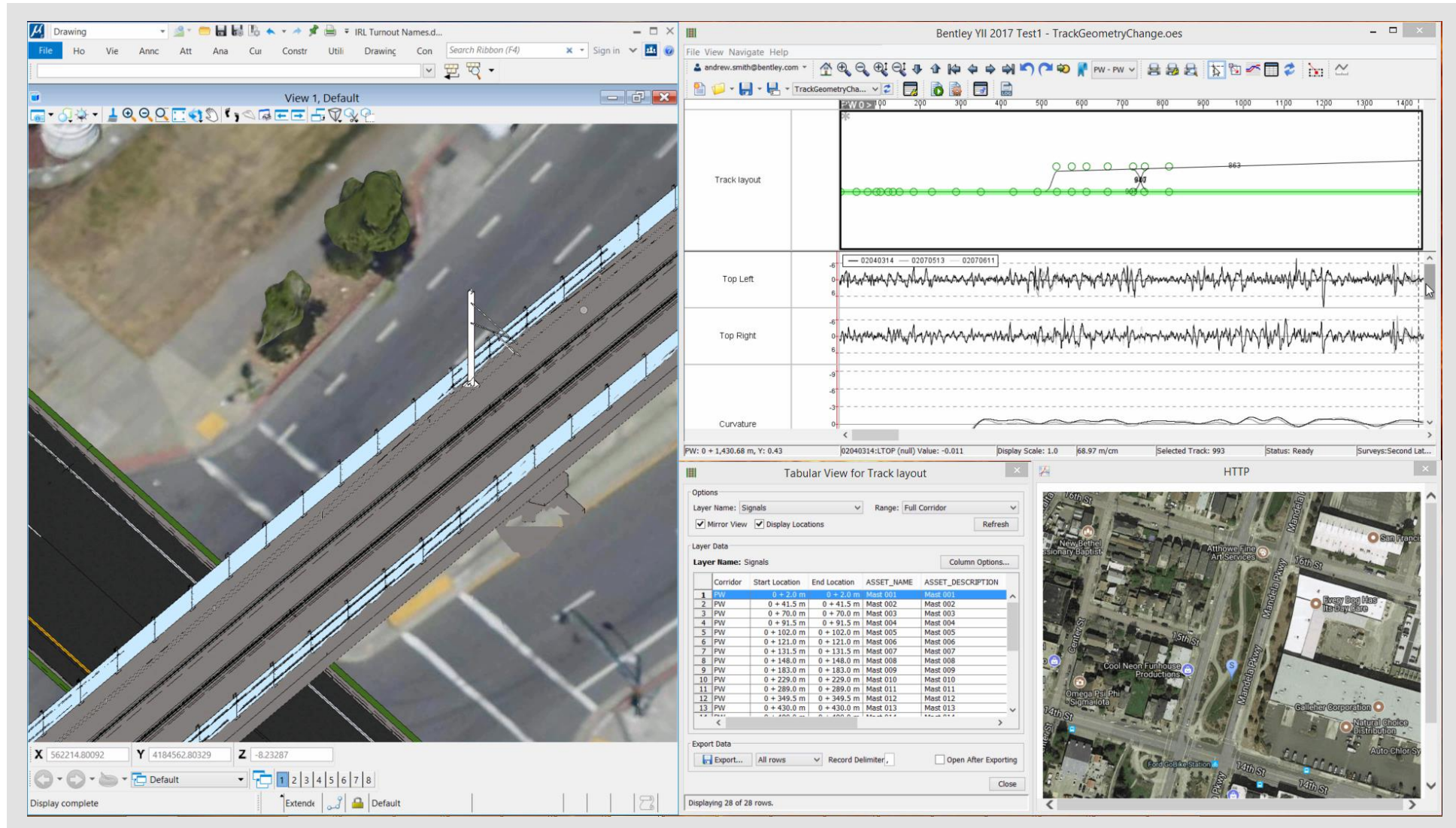




April 22 2018



Aprovechando Contexto & Componentes Digitales



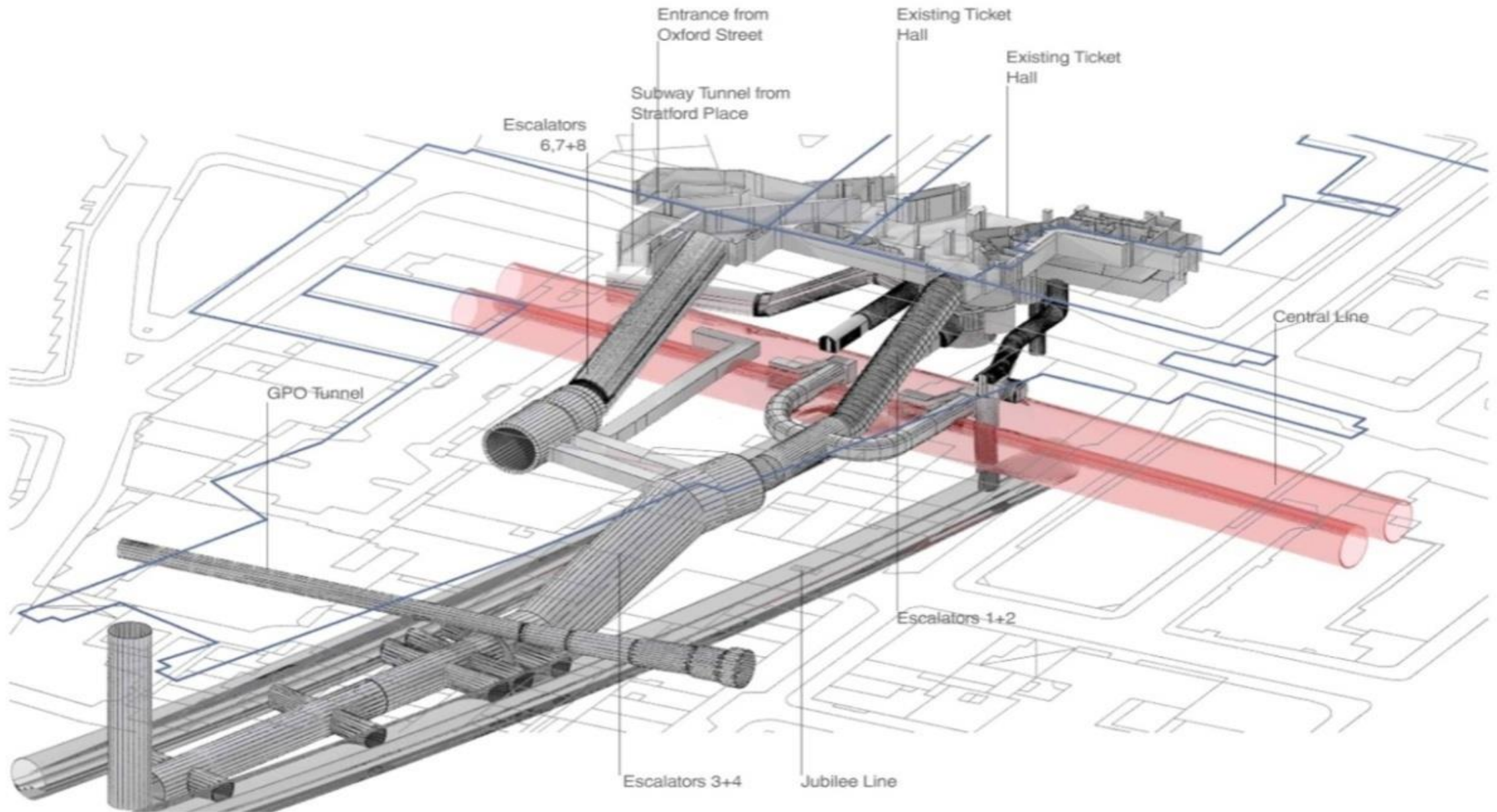
BOND STREET STATION - PASSENGER MODELLING

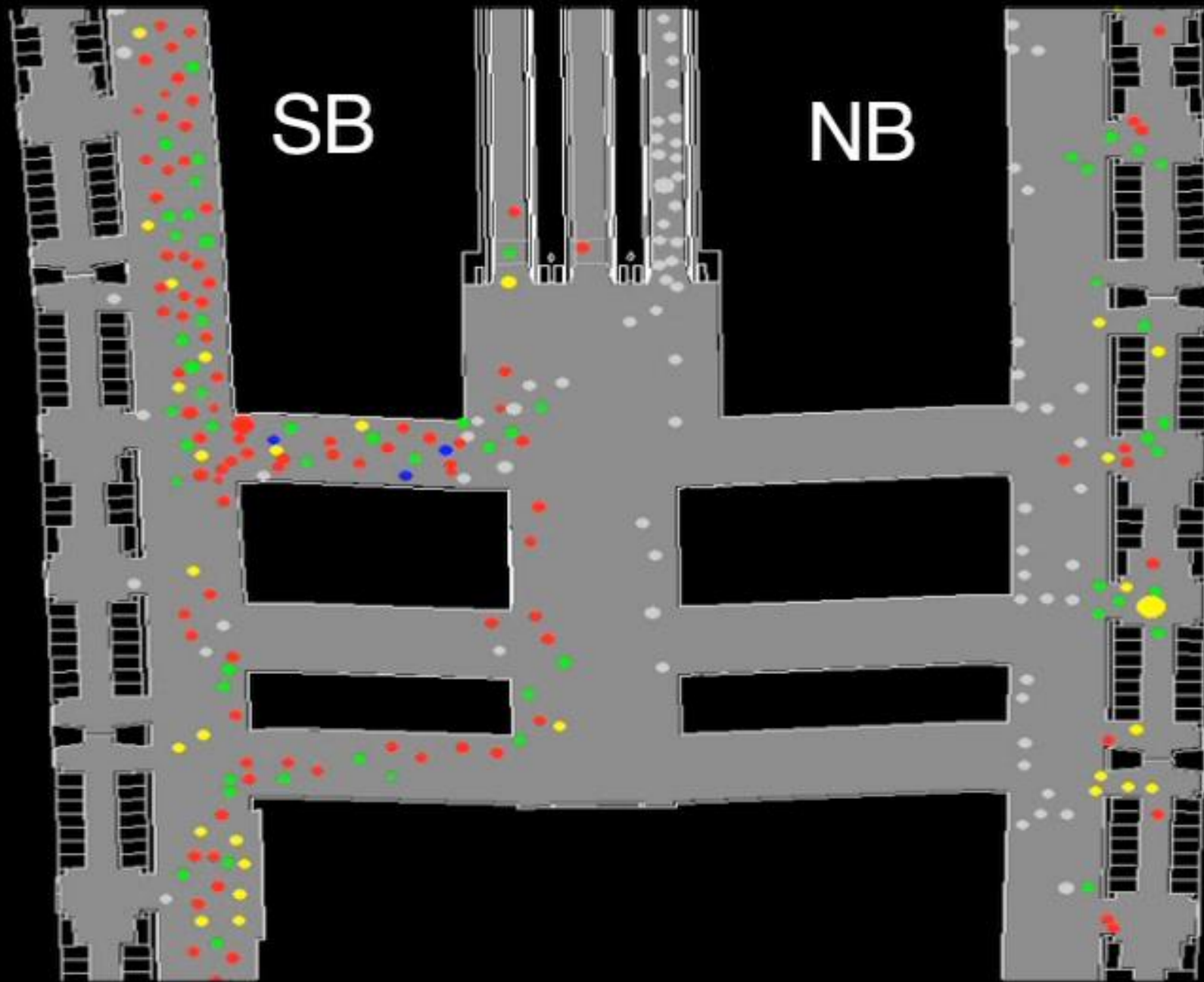


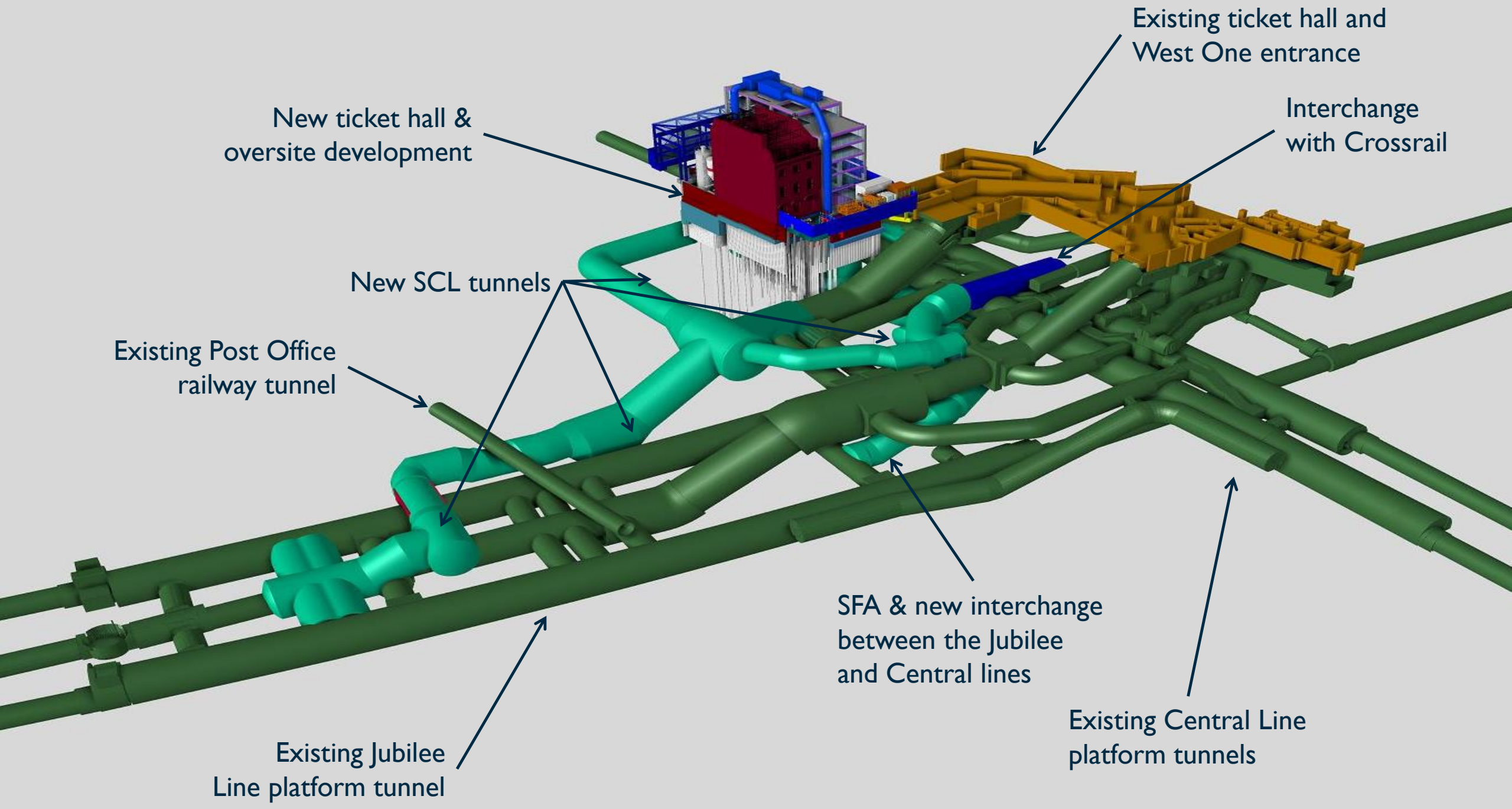
Transport
for London



Design
Insights







New ticket hall &
oversite development

Existing ticket hall and
West One entrance

Interchange
with Crossrail

New SCL tunnels

Existing Post Office
railway tunnel

SFA & new interchange
between the Jubilee
and Central lines

Existing Jubilee
Line platform tunnel

Existing Central Line
platform tunnels

Going Digital

Accelerate your pace of possible!

**Take your
Digital Assessment**

www.bentley.com/GoingDigital



¡Gracias!

Alejandro Donnadieu Cervantes
alejandro.donnadieu@bentley.com
+52 (55) 5488-5420

A hand in a dark suit jacket and white shirt cuff is pointing towards the viewer. The background is a digital grid of blue dots. In the upper right, a city skyline at night is visible, featuring the Oriental Pearl Tower. The overall color palette is blue and purple.

Bentley is... Advancing Infrastructure

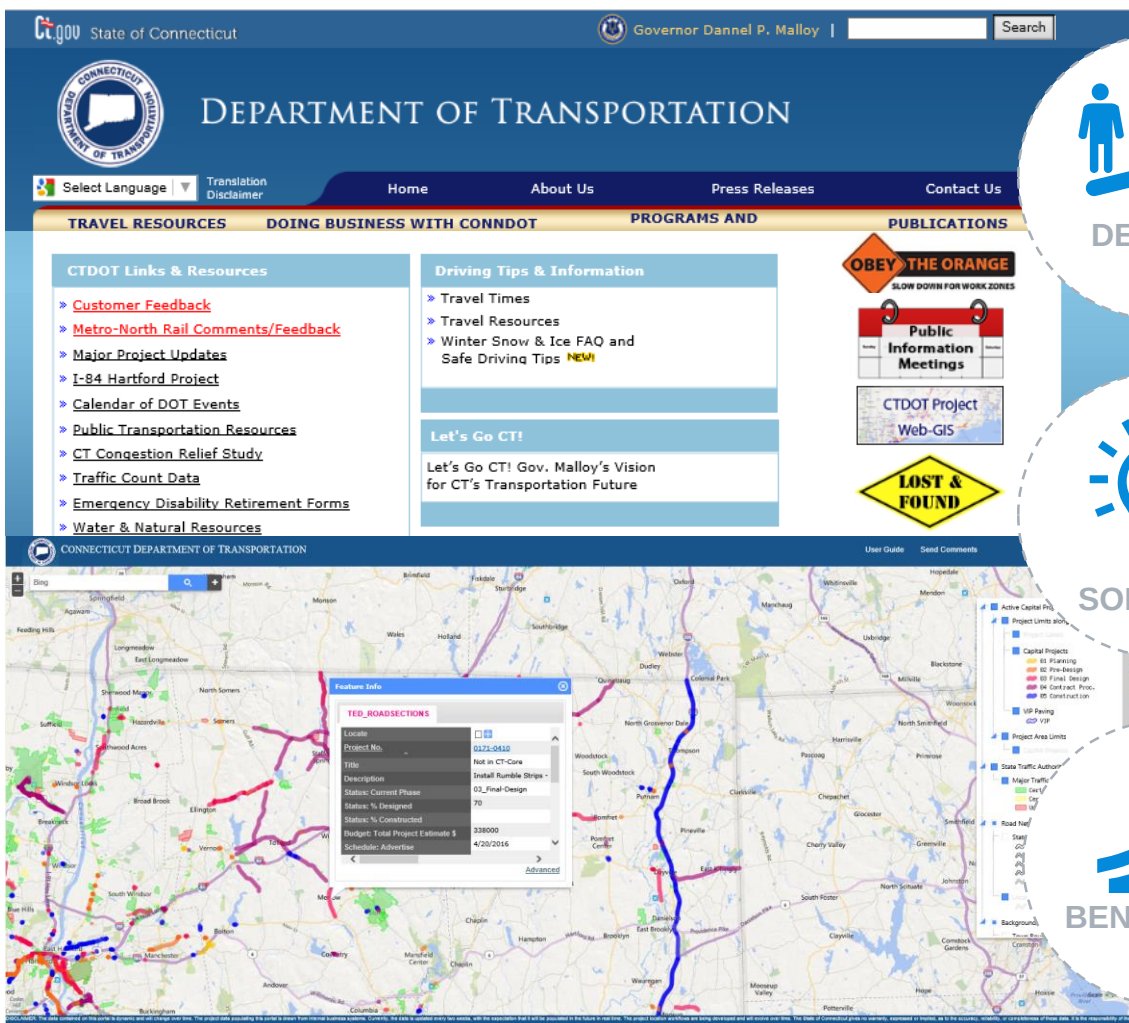
Alejandro.Donnadieu@Bentley.com



Casos de estudio en Transporte

Tránsito, Carreteras y Puentes

Connecticut DOT La información del ciclo de vida de los activos integrados ayuda a lograr el cumplimiento normativo



DESAFIO

Información de activos requerida y gestión espacial para lograr :

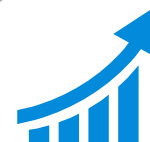
- ✓ Visualización de información de toda la organización en una sola vista y habilitación del público para ver información
- ✓ Conectando información a través de diferentes soluciones comerciales para proporcionar un enfoque profundamente integrado a la gestión de activos de ciclo de vida completo.



SOLUCIÓN

Solución completa de AssetWise que incluye :

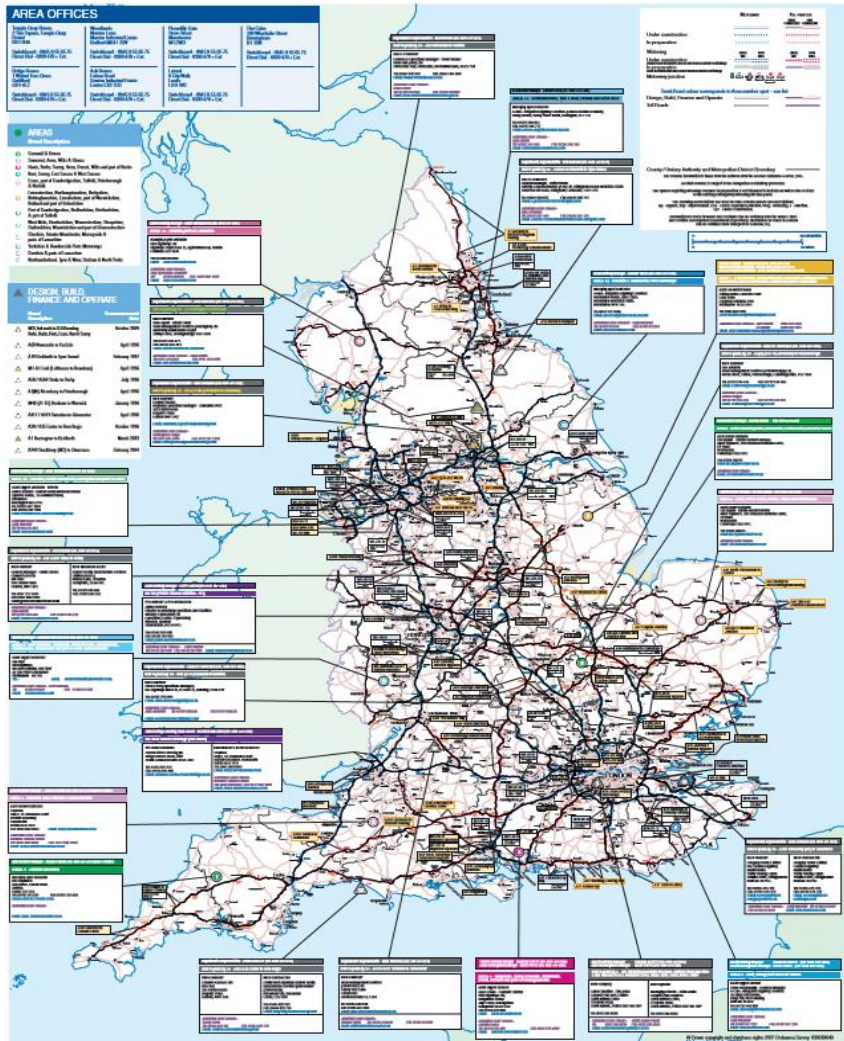
- ✓ Gestión espacial y de red
- ✓ Gestión de información de activos
- ✓ Agregue y analice datos de activos
- ✓ Gestión de inspección
- ✓ Enrutamiento y Permisos



BENEFICIOS

- ✓ Permite una mejor eficiencia para los informes FHWA MAP-21 y HPMS obligatorios.
- ✓ Automatiza el proceso de permisos ahorra tiempo y dinero en el procesamiento de permisos para los empleados de CTDOT
- ✓ Mejora los procesos de inspección que proporcionan viajes más seguros para el público en general

El proyecto NOMS de Highways England permite la integración y el intercambio de información sobre activos



DESAFÍOS

- ✓ Administre los cierres de manera más efectiva y reduzca los costos asociados
- ✓ Integrar con toda su información de ciclo de vida del activo
- ✓ Optimizar la colaboración y la comunicación de las partes interesadas en el negocio
- ✓ Mapa y visualización de cierres y activos relacionados



SOLUCIÓN

- Solución completa de AssetWise que incluye:
- ✓ Administrar, controlar, distribuir y archivar toda la información relacionada con los activos de la infraestructura
 - ✓ Habilitar espacialmente resultados para la visualización del mapa



BENEFICIOS

- ✓ Ahorrará GBP 7.02 millones para un ROI de 1,651 por ciento en el primer año.
- ✓ Reducirá las horas de recursos requeridas para abordar problemas de mantenimiento en 14,400 horas.
- ✓ Espera eliminar 10,824 toneladas de emisiones de carbono anualmente.



**GBP
7.02
MILLION**
cost savings
per year

**10,824
TONS OF
CARBON**
saved
per year

**14,400
HOURS
NIGHTTIME
WORK**
eliminated

**3,600
ROAD
EVENTS**
reduced
per year

Network Event Manager

Network Event Properties Last refreshed at 17:49

Event Number	00007220-01	Admin Unit	Area 09
Event Type	Ad-hoc Routine Works	Data Source	Manual Data Entry
Event Status	Work In Progress	Validation State	Valid
Planned Start	01/06/2020 20:00	Actual Start	
Planned Complete	02/06/2020 05:00	Actual Complete	
Description	M42 to M6 link north carriageway closure for overhead gantry replacement.		

Network Event Details

Attributes | Location | Impacted Network | Operational Impact | Schedule | Actions | Versions

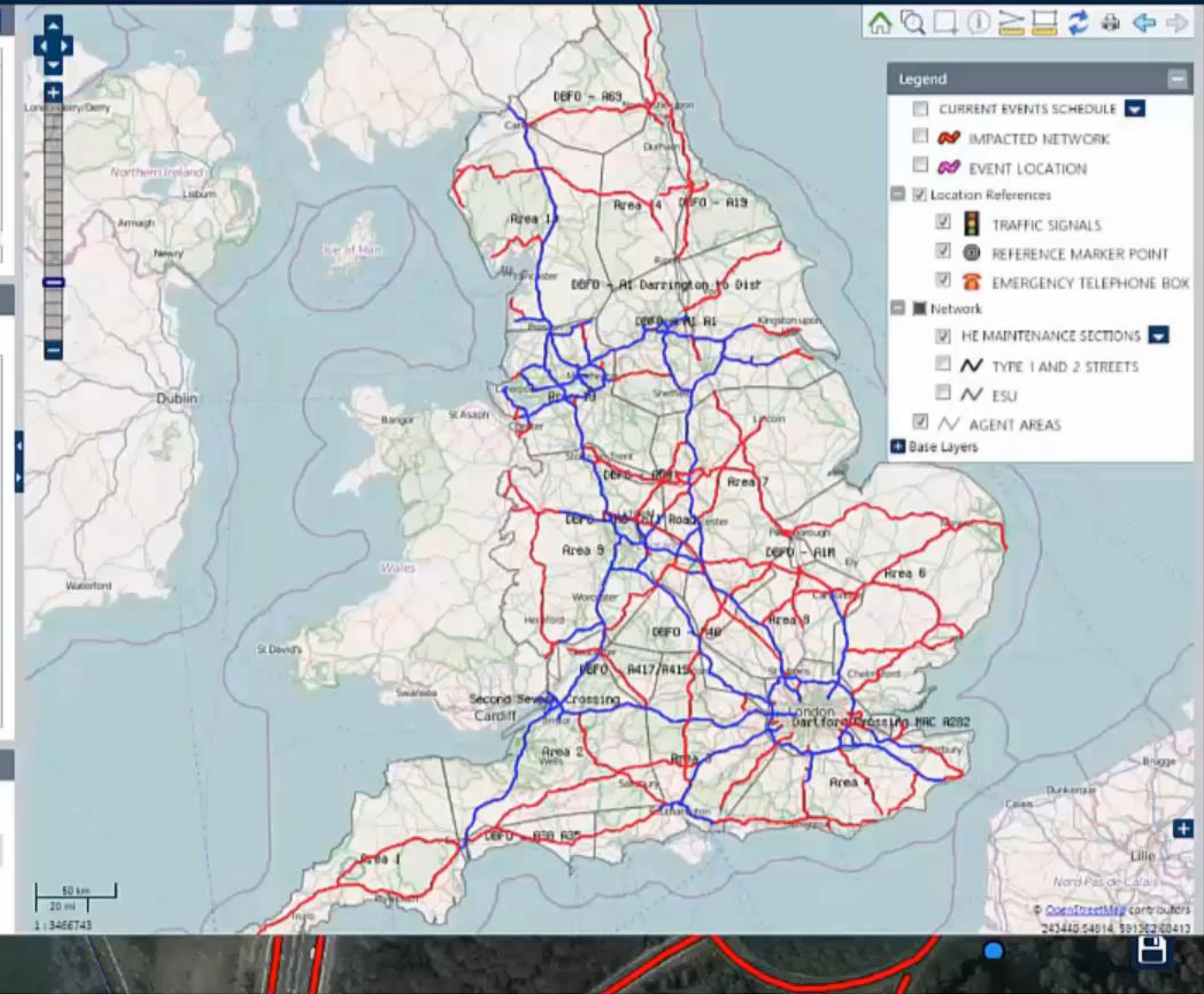
Planned Duration	2	Planned Duration Units	Days
Slippage	0	Distribute	Yes
Nature of Works	Gantry	User Responsible	Duncan Begam
Delay	Severe (more than 30 mins)	Agency Ref	HE2010-GHW8960023/005
Works Ref		TMA Works Ref	
Mobile Lane Closure	No	Alternate Route Used	Yes
SRW ID		Notes	

Contact Type	Contact Name	Reference	Telephone Day	Telephone Night	Notes
No Contacts found.					

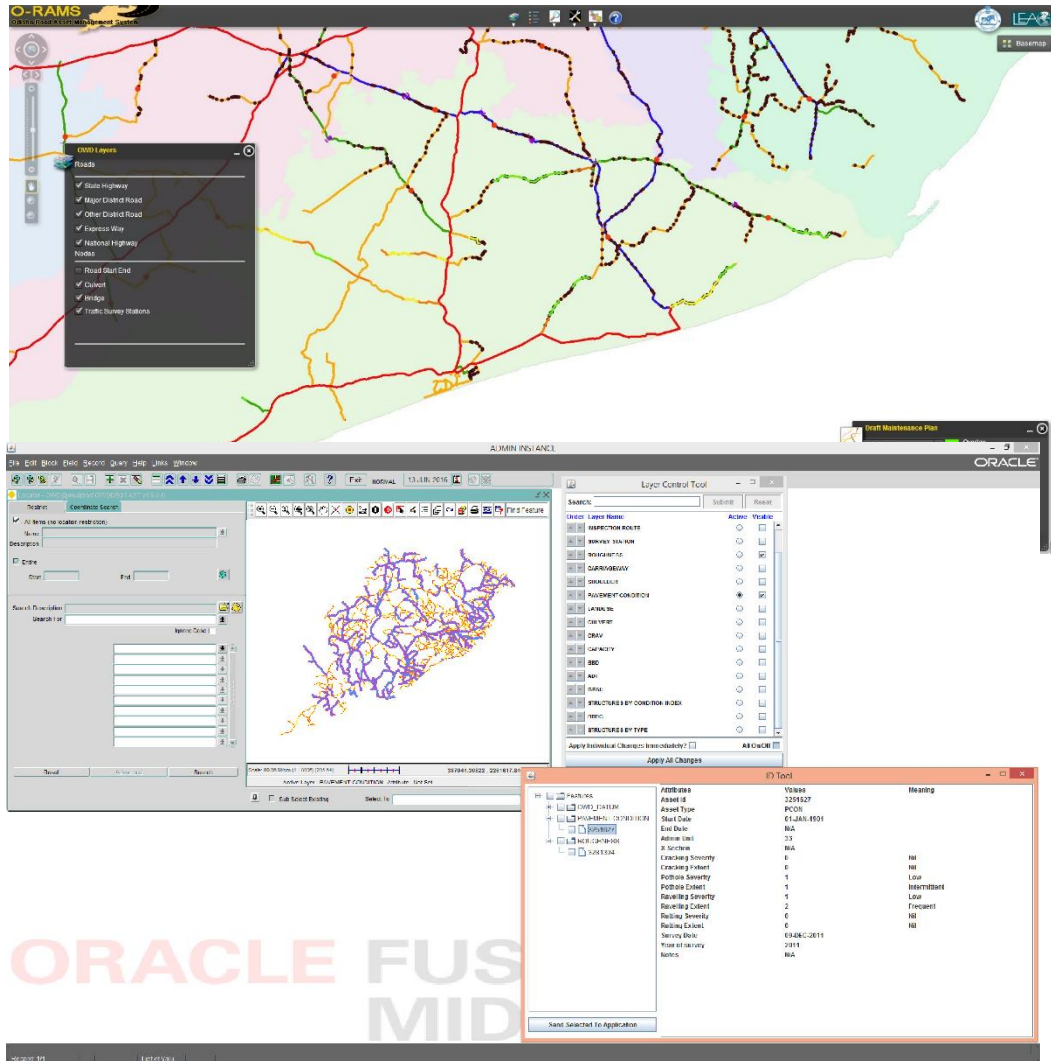
Monitor and manage scheduled network maintenance events

Refresh

1 : 1,812 419691.9593, 286733.3256 m



Odisha Trabaja en el análisis simplificado y la generación de informes de la información de activos de transporte para reducir los costos de operación y mantenimiento



DESAFIOS

- ✓ Integrar la tecnología SIG en el mapeo de la red de carreteras y puentes de Odisha
- ✓ Para tener visibilidad de
 - ✓ the present condition of the roads
 - ✓ and traffic demand
- ✓ Necesita una gestión de activos flexible e interoperable



SOLUCIÓN

- Solución completa de AssetWise que incluye:
- ✓ Mantenga toda la información en un sistema seguro con control de acceso unificado
 - ✓ Asegúrese de que solo los usuarios autorizados puedan crear y actualizar información sobre carreteras y activos.

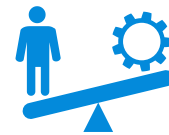
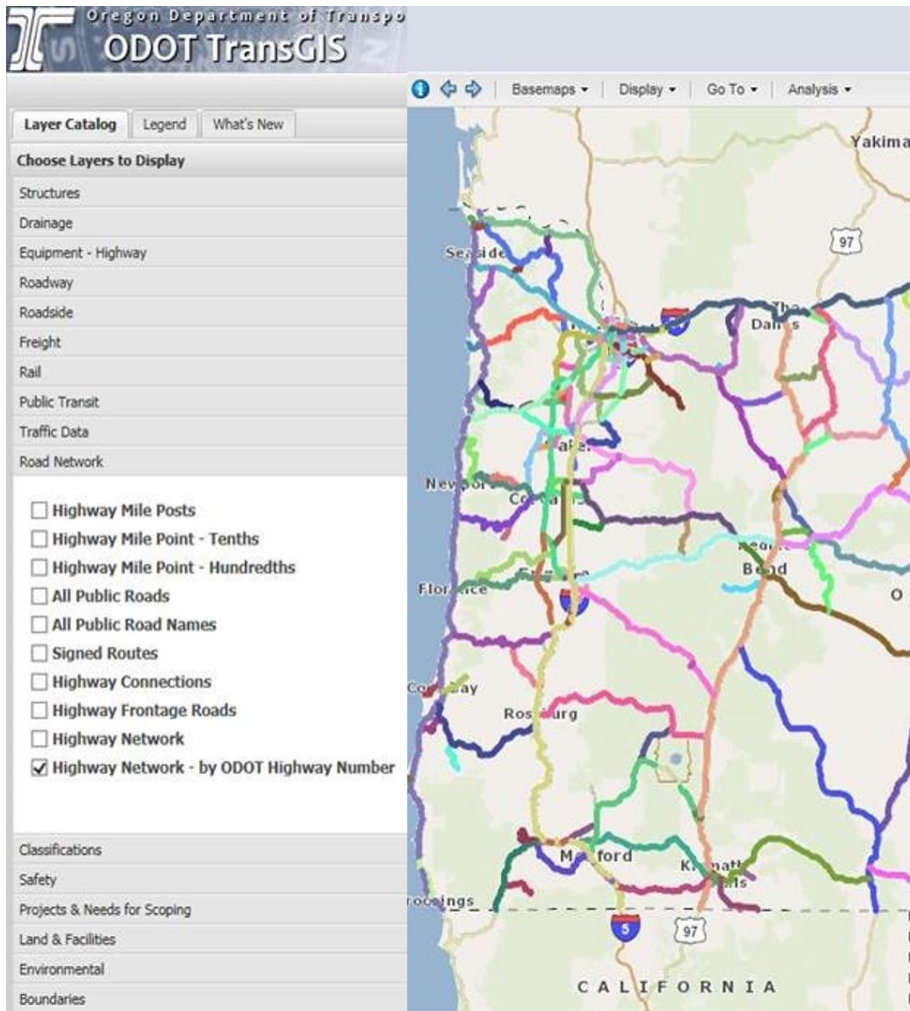


BENEFICIOS

- ✓ Una única fuente de verdad para el inventario y la Condición de las carreteras y puentes de Odisha
- ✓ El seccionamiento y la rehabilitación homogéneos basados en reglas t para la sostenibilidad de 1.650 puentes
- ✓ Análisis e informes simplificados de la información de TAM para reducir los costos de operación y mantenimiento
- ✓ Admisiones de HDM-4 admitidas en formato HDM-4

Oregon DOT Aumento de la eficiencia de la gestión de datos y el informe normativo

Cumplimiento de ROI de más de \$ 6.1M



DESAFIO

- ✓ Reemplace los sistemas obsoletos con la solución para conciliar los activos existentes con cambios lineales en la red
- ✓ Integre todos los activos asociados en una única solución como base de la información de la carretera
- ✓ Mantener representación espacial de la información
- ✓ Mejorar / crear interfaces con otros sistemas ODOT
- ✓ Apoyar los requisitos de informes reglamentarios



SOLUCIÓN

Solución completa de AssetWise que incluye:

- ✓ Capacidades de gestión de red lineal
- ✓ Segmentar dinámicamente la red
- ✓ Funcionalidad analítica
- ✓ Informes de extracción de datos
- ✓ Habilitar espacialmente resultados para la visualización del mapa



BENEFICIOS

- ✓ Tiempo reducido para crear una actualización de la capa de datos espaciales en 3 meses por persona
- ✓ Aumento de la eficiencia de los informes en una media del 60%
- ✓ Se realizó una eficiencia de gestión de datos del 20-25%
- ✓ Tiempo reducido para preparar los datos del informe federal en un 83%
- ✓ ROI total estimado \$ 6.1M en 5 años

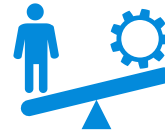


A Clean Modern User Interface

1 : 288,896

-8673216.8642, 4288355.3272 m

Utah Transit Authority consigue alcanzar estado de buena reparación y cumple los requerimientos de MAP-21



DESAFIO

Mejore y amplíe la gestión de activos de tránsito de UTA para lograr:

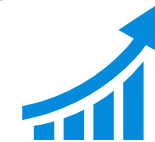
- Estado de buena reparación
- Cumplir con los requisitos de la Administración Federal de Tránsito en Avanzando hacia el Progreso en el Siglo XXI (MAP-21)



SOLUCIÓN

Solución integral de gestión de inspección :

- ✓ Inventario
- ✓ Deterioro
- ✓ Inspección
- ✓ Calificación de condición
- ✓ Mantenimiento
- ✓ Riesgo



BENEFICIOS

- ✓ Costos reducidos
- ✓ Mitigar la interrupción del servicio
- ✓ Evita la pérdida potencial de pasajeros
- ✓ Lograr una mayor satisfacción del cliente.

Nevada DOT Reduced Inspection Time and Achieved Regulatory Compliance



DESAFIO

Mejorar y ampliar la solución de inspección del puente DOT de Nevada para lograr :

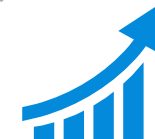
- ✓ Visibilidad a la información de inspección y mantenimiento
- ✓ Inspecciones de puente a tiempo completo en todo el estado
- ✓ Cumplimiento normativo con las auditorías FHWA



SOLUCIÓN

Solución completa de AssetWise que incluye :

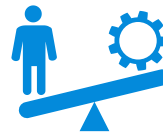
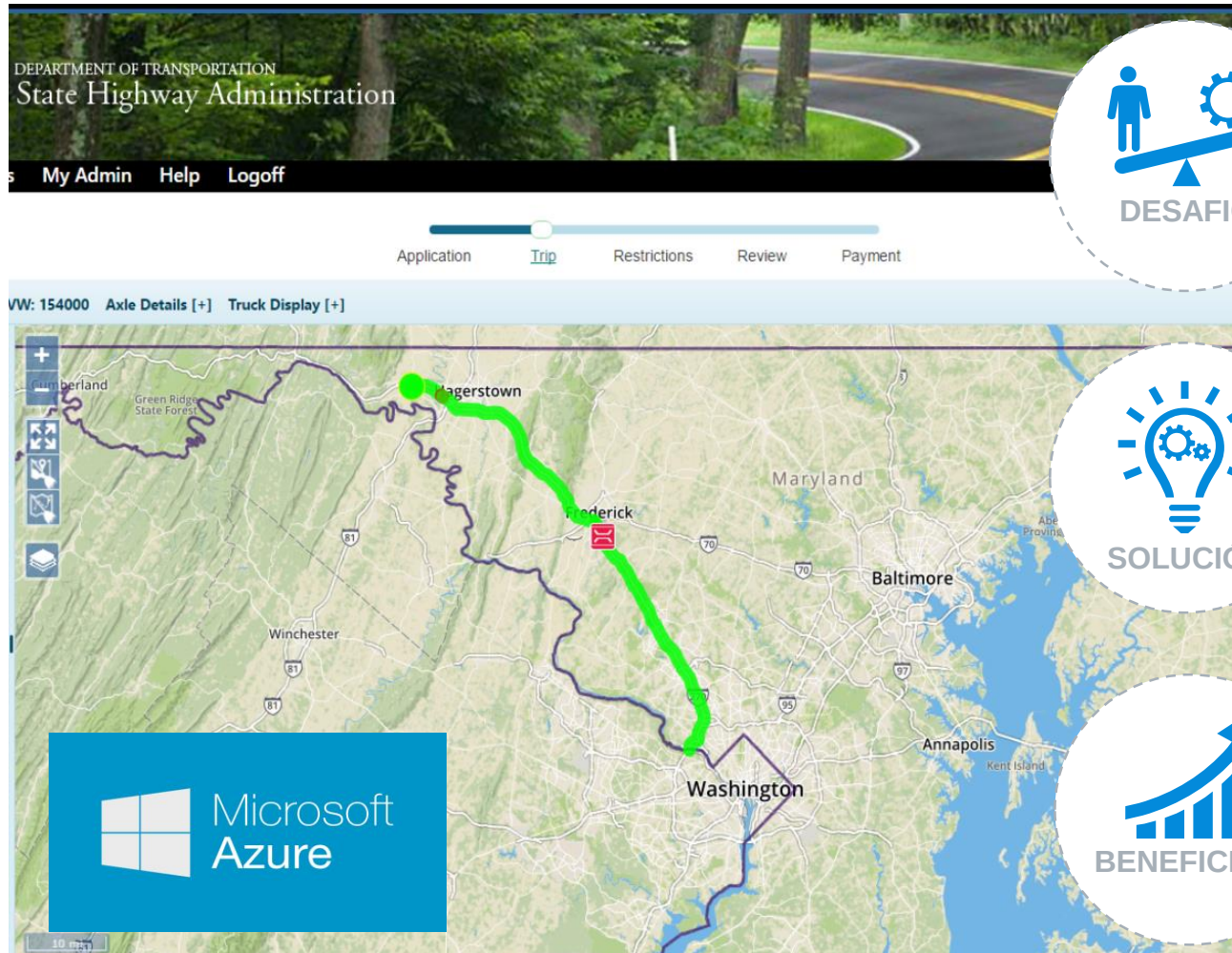
- ✓ Información recolectada en todos los puentes
- ✓ Evaluación de gestión basada en riesgos
- ✓ Informes de gestión



BENEFICIO

- ✓ Tiempo de inspección reducido en un 30%
- ✓ Se logró el cumplimiento normativo en la auditoría anual de FHWA de 23 métricas clave
- ✓ Seguridad mejorada

Maryland DOT Permitting, Routing and Bridge Solution To Save Carriers USD 24 Million Annually



DESAFIO

Necesidad de:

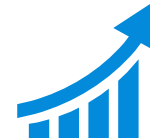
- ✓ Mejorar la seguridad de la ruta y la sostenibilidad de las carreteras
- ✓ Volumen de direcciones de solicitudes de permisos OS / OW
- ✓ Mantener el inventario del puente y la información de inspección
- ✓ Asegúrese de que las holguras de puentes horizontales y verticales superiores e inferiores se verifiquen con precisión
- ✓ Garantizar un viaje seguro de las cargas permitidas en todo el estado



SOLUCIÓN

Servicios integrales de AssetWise en Azure :

- ✓ Permisos
- ✓ Permisos multi estatales
- ✓ Enrutamiento
- ✓ Análisis de puente, inventario e inspección



BENEFICIOS

- ✓ Los operadores ahorrarán USD 24,6 millones por año y al menos una hora en cada movimiento en el estado.
- ✓ Ahorrar 10 minutos de manual por procesamiento de permisos
- ✓ Liberar a 10 empleados de tiempo completo anualmente
- ✓ Un viaje más seguro para el público en general



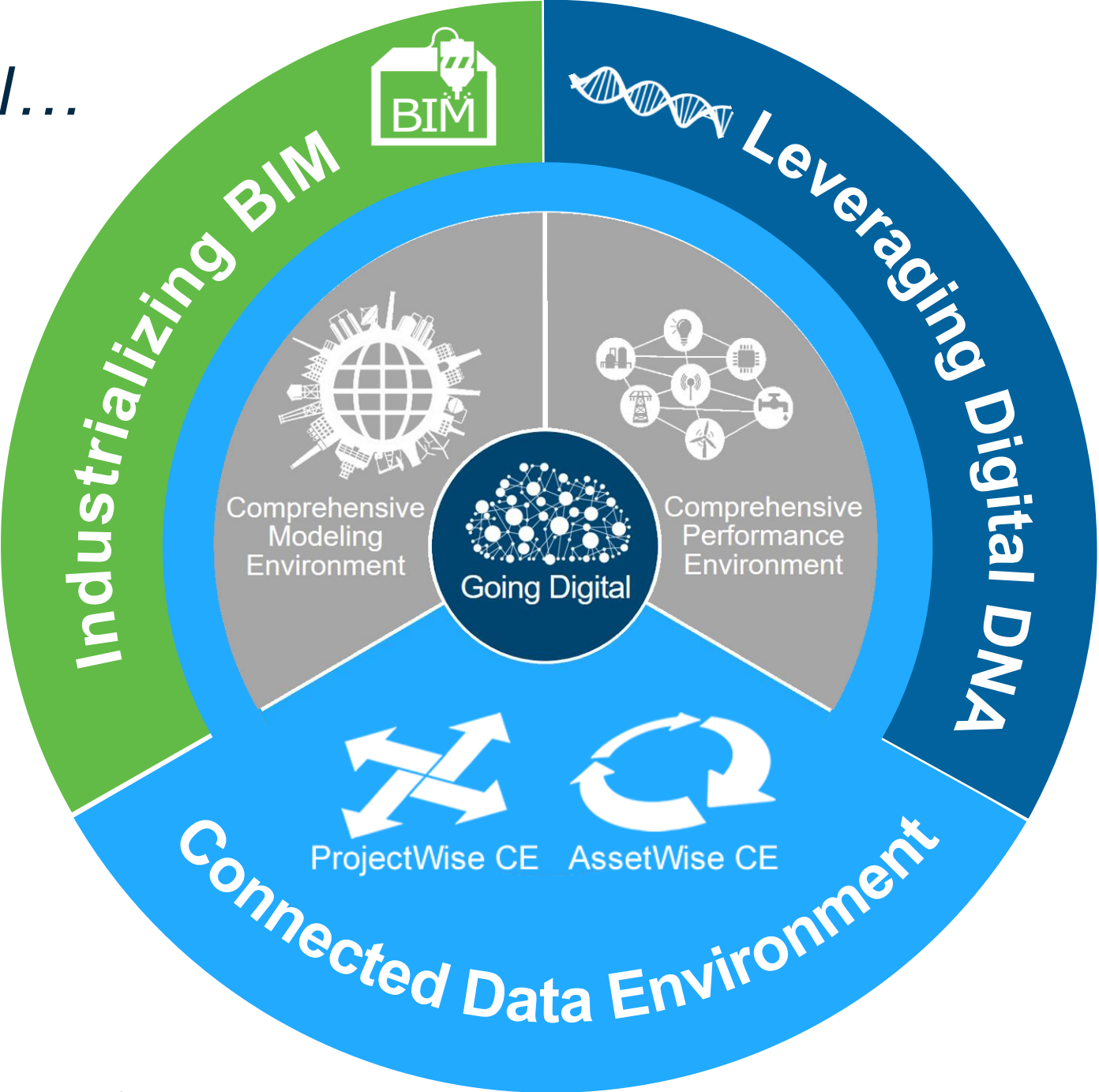
Innovation in Bridges

- Unique Physical & Cultural Challenges
- Diverse & Distributed project team
- ProjectWise
- GEOPAK
- InRoads
- Microstation

Hoover Dam Bypass

Jacobs Engineering
Pasadena, California USA

Going Digital...





Casos de estudio en Hospitales y Campuses



UCSF Medical Center at Mission Bay

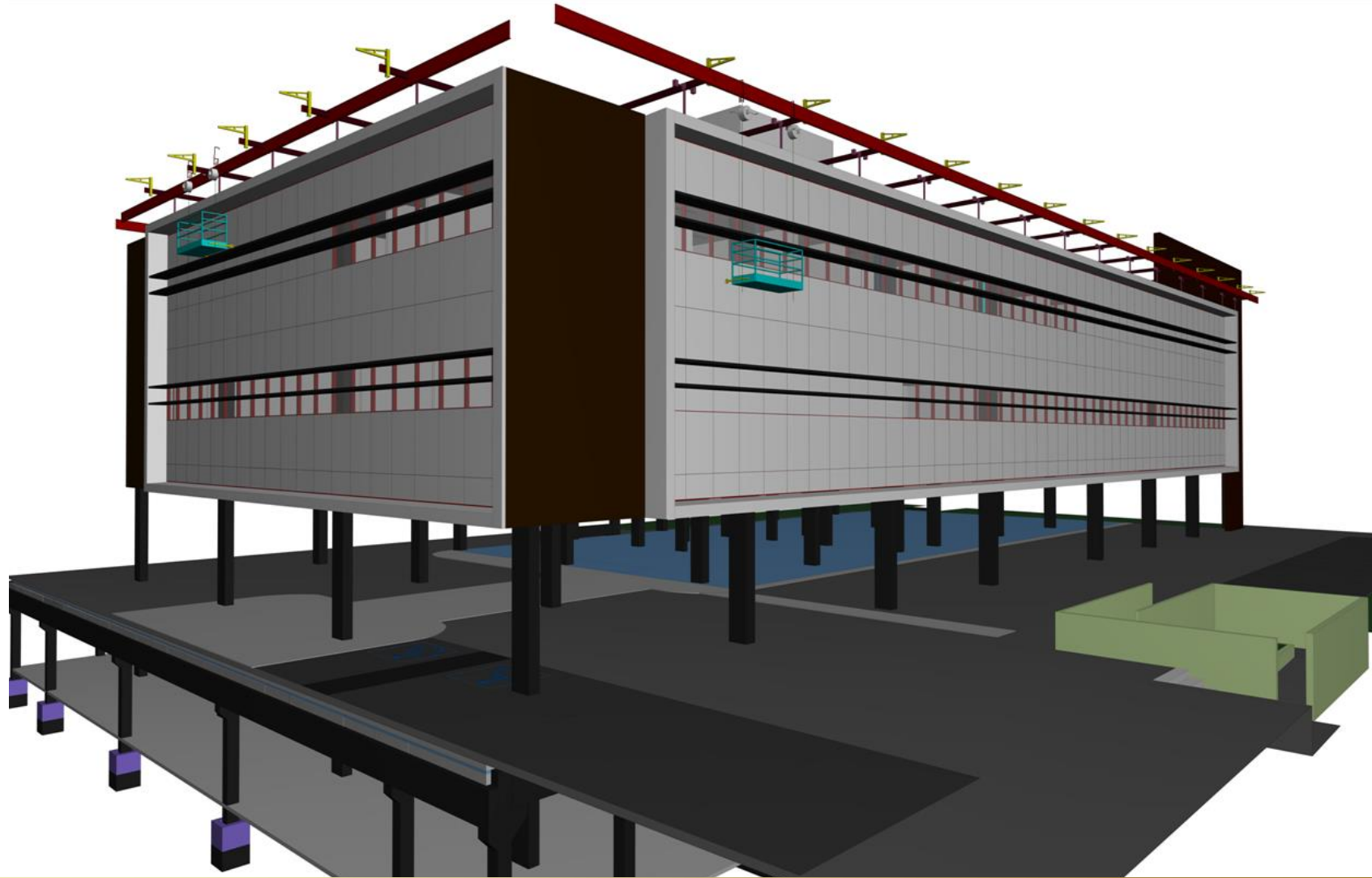
DPR Construction

San Francisco, California, United States

Connecting Project Teams

- BIM collaboration
 - Virtual Building Process
 - Contractor coordination
 - Saved Time & Money
-
- ProjectWise
 - 350 users
 - \$35,000 saved per Coordination Review
 - 5% less time managing references
 - \$65,000 saved sharing clash models





Innovation in Construction

- BIM construction simulation
- LEED certified
- Bentley Architecture
- Bentley Building Mechanical Systems
- Bentley Building Electrical Systems
- Bentley Navigator
- Bentley Schedule Simulation

Planning Innovation of a Medical Center

Matec Engenharia
São Paulo, Brazil



Innovation in Campuses

- 6 Design packages
- 850 3D Design models
- 2,300 Drawings
- GEOPAK
- Bentley Architecture
- Bentley Structural Modeler
- Bentley Building Mechanical Systems
- Bentley Building Electrical Systems
- ProjectWise
- Bentley Navigator

Infantry Brigade Combat Team Complex

Barge Waggoner Sumner & Cannon
Ft. Stewart, Georgia



Innovation in Building

- BIM collaboration
- Building siting
- Sunshade configuration
- Contractor coordination

- MicroStation
- Bentley Architecture
- Bentley Navigator
- i-models
- i-model plug in for Revit

Nemours Children's Hospital

Stanley Beaman & Sears
Orlando, Florida, United States

Sutter Healthcare: Castro Valley Hospital



Designer



GC



Sutter Health
With You. For Life.

Owner



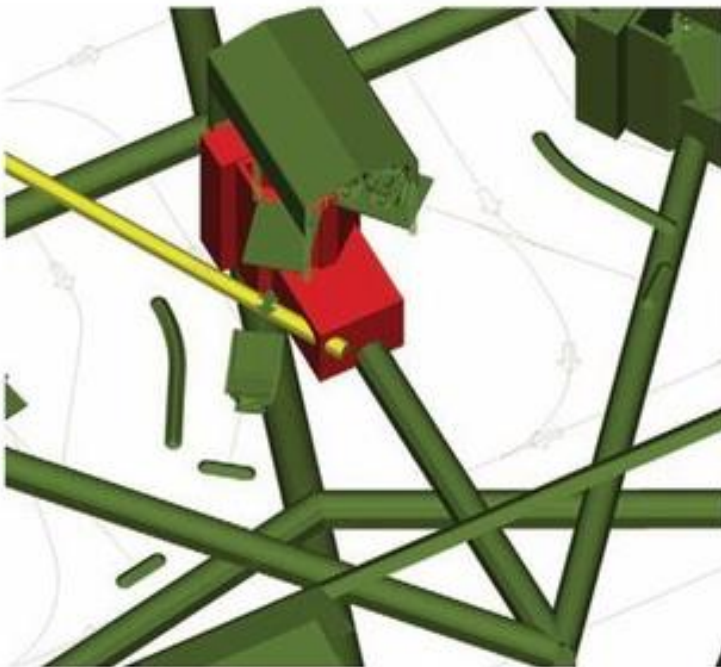
Hatch

Dynamic 4D Environment To Analyze Constructability and Safety

Santiago, Chile

The Andina Division of CODELCO, a Chilean state-owned copper mining company, asked Hatch Chile to develop a dynamic 4D environment to analyze the engineering design, constructability, and safety conditions of projects to be executed from 2010 to 2016 within a 2-kilometer area of the Phase II development project.

Hatch Chile based the solution on the integration of Bentley 3D modeling tools to create a visualization and review module. Leveraging the high-level capabilities of Bentley Navigator, the solution enables dynamic 4D visualization and design review of projects during a given time period within the area of interest.



PROJECTWISE



Design Integration Visa
BIM Review Visa
BIM Standards Management Visa

Optioneering Visa
Construction Management Visa
Advanced Work Packaging Visa

CONNECTED DATA ENVIRONMENT

Connection Center
Automation Center
Components Center
Optioneering Center

ASSETWISE



Asset Lifecycle Information Management
Asset Reliability
Operational Analytics
Enterprise Interoperability



ProjectWise Explorer

Navigator

Structural Navigator

Open Roads Navigator



Worksite

Bentley Map Mobile

ProjectWise Edge

InspectTech Collector

CAMPUSES

- Map
- Descartes
- AECOSim
- RAM
- STAAD
- OpenRoads
- gINT
- SITEOPS
- ContextCapture
- LumenRT
- Haestad
- OpenUtilities
- Communications

MINING

- MineCycle
- OpenPlant
- STAAD
- Promis.e
- Map
- Descartes
- ContextCapture
- OpenRail
- gINT
- Haestad
- AssetWise APM
- Amulet

ROADS

- OpenRoads
- OpenBridge Modeler
- LEAP
- RM Bridge
- gINT
- Descartes
- SITEOPS
- ContextCapture
- LumenRT
- Map
- Haestad
- InspectTech
- SUPERLOAD

CONSTRUCTION

- Navigator
- ConstructSim
- ProStructures
- AECOSim
- Descartes
- OpenRoads
- SITEOPS
- EADOC
- ContextCapture
- LumenRT

UTILITY NETWORKS

- OpenUtilities
- Communications
- Substation
- Haestad
- STAAD
- Descartes
- SITEOPS
- ContextCapture
- LumenRT
- InspectTech
- Amulet
- AssetWise APM

WATER & WASTEWATER

- Haestad
- OpenPlant
- AutoPLANT
- AECOSim
- STAAD
- RAM
- gINT
- OpenUtilities
- OpenRoads

BUILDINGS

- AECOSim
- RAM
- STAAD
- ProStructures
- Hevacomp
- speedikon
- gINT
- OpenRoads
- OpenUtilities
- Communications
- Haestad
- ContextCapture
- LumenRT

RAIL & TRANSIT

- OpenRail
- OpenBridge Modeler
- RM Bridge
- LEAP
- gINT
- Promis.e
- SITEOPS
- ContextCapture
- LumenRT
- Map
- AECOSim
- STAAD
- RAM
- InspectTech
- Optran

SUBSURFACE UTILITIES

- OpenUtilities
- Communications
- Haestad
- OpenRoads
- gINT

WIND FARMS

- SACS
- MOSES
- MAXSURF
- ProSteel
- OpenPlant
- gINT
- ContextCapture
- AssetWise APM
- Amulet

CITIES

- Map
- Descartes
- OpenRoads
- OpenRail
- OpenUtilities
- Communications
- AECOSim
- ContextCapture
- LumenRT
- SITEOPS

COMMUNICATIONS NETWORKS

- Communications
- STAAD

POWER PLANTS

- OpenPlant
- AutoPLANT
- AutoPIPE
- Promis.e
- STAAD
- ProStructures
- AECOSim
- gINT
- Descartes
- ContextCapture
- OpenRoads
- AssetWise APM
- Amulet

OFFSHORE STRUCTURES

- SACS
- MOSES
- MAXSURF
- AutoPIPE
- ProSteel
- ConstructSim
- OpenPlant
- gINT
- ContextCapture
- AssetWise APM
- Amulet

NUCLEAR POWER

- AutoPIPE
- OpenPlant
- AECOSim
- STAAD
- SITEOPS
- AssetWise APM
- Amulet

BRIDGES

- OpenBridge Modeler
- RM Bridge
- LEAP
- OpenRoads
- gINT
- ProStructures
- ContextCapture
- LumenRT
- LARS
- SUPERLOAD
- InspectTech

PROCESS PLANTS

- OpenPlant
- AutoPLANT
- AutoPIPE
- PlantWise
- Promis.e
- AECOSim
- ProStructures
- STAAD
- gINT
- OpenRoads
- SITEOPS
- ContextCapture
- LumenRT
- AssetWise APM
- Amulet

BENTLEY'S
APPLICATION
PLAYBOOKS

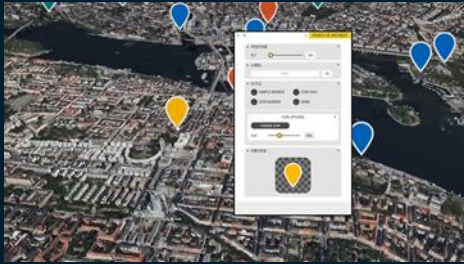
MICROSTATION



Bentley
Advancing Infrastructure

OpenCities Connected Data Environment (CDE)

Plan



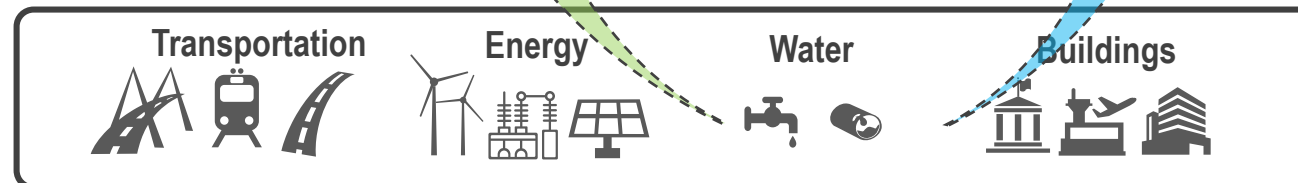
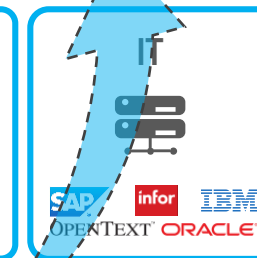
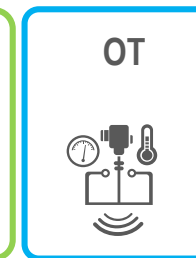
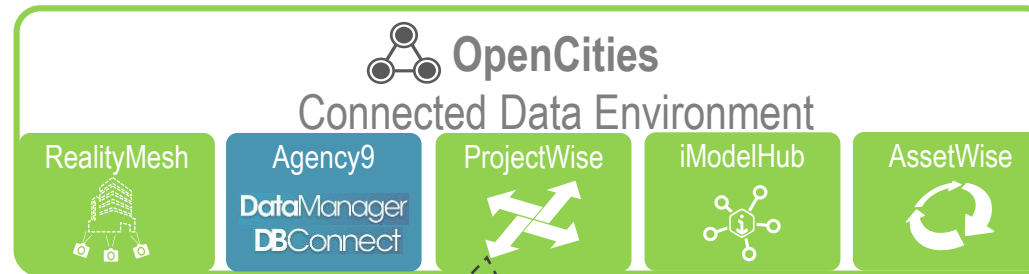
Design



Build

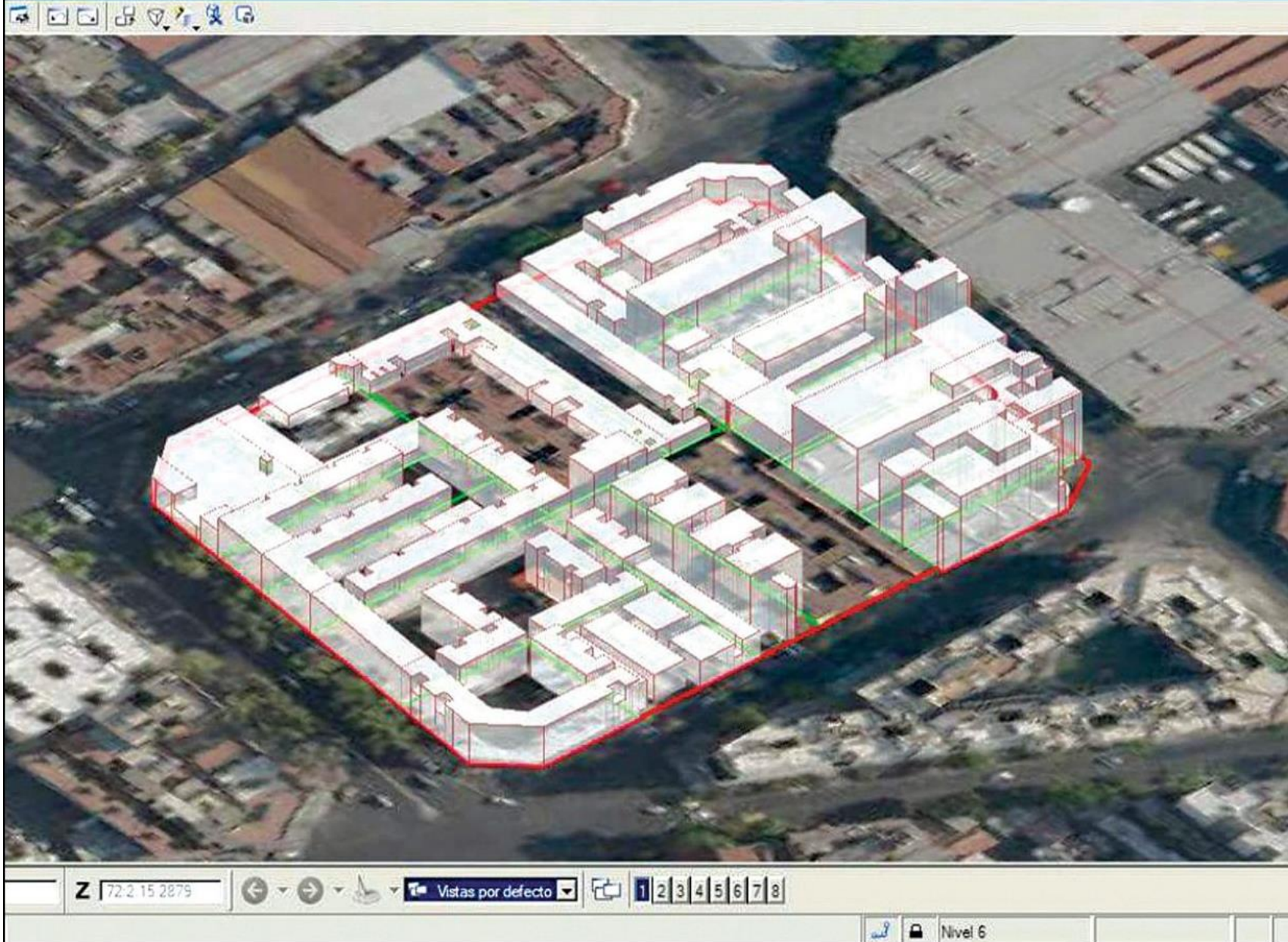


Operate



WINNER

Secretaría de Finanzas del Distrito Federal
Programme for the Modernisation of the Mexico City Cadastre
Mexico City, Mexico



Sustaining Our Society

- Mexico City Finance Dept.
- Mapping project
- More accurate tax assessment based on land census data
- Bentley Cadastre
 - 8,000 aerial photos
 - 1,486 km² mapped
 - 2 million property visits
 - 2D and 3D visualizations

A hand in a dark suit jacket and white shirt cuff is pointing towards the viewer. The background is a blurred cityscape at night, featuring the Oriental Pearl Tower. A semi-transparent blue grid pattern is overlaid on the entire image.

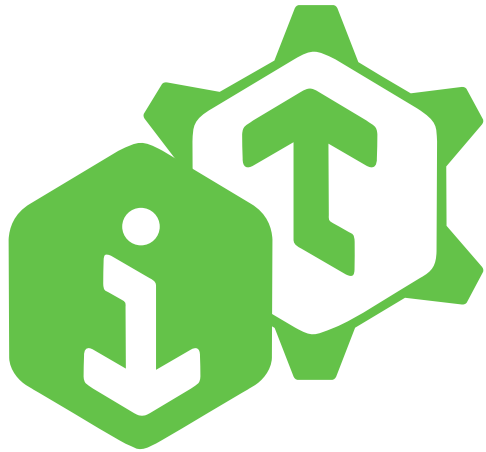
iModel Hub

Going Digital with Bentley

Create Immersive Connections with your
Infrastructure Digital Twin



iModel.js



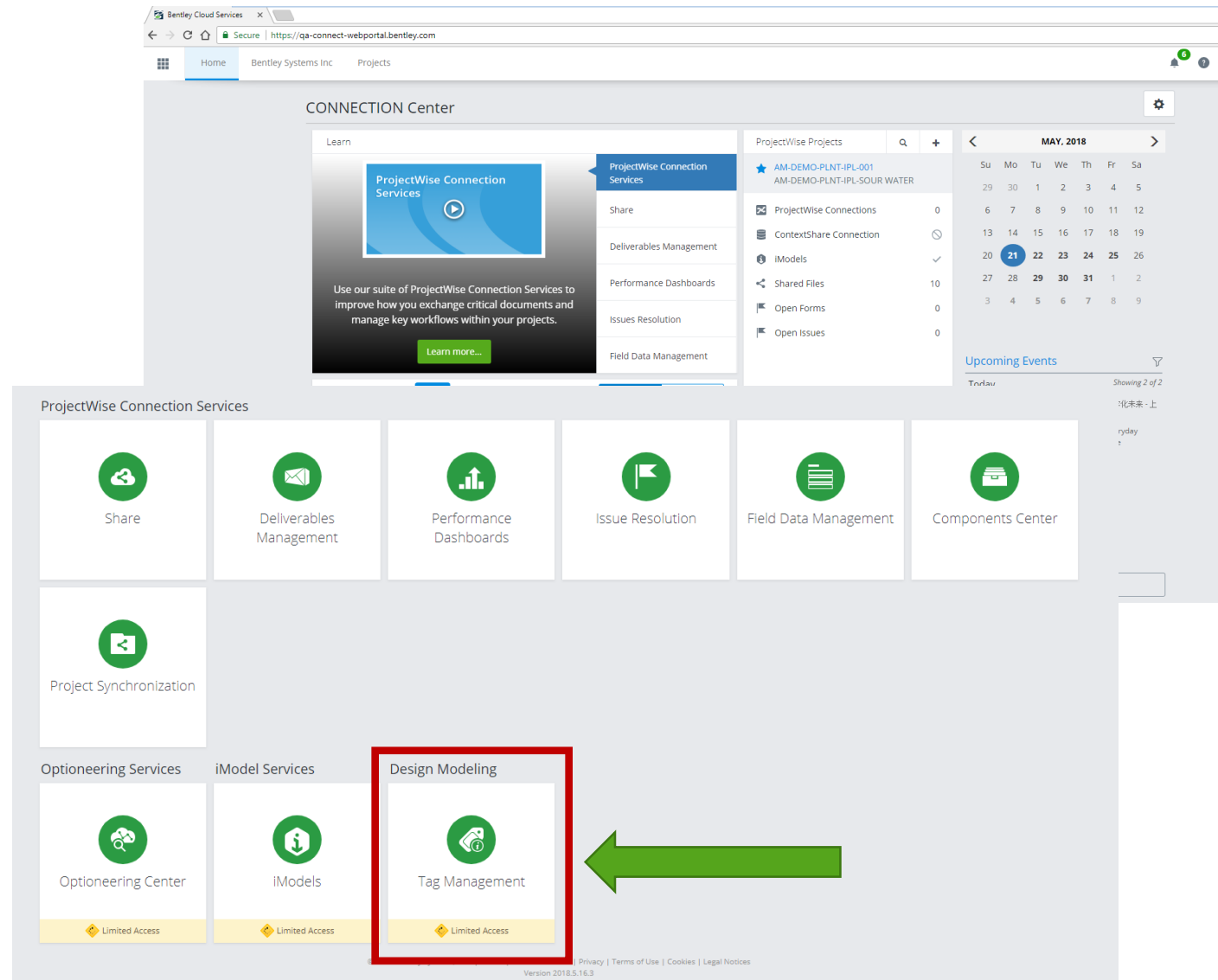
iTwin Services

Immersive Connections for an
Open Ecosystem



CONNECTION Center

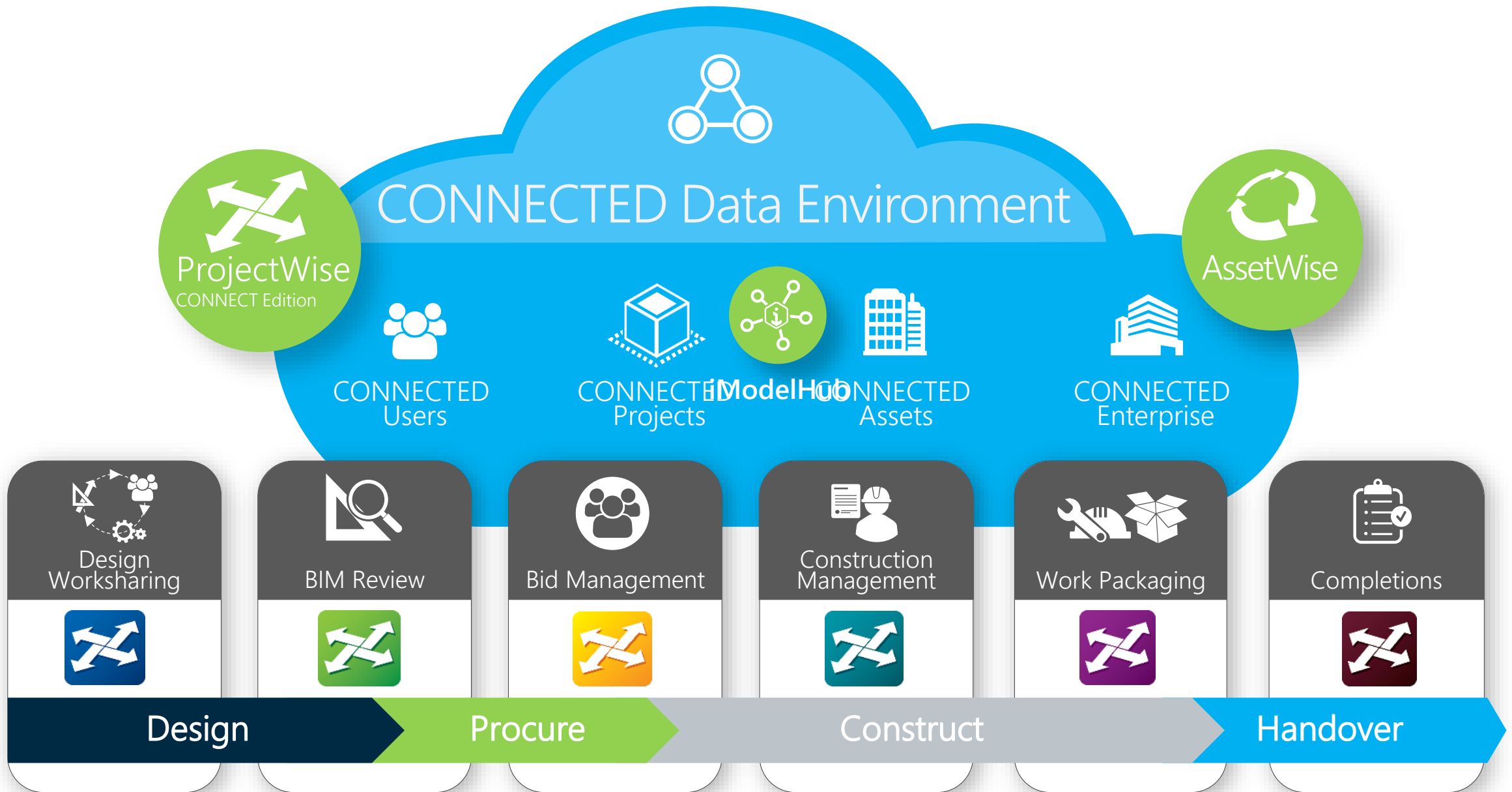
- Project Sharing
- Performance Dashboards
- Issue Resolution
- Field Data management
- Deliverables Management
- Project Synchronization
- iModel Hub
- Tag Management



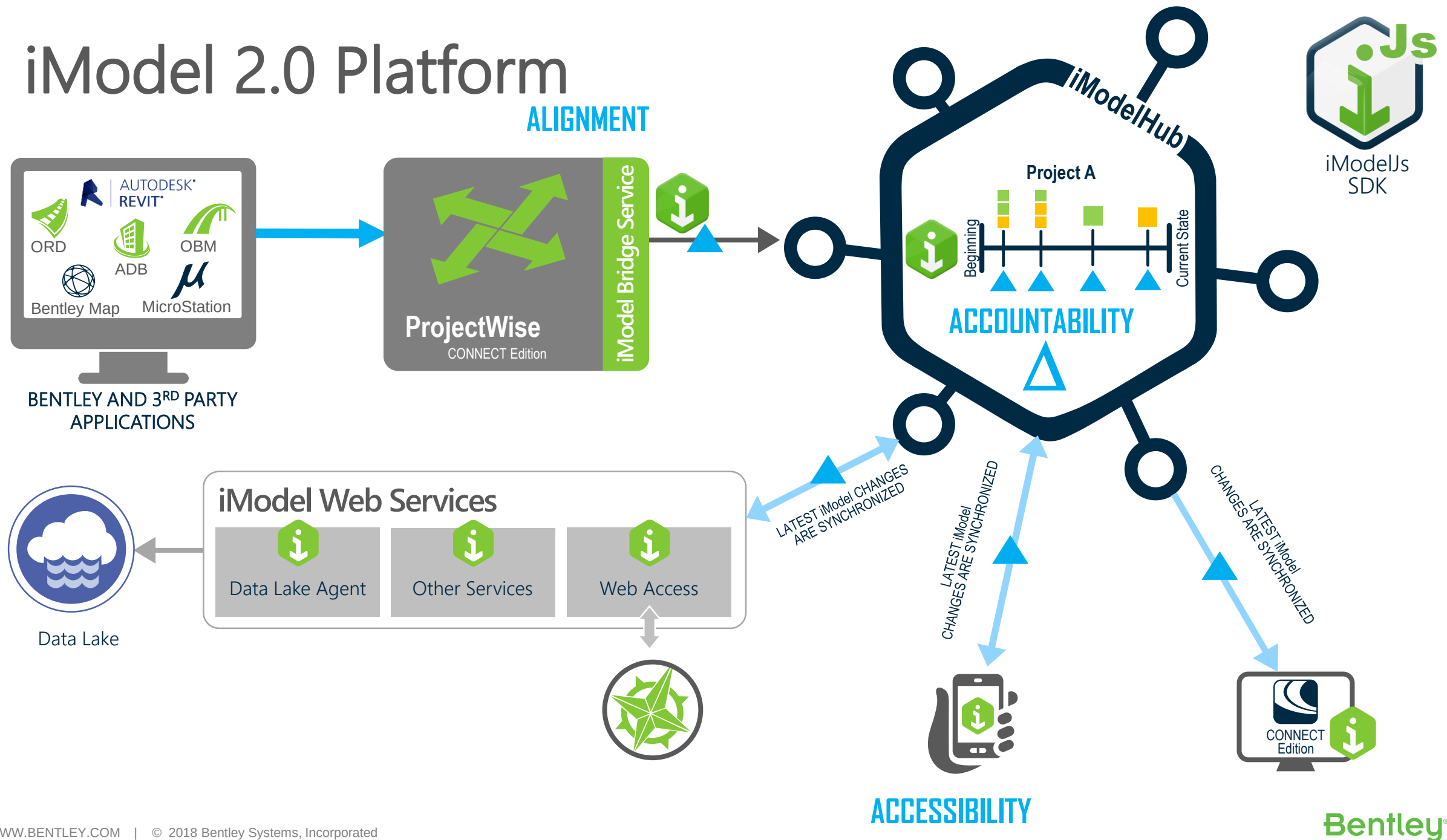


iModelHub

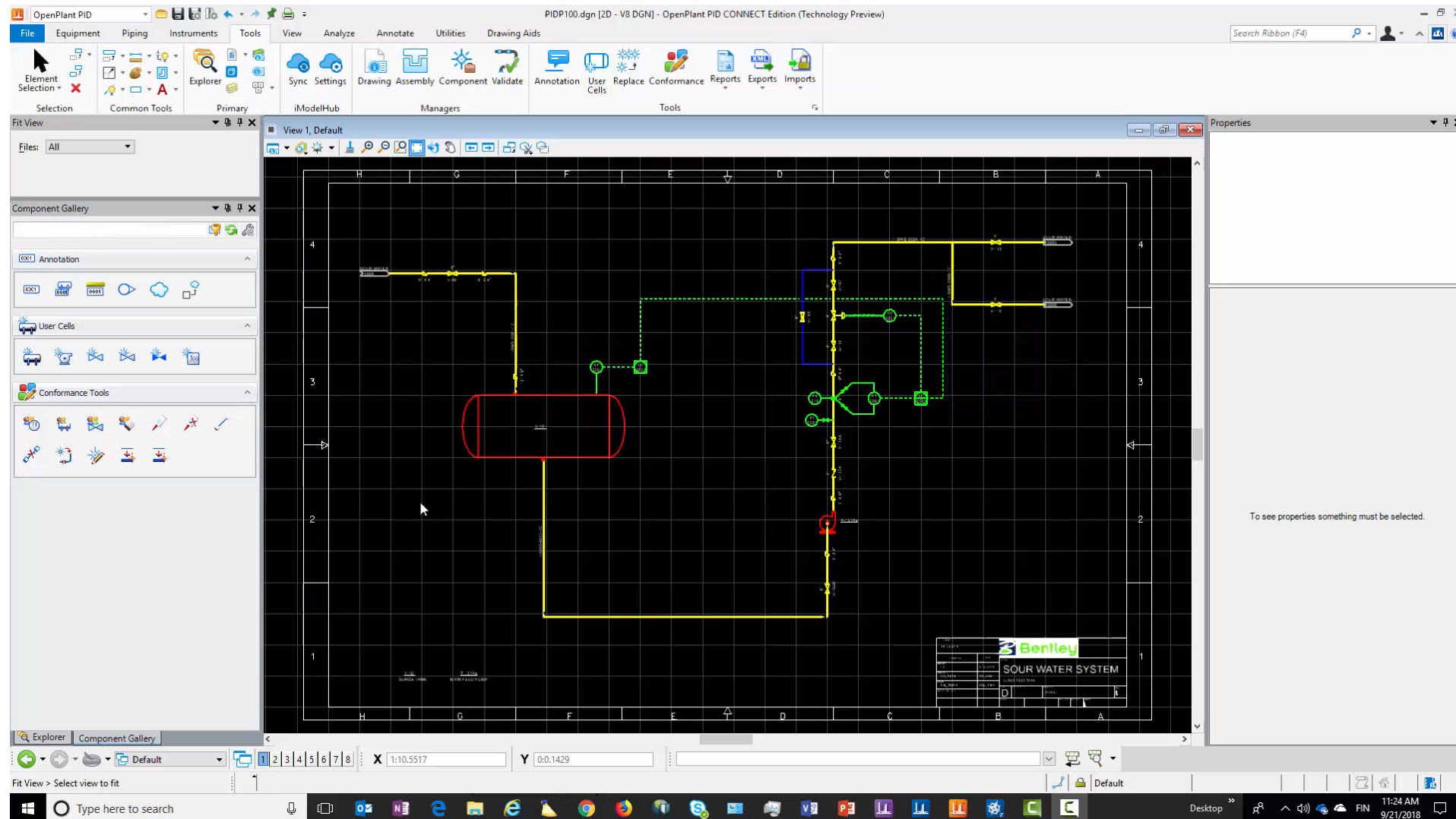
- ✓ Model Centric
- ✓ Work In Progress Design
- ✓ Change Management
- ✓ Data Insights



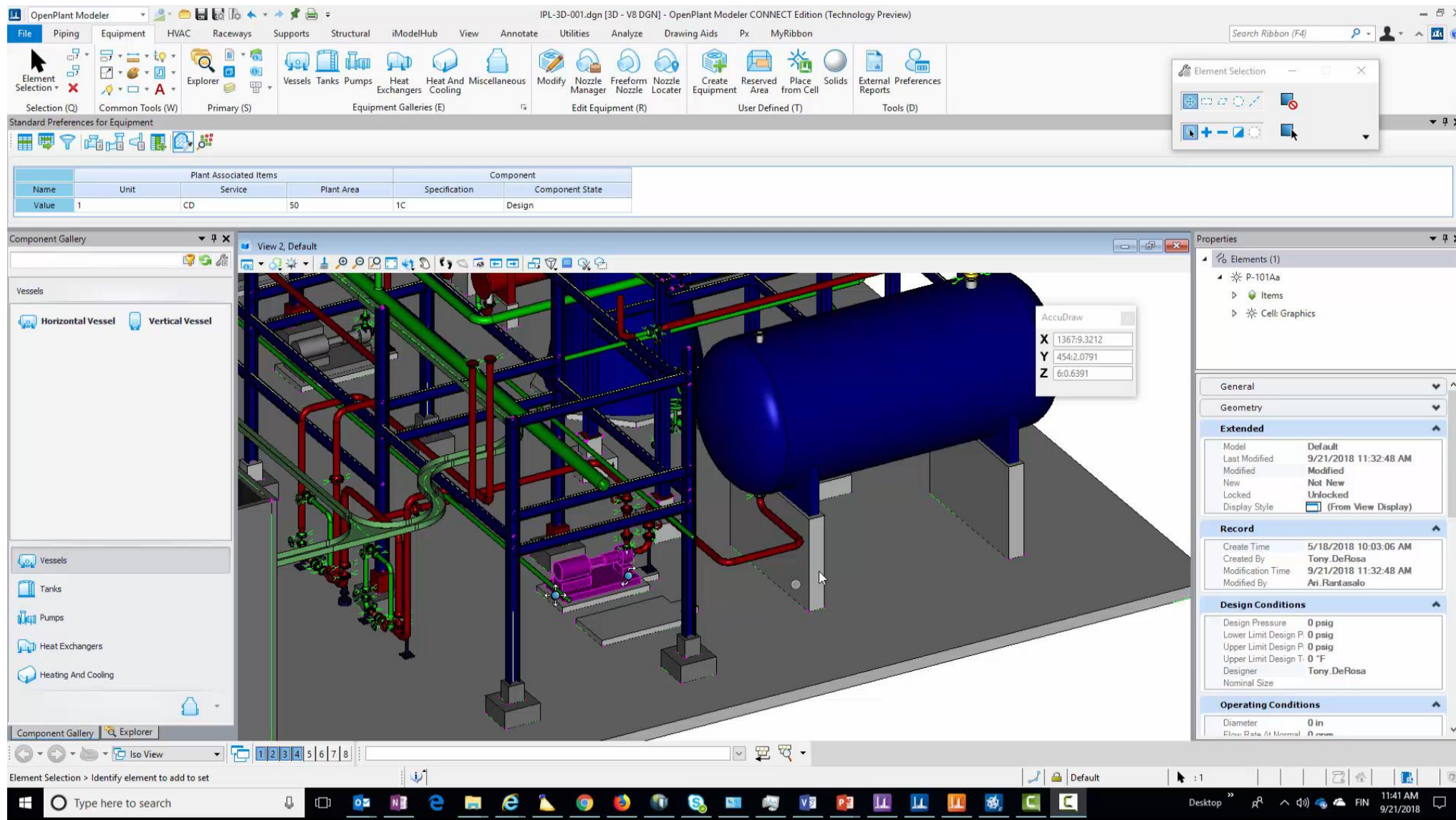
iModel 2.0 Platform



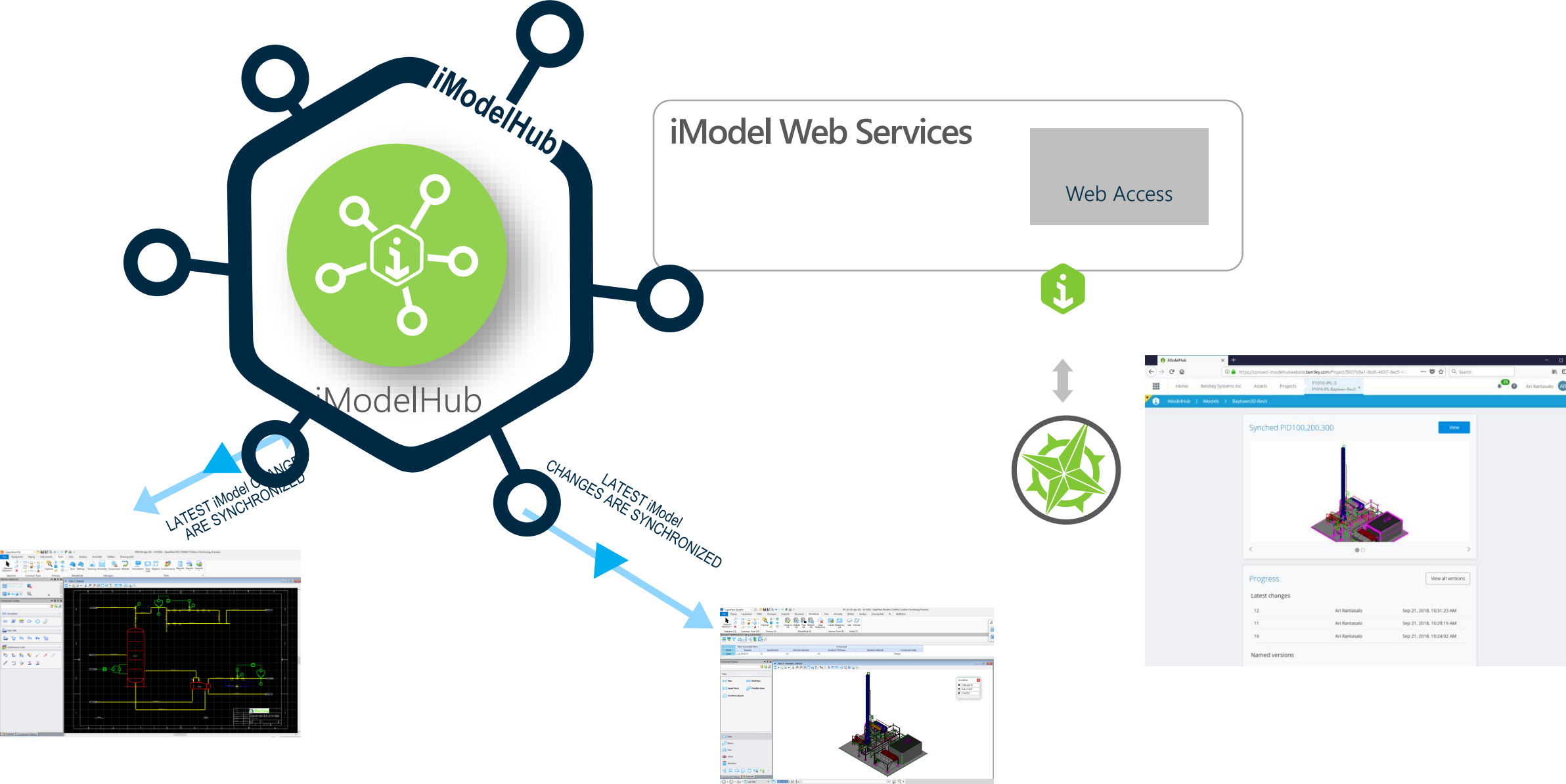
iModel 2.0 and OpenPlant PID – Synch chances to iModel



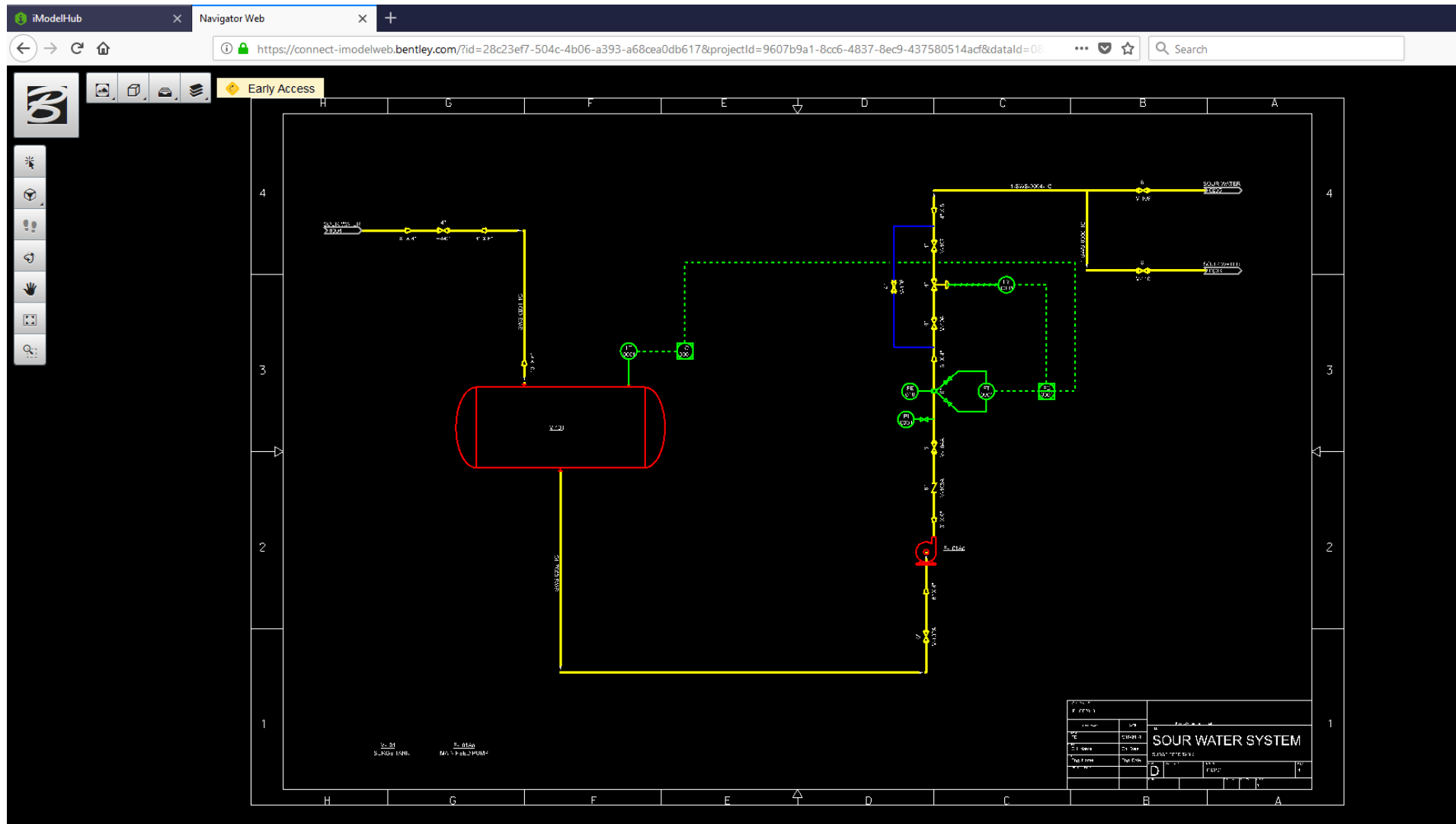
iModel 2.0 and OpenPlant Modeler



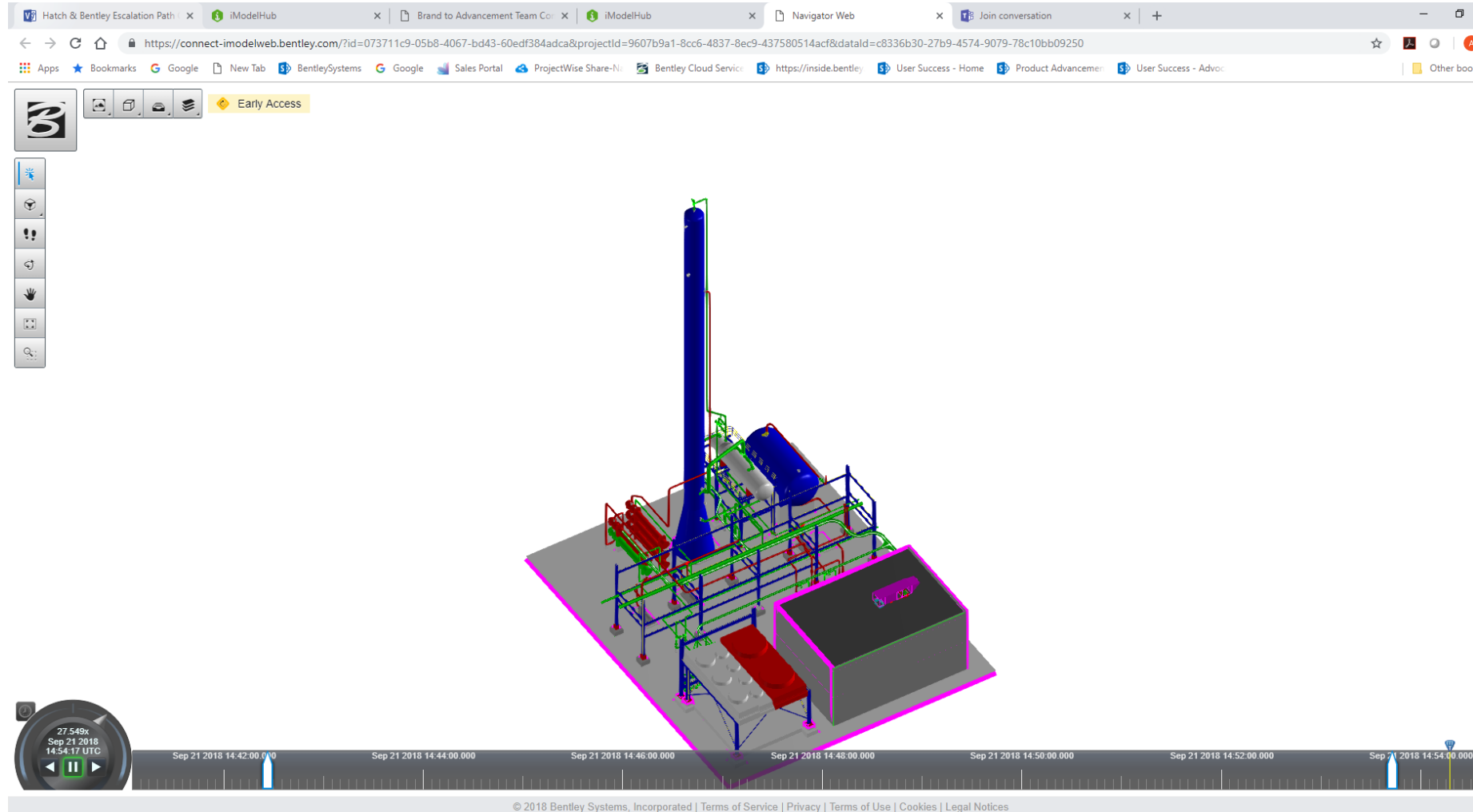
iModelHub



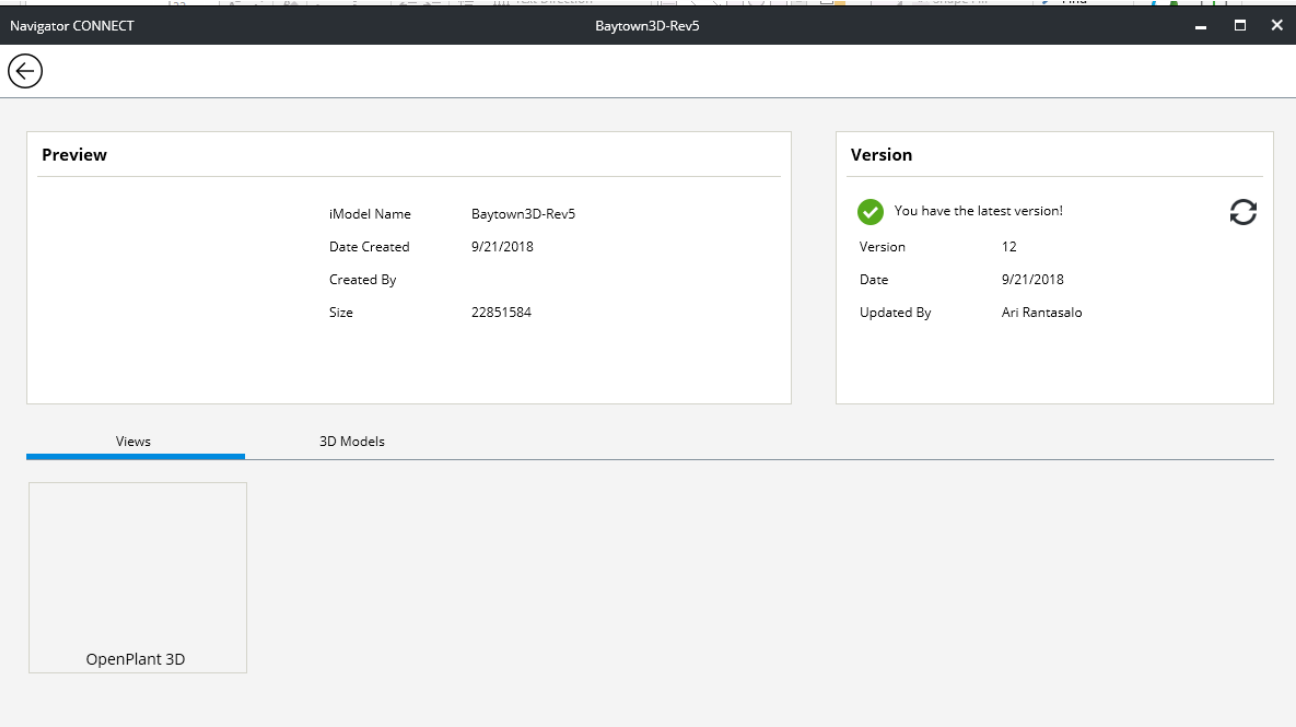
iModel and Navigator Web

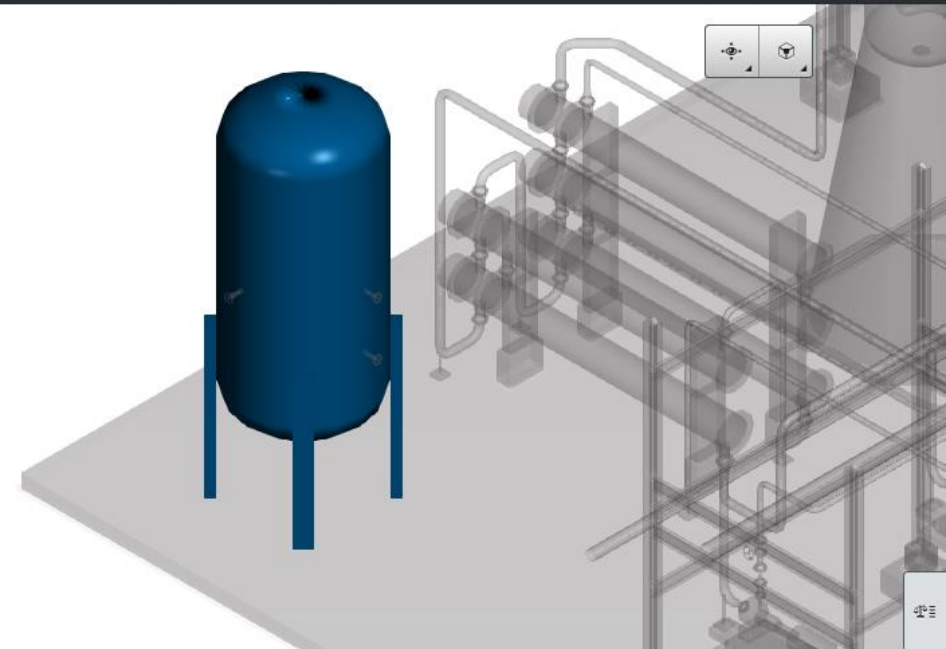
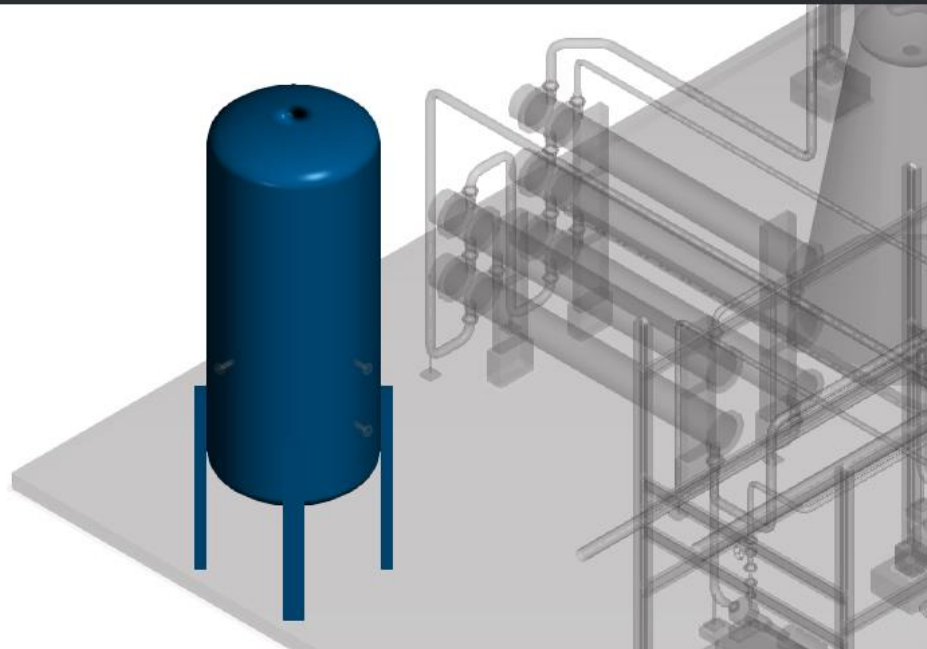


iModel and Navigator Web



Navigator





Property Comparison Detailed View



Show: Changed C...

Category	Property	Version 16 (Current Version)	Version 15
Record	Modified By	Ari.Rantasalo	
Operating Conditions	Height	240.0 in	190.0 in
Miscellaneous	Head height	20.0 in	30.0 in
Miscellaneous	Lower head height	20.0 in	30.0 in

The background image features a hand in a dark suit jacket and white shirt, pointing its index finger towards the left. The hand is positioned in the center-right of the frame. Overlaid on the entire image is a semi-transparent blue grid of small white dots. In the background, a city skyline at night is visible, with the Oriental Pearl Tower being a prominent feature. The overall color palette is dominated by blues and purples, with some warm city lights.

PROJECTWISE

Going Digital with Bentley



ProjectWise
CONNECT Edition

100+
COUNTRIES

1M+
PROJECTS DELIVERED

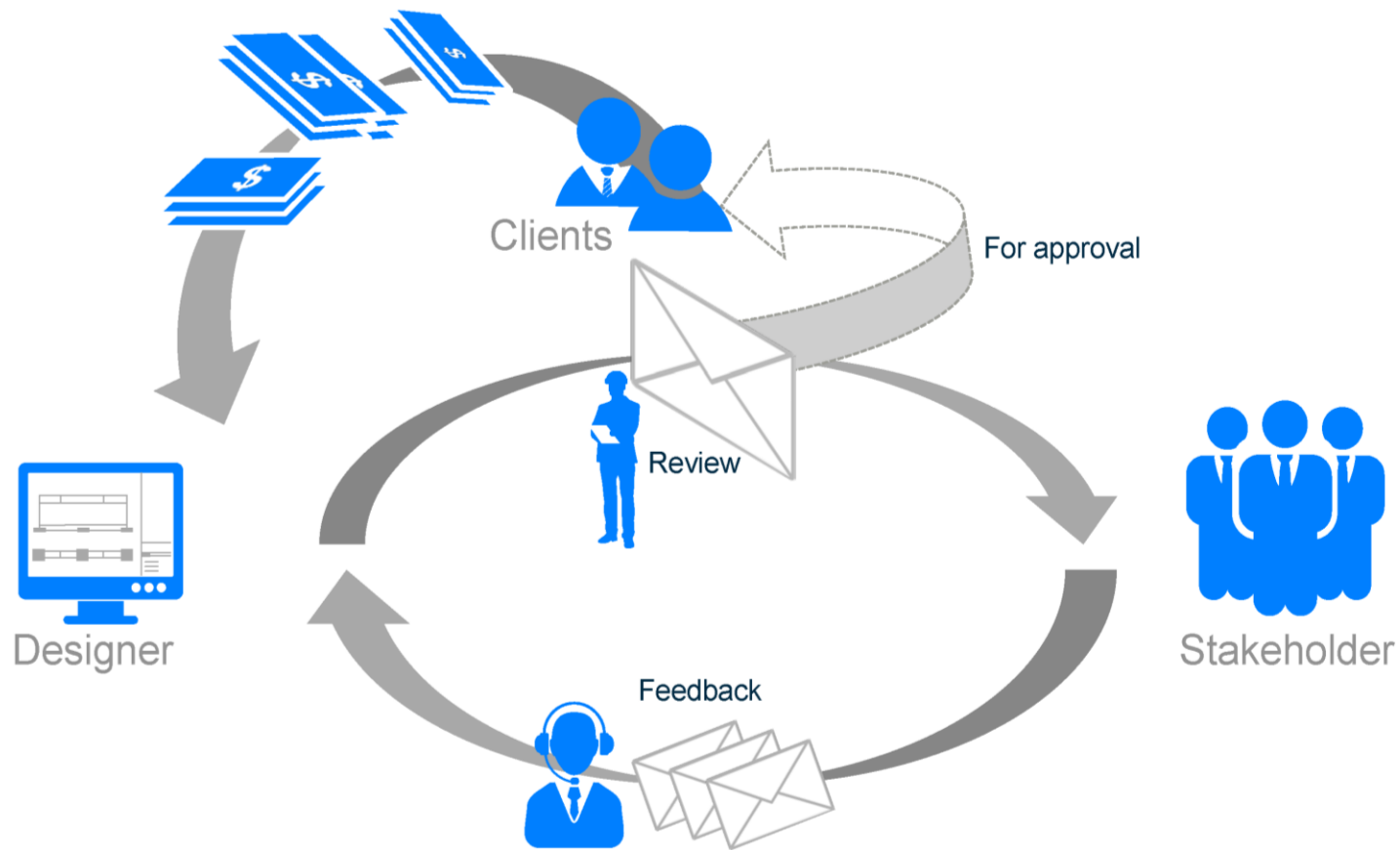
1M+
MONTHLY BUSINESS
PROJECT AUTOMATIONS

10B+
AUDIT TRAIL RECORDS

1

CONNECTED DATA ENVIRONMENT

CONNECTED DATA ENVIRONMENT

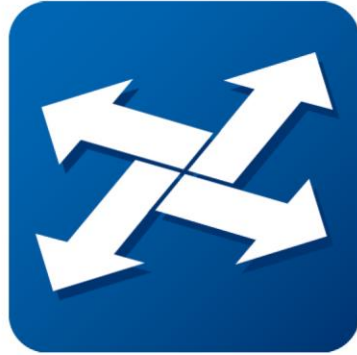


Supply Chain Collaboration

↑ Expedite Deliverables

↓ Shorten Turnaround Times

Connected Data Environment



ProjectWise

CONNECT Edition

 Office 365  OneDrive  SharePoint  Power BI



CONNECTED DATA ENVIRONMENT

Real-time Project Visibility



**ProjectWise Project
Performance Dashboards**
CONNECT Edition

Project activity

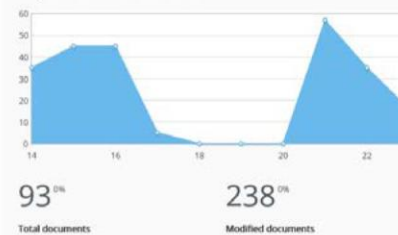
Active project team members



Project team member activity



ProjectWise documents edited



Most actively

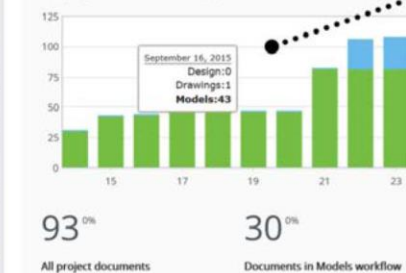


Project performance

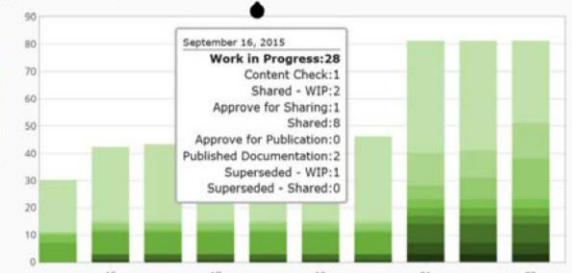
Project performance
ProjectWise Project Performance Dashboards

Project status and trends

All project documents by workflow



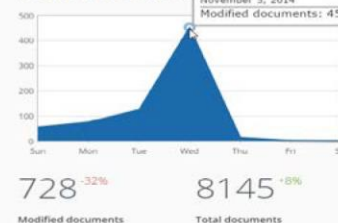
Documents by state in Models workflow



Active project team members



Modified documents

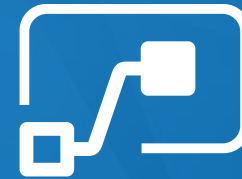


Most actively modified documents



ProjectWise

Microsoft 365





Observation Report

CONTRACT: US-117-10000000

DATE: 10/10/2018

PROJECT: 10101010

NO.	DESCRIPTION	DATE	TIME	STATUS
1	10101010	10/10/2018	10:00	1
2	10101010	10/10/2018	10:05	2
3	10101010	10/10/2018	10:10	3
4	10101010	10/10/2018	10:15	4
5	10101010	10/10/2018	10:20	5
6	10101010	10/10/2018	10:25	6
7	10101010	10/10/2018	10:30	7
8	10101010	10/10/2018	10:35	8
9	10101010	10/10/2018	10:40	9
10	10101010	10/10/2018	10:45	10

CONTRACTOR'S SIGNATURE

DATE: 10/10/2018

TIME: 10:00

STATUS: 1

Report



Notify



Live Design Review



Approval





Microsoft Flow



Report



Notify



Live Design Review

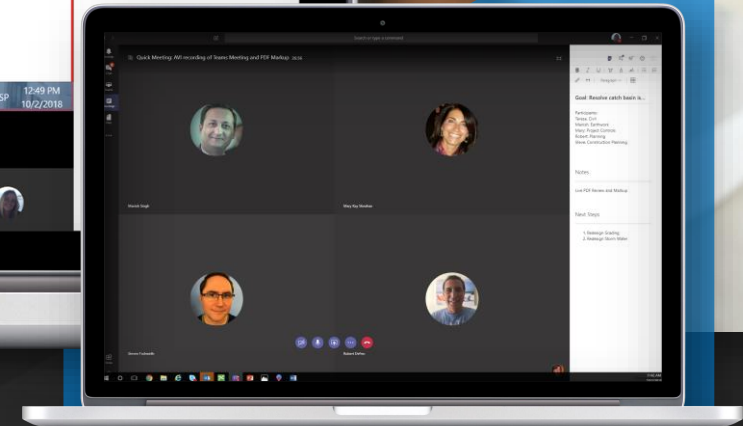
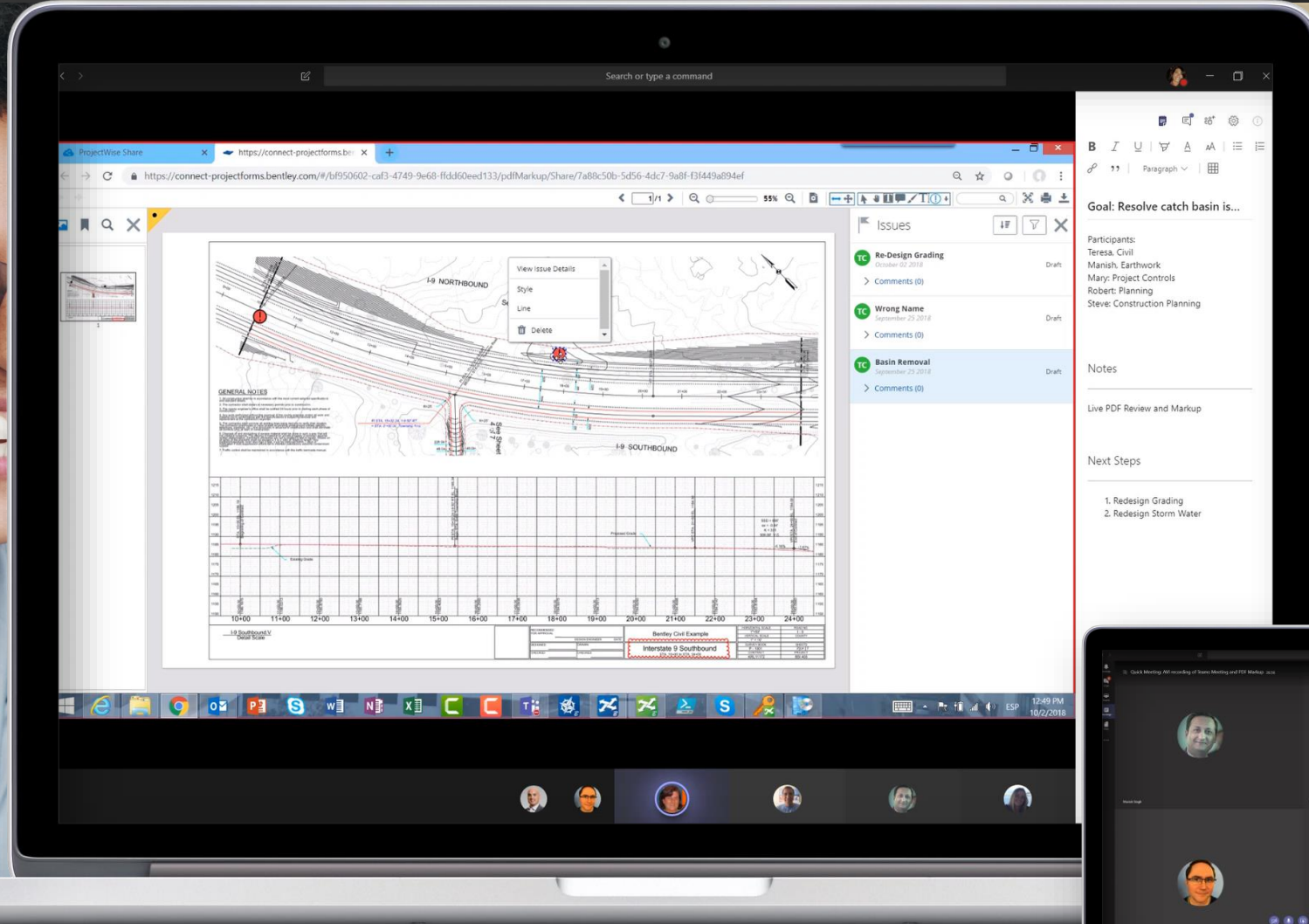


Approval





Microsoft Teams



Report



Notify



Live Design Review



Approval





Project Digital Twin



Report



Notify



Live Design Review



Approval



Home | ProjectWise Review - Ben

https://dev-projectwise365.bentley.com

carlanjp@rogers.co... Bookmarks Product Marketing... Project Delivery AU... CDOT Digital Forms for C... CDOT_ASSETWISE Fieldwire — The #1... https://www.budge... (10) WAVES GENTL... The top 25 day trip... CARS Bentley Other bookmarks

+

Drag or **upload** a file.

.i.dgn

Open last session

001

TG

Pier Material issue

33 minutes ago

002

TG

Deck Pavement depth

34 minutes ago

See all 2 conversations

Sessions

Search...

Name	Modified	Modified By	Created	Created by
Rail_Traverse_City	--	--	about 22 hours ago	Jean-Paul Gauthier
Bridge_Large	--	--	about 22 hours ago	Jean-Paul Gauthier
Rail_Station	--	--	about 22 hours ago	Jean-Paul Gauthier
Oakland_West_Station_Rail_Large_data	--	--	about 23 hours ago	Jean-Paul Gauthier
Iowa_I80_Bridge_large_data_Project	--	--	about 23 hours ago	Jean-Paul Gauthier
I-80_Interchange_Project	33 minutes ago	Taylor Gilmore	2 days ago	Jean-Paul Gauthier
420_Bridge	about 3 hours ago	Molly Brown	2 days ago	Jean-Paul Gauthier
Highway Project	--	--	2 days ago	Jean-Paul Gauthier
Interstate Highway Project	--	--	2 days ago	Jean-Paul Gauthier
I-80 Bridge Project	--	--	2 days ago	Jean-Paul Gauthier

< 1 2 >

1-10 of 15

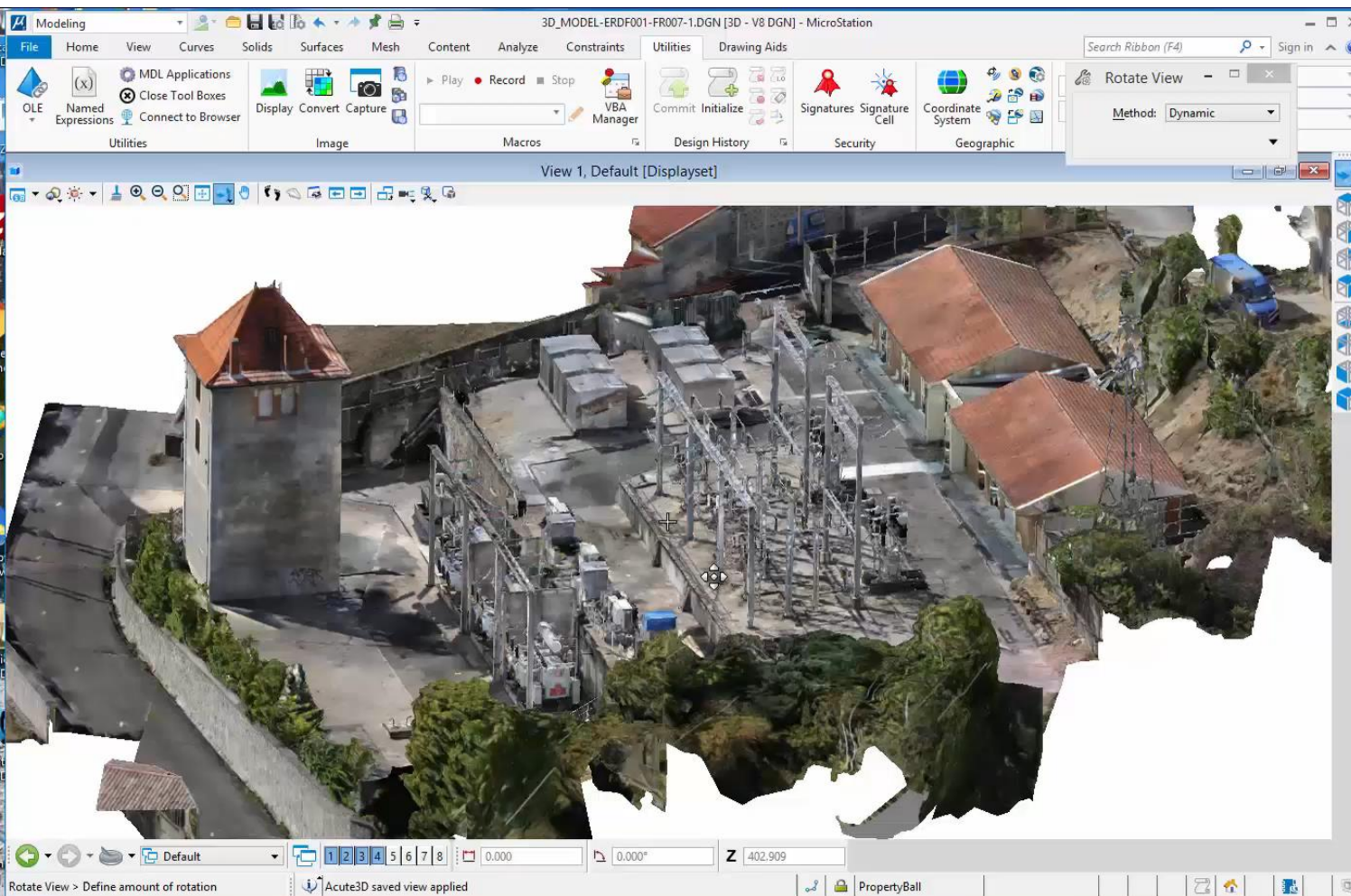
A hand in a dark suit jacket points towards the viewer. The background is a digital grid of blue dots. In the upper right, a city skyline at night is visible, featuring the Oriental Pearl Tower. The overall theme is technology and digital reality.

Modelado de la Realidad



Bentley®

Advancing Infrastructure



Reality modeling makes capturing “as-is” easy

Bentley Reality Modeling



ContextCapture
Photo Planning



Capture Devices

ContextCapture
Mobile
Application



On-Premise



Cloud



Cloud

ProjectWise
ContextShare



Mapping/Plann
ing



Design



Construction



Inspection and
Operation

A person in a dark suit and tie is pointing their right index finger towards the viewer. The background is a composite image featuring a city skyline at night, with the Oriental Pearl Tower visible. Overlaid on the entire scene is a blue, semi-transparent grid of dots, resembling a digital or data visualization. The text 'BIM 4D – Synchro & Digital Construction Environment' is centered in white, bold, sans-serif font.

BIM 4D – Synchro & Digital Construction Environment

Going Digital with Bentley

What is 4D?

4D

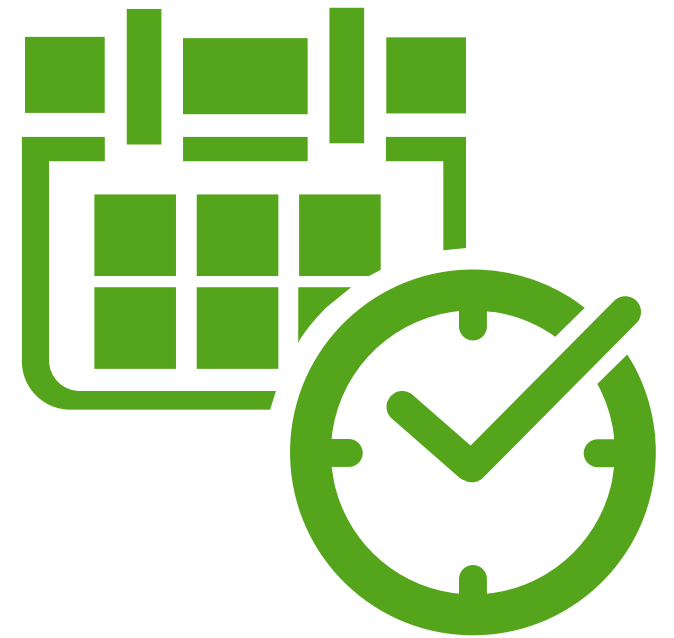
Integrates a 3D model with the project schedule, describing its construction over time. Users can change the model and schedule, then review the downstream effects.

5D

Includes costs and the ability to track actual costs against a baseline.

6D

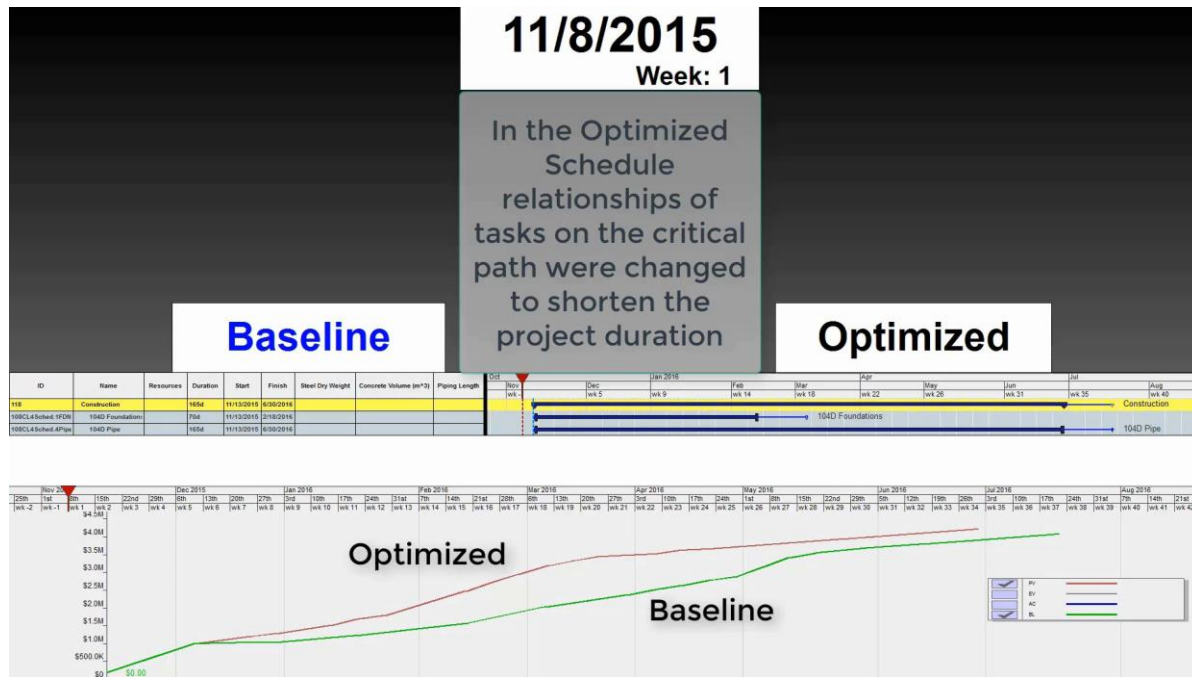
Includes safety and compliance.



SYNCHRO enables 4D, 5D and 6D

What is SYNCHRO?

A digital construction environment that virtually and visually enables the **planning, scheduling** and **controlling** of construction execution.



- Visualise design, procurement and construction
- Visual planning sessions with temporary works
- Digital rehearsals, status meetings and safety planning
- Cost/schedule analysis and monitoring
- Mobile field statusing, verification and reporting
- What-if scenarios to optimise execution
- Analytical dashboards for project insights
- Mixed reality interaction with project data
- API for IoT and Edge devices

Invest in proven technology

SKANSKA

Balfour Beatty



Turner
Building the Future



AECOM



Who uses SYNCHRO?

Contractors, subcontractors, suppliers, fabricators, design consultants, project managers and owners use the platform for every type of project

Sample 4D project metrics

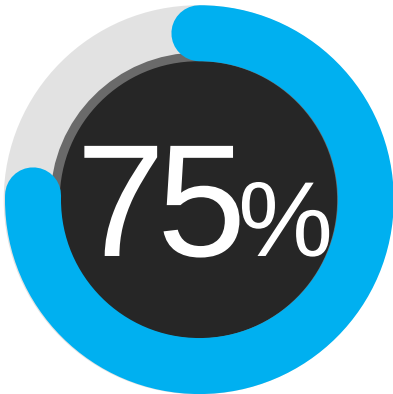
Enables teams to improve quality, safety, productivity and efficiency of projects around the world



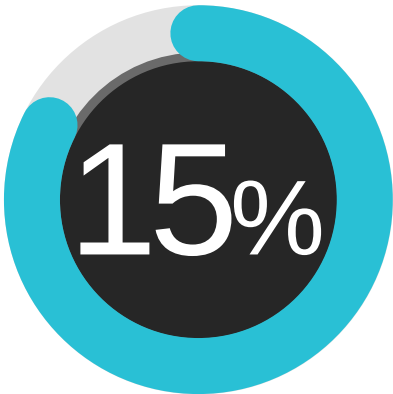
Elimination
of injuries



Reduction
in labour cost



Increase
in field labour
productivity



Reduction
in schedule time

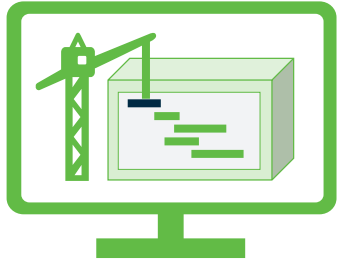




SYNCHRO™ Pro
CONNECT Edition

for Desktop

At the office



4D planning with
models, schedules
and resources

Secure cloud
storage and
access

Visual
analysis
and clash



SYNCHRO™ XR
CONNECT Edition

for HoloLens

At the jobsite /
at the office



SYNCHRO™ Portal
CONNECT Edition

Construction
Digital Twin

| Create multiple projects
| Work with multiple teams
| In real time

Mobile Applications API services Azure SQL

Graphic
data
analysis

Microsoft
POWER BI

At the jobsite /
at the office



SYNCHRO™ Site
CONNECT Edition

for iPad

At the jobsite



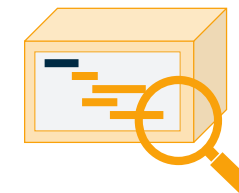
Progress
tracking
control



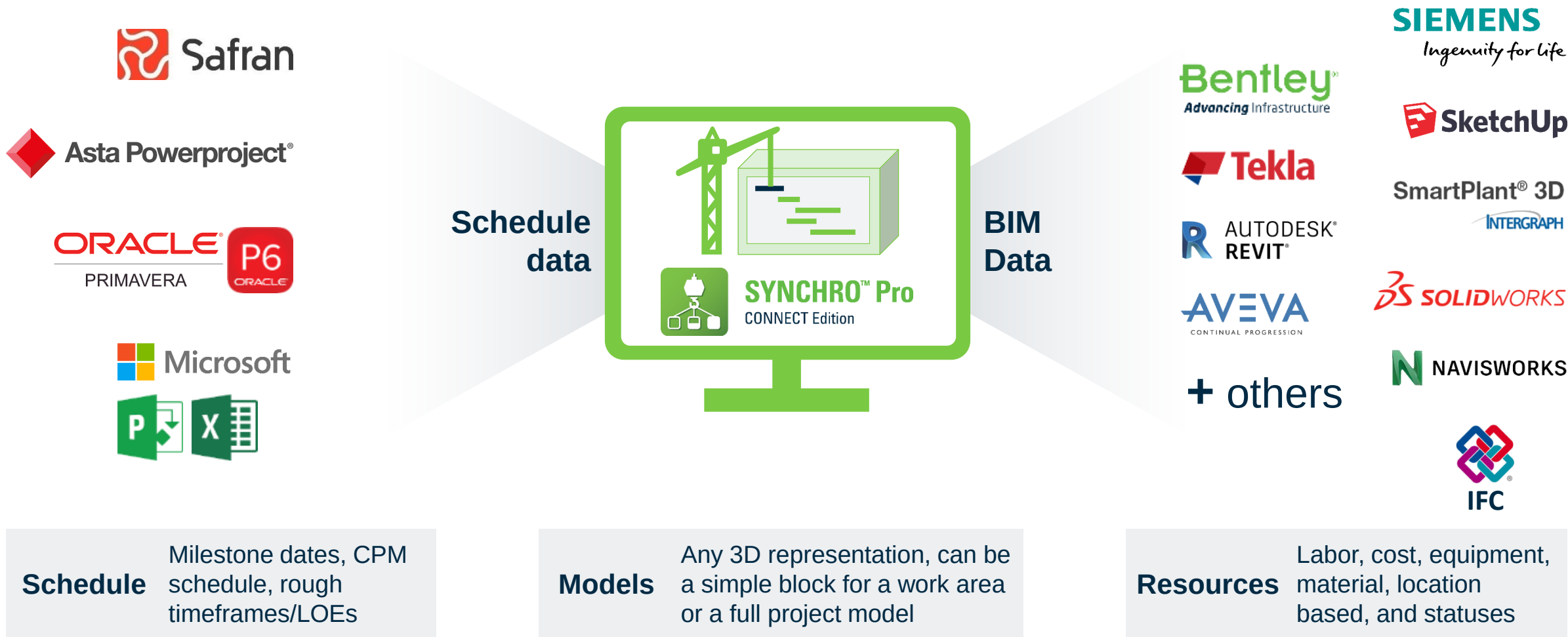
SYNCHRO™ OpenViewer
CONNECT Edition

At the jobsite /
at the office

Open and use
4D files created
by others for
free



Interoperability





SYNCHRO™ XR
CONNECT Edition

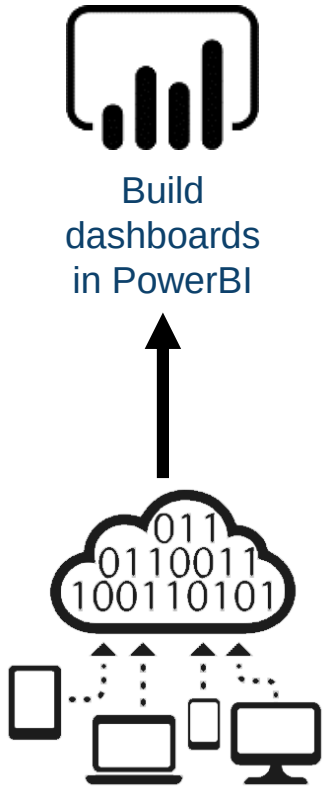
for HoloLens

DEMO: Holographic Construction

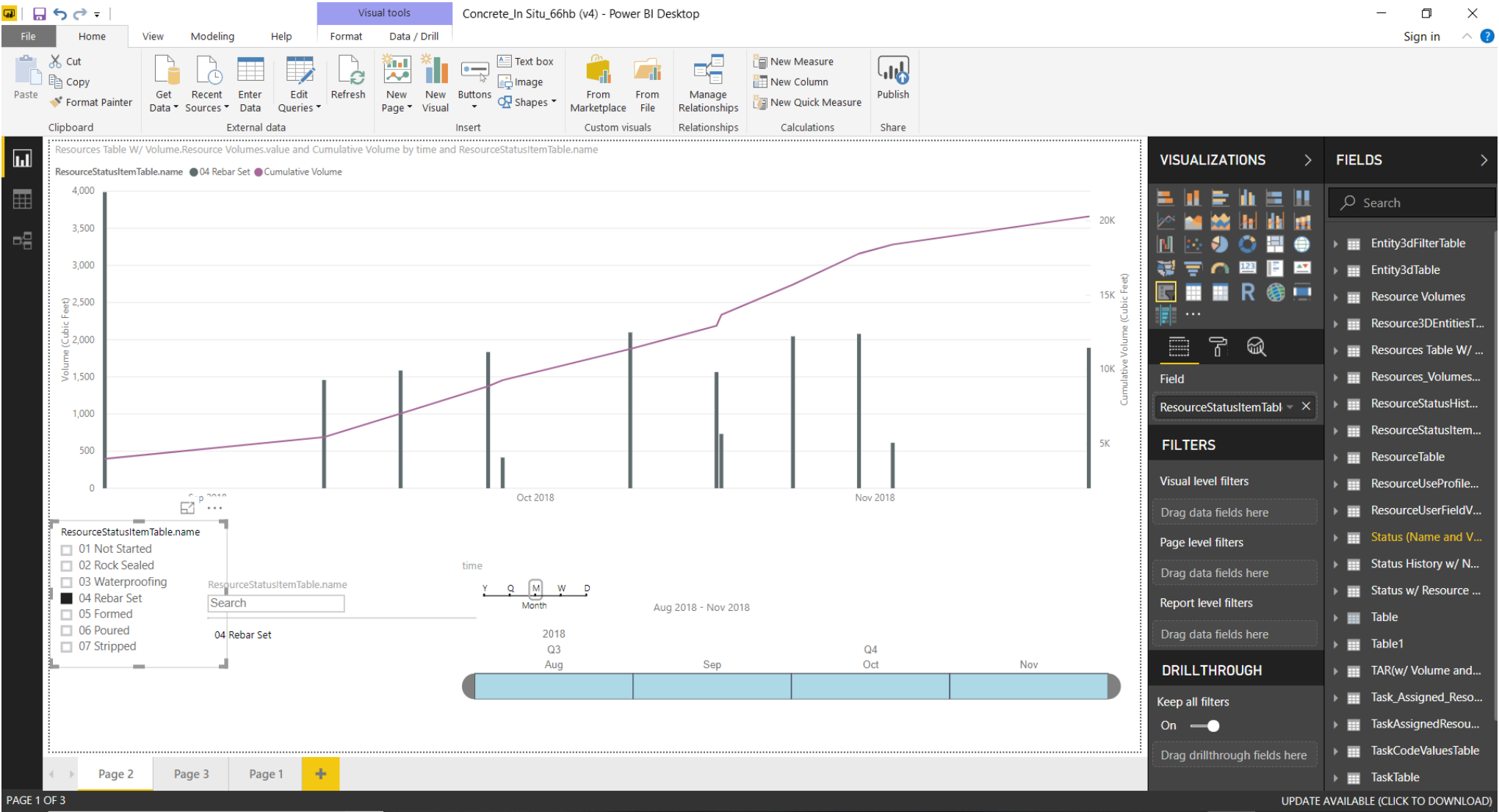
Mar 22, 2017

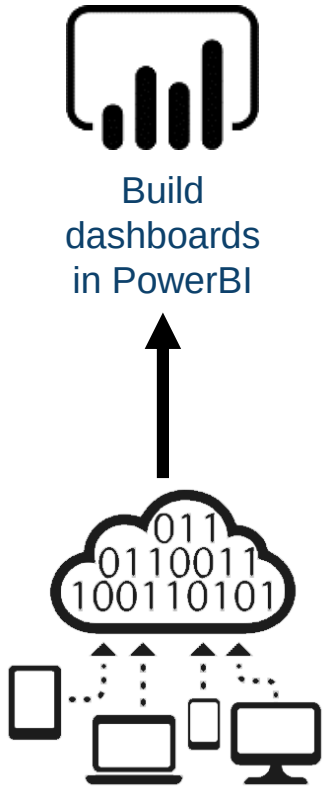


Balfour Beatty
Construction



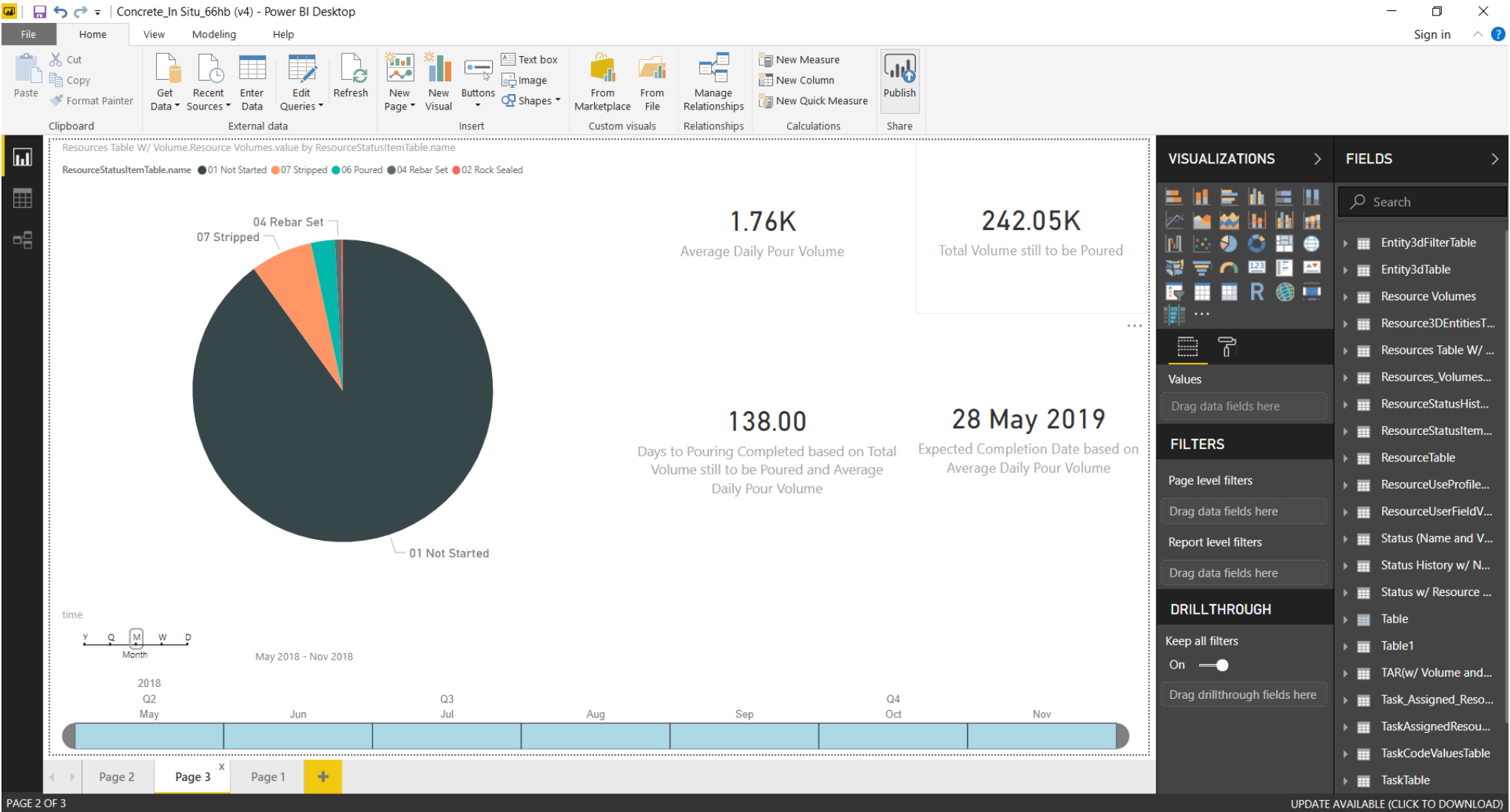
Capture data from anywhere and store it in the cloud





Capture data from anywhere and store it in the cloud

Build dashboards in PowerBI



Projects

People

Companies

Construction



Mining



Plant



Road Design



Bridge Design



Rail



Airport



Power



Oil



Buildings



Retail



Hospital



Project Manager



Civil Engineer



Contractors



BIM Manager



Architect



Field Technician



Protection and Control Engineer



Engineers



Engineering Manager



Architects



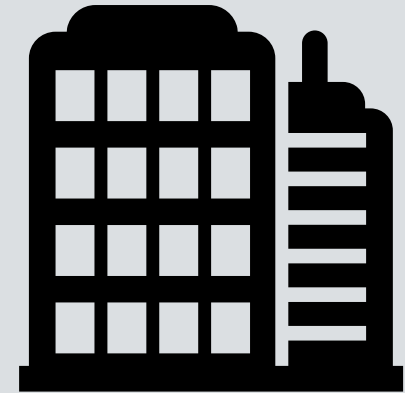
General Contractors



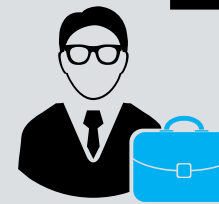
EPC Entities



Specialty Subcontractors



Construction Managers



Owners

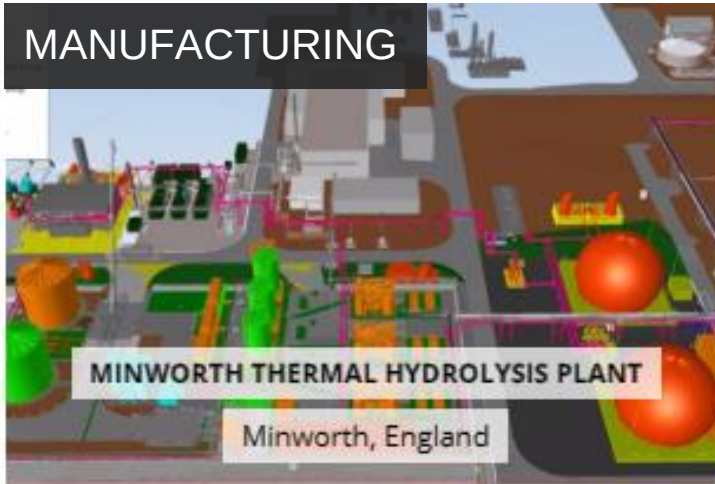
Case Studies by Industry



Project Examples using SYNCHRO PRO

www.synchroltd.com

MANUFACTURING



AIRPORT



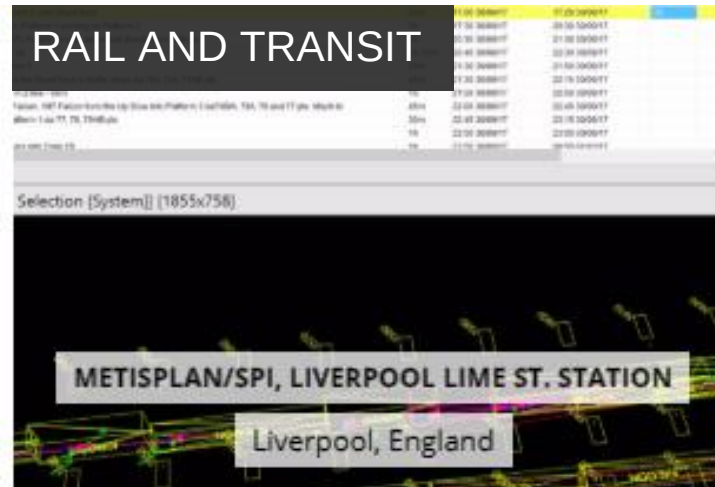
BUILDING



MANUFACTURING



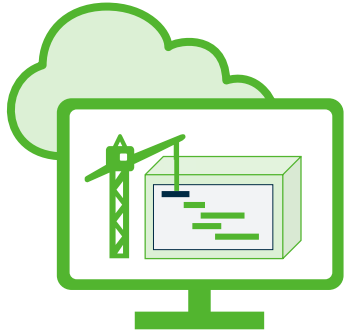
RAIL AND TRANSIT



RAIL AND TRANSIT



Find out more



Virtual demo
in depth demonstration of capabilities



SYNCHRO Academy
Free module-based online learning



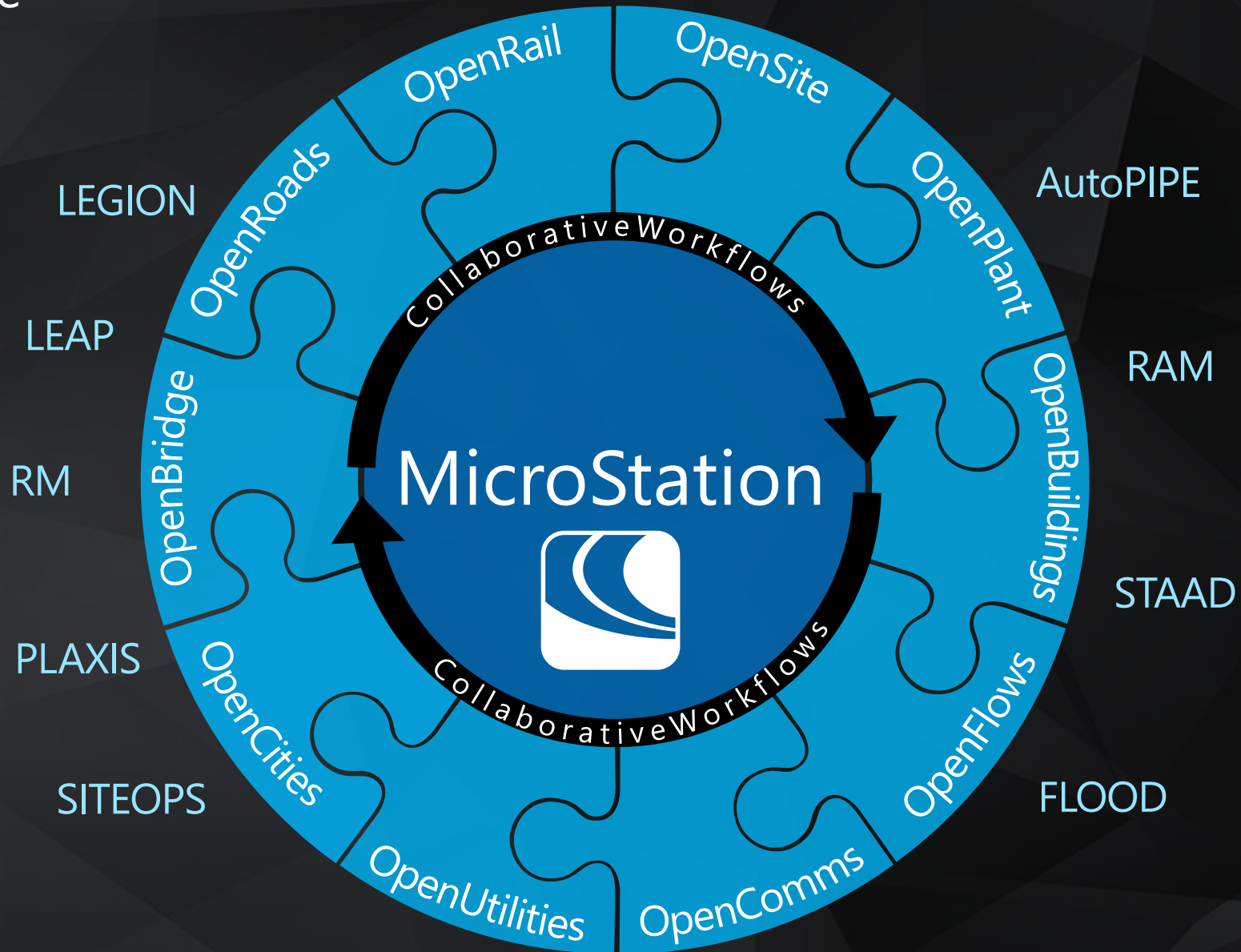
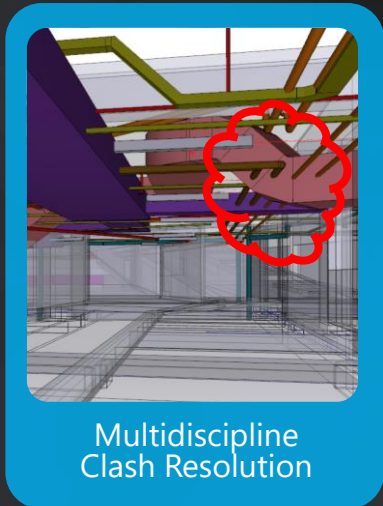
Group training
Register for a local training or custom on-site

A hand in a dark suit jacket and white shirt points towards the viewer. The background is a composite image featuring a city skyline at night, with the Oriental Pearl Tower visible. Overlaid on the image is a blue digital grid pattern. A semi-transparent dark blue horizontal band contains the title and subtitle text.

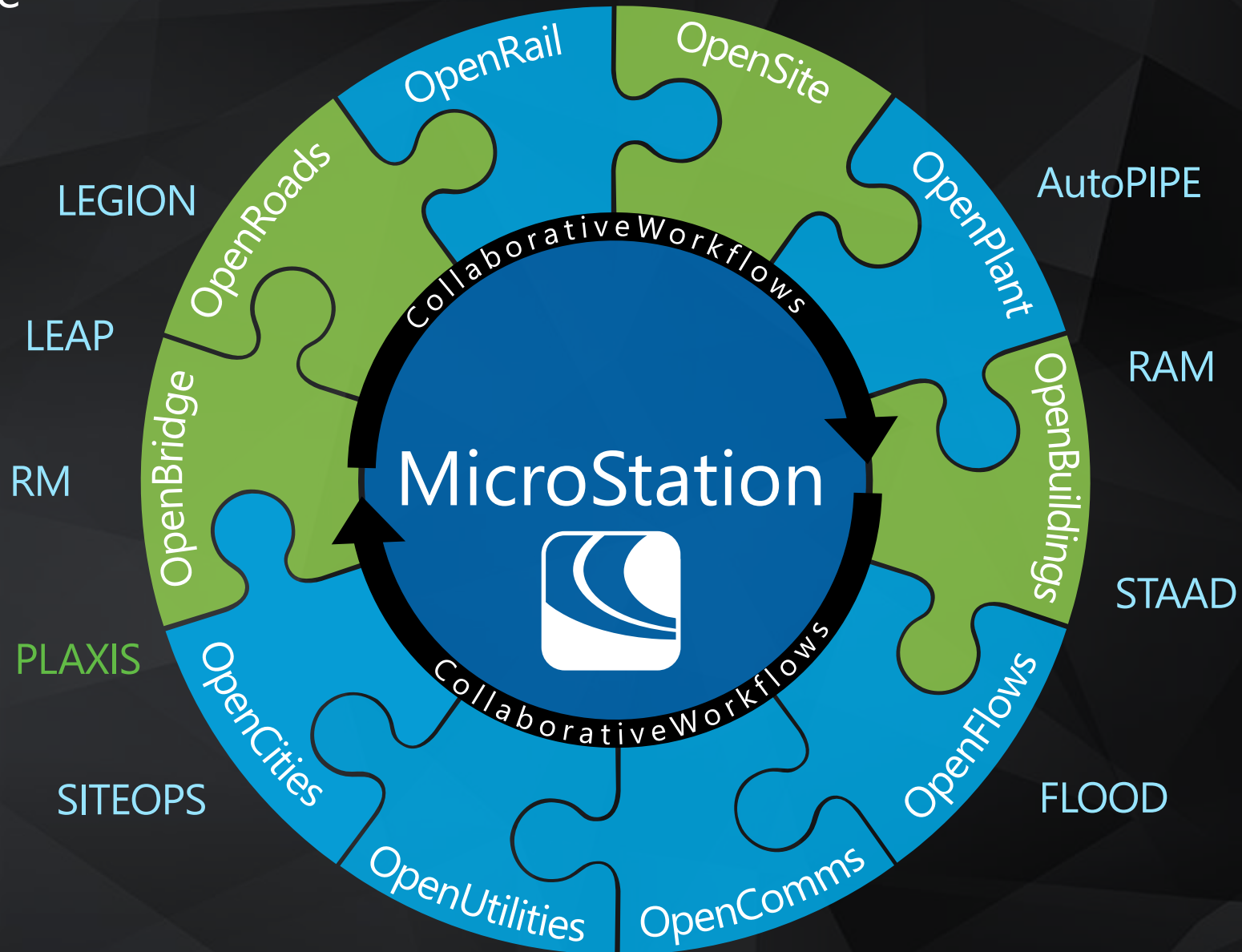
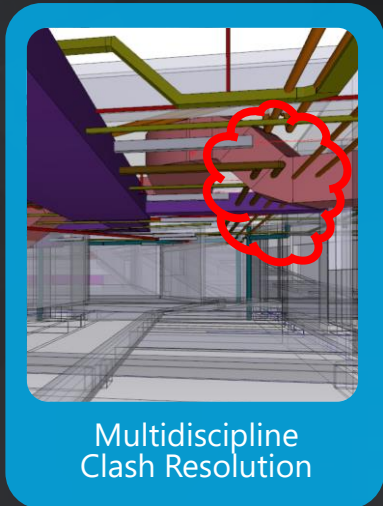
BIM 2D & 3D - Modelación

Going Digital with Bentley

Comprehensive Modeling Environment



Comprehensive Modeling Environment





Academias – Factor de cambio

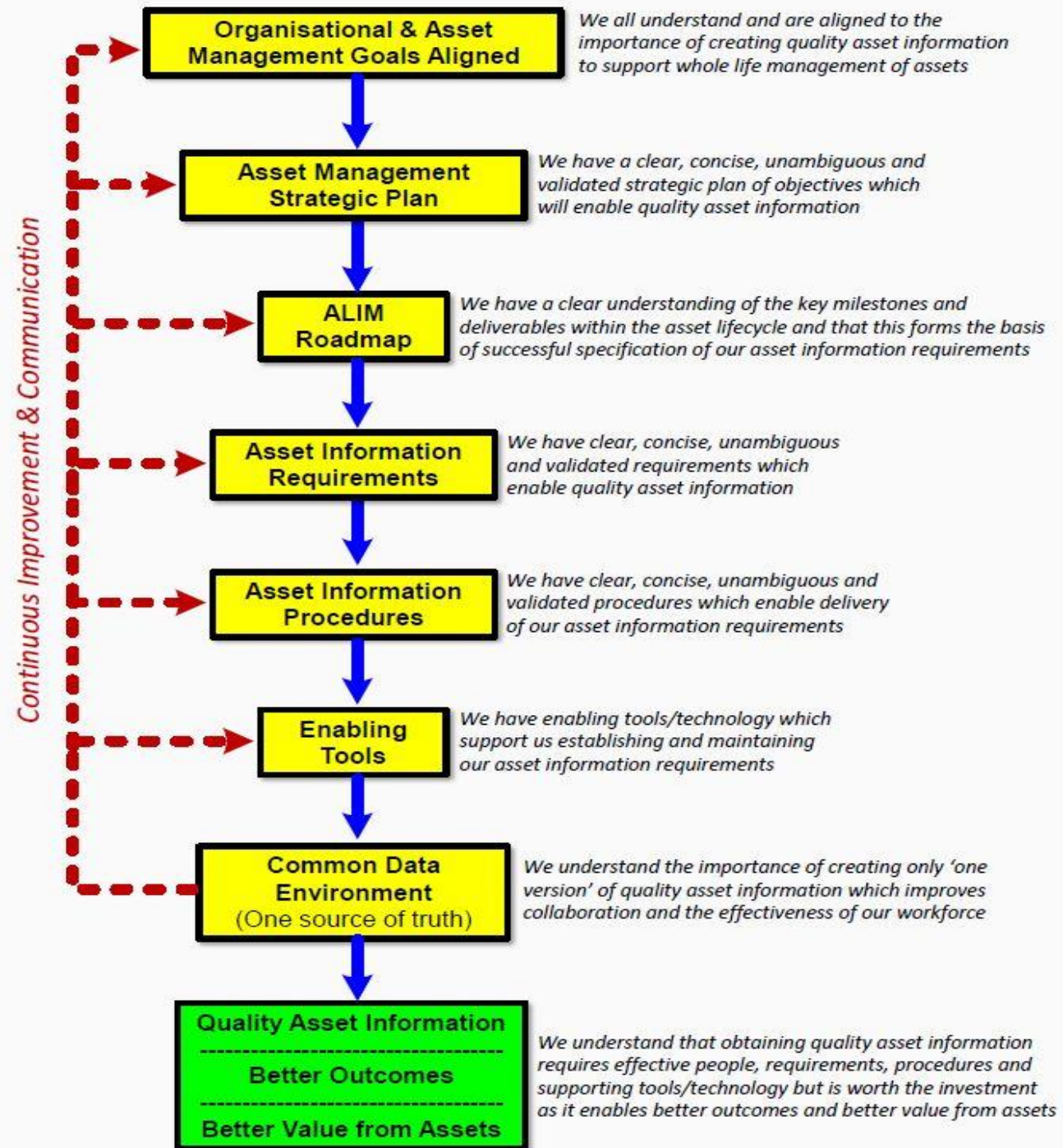
Going Digital with Bentley

BIM Advancement Academy

1. Outcomes?

*What are our goals?
What do we need?
How will we measure?*

Better Information Management Strategy



BIM Advancement Academy

1. Outcomes?

*What are our goals?
What do we need?
How will we measure?*

2. How do I apply it to the project?

Processes andtechnology

Academies Materials

Dde¹
Digital Delivery
Essentials 1

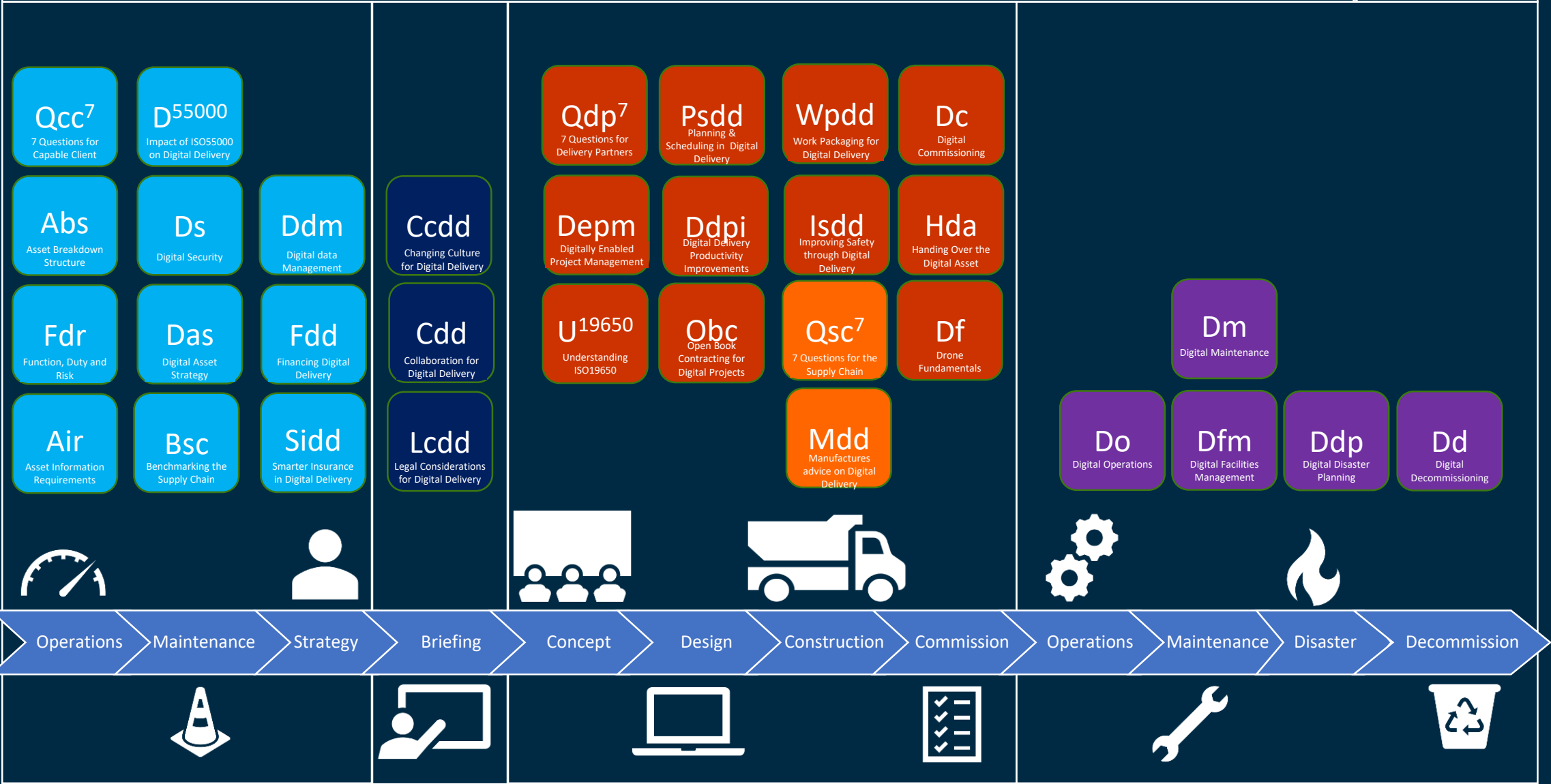
Dde²
Digital Delivery
Essentials 2

Dde³
Digital Delivery
Essentials 3

Cidt
Current Industry
Digital thinking

Da
Digital Awareness

Acrl
Audience with
Crossrail



BIM Advancement Academy

1. Outcomes?

*What are our goals?
What do we need?
How will we measure?*

2. How do I apply it to the project?

Processes andtechnology

3. Deploy

*Stakeholder
Alignment*

Stakeholder Alignment for the Asset Lifecycle



Key Requirements

- Compliance with Employer's Information Requirements (EIR)
- Asset Centric Workflow
 - Relationships between documents and assets
- Full support for Asset Data Dictionary Document (AD4) asset registry and tag management
- Full management control of Master and Task Information Delivery Plan (MIDP/TIDP)
- Seamless and automated handover to Client
- Full support for PAS1192 Digital Plan of Work Framework
- Full support for BS1192 collaborative workflows