Panel: Connect to drive the circular economy

The future of connected communities and what it means for critical infrastructure

Hosted by Max McKay, AVEVA
We are exploring the future of connected communities and what that means for critical infrastructure. With connectivity being a focal point of conversations within the industry, we will dive into what “connectivity” truly means and the value that comes from technology adoptions throughout your infrastructure organization's digital journey.
Connect to drive the circular economy

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Connected infrastructure

The power of the connected industrial economy

Gary Wong, Global Industry Principal of Infrastructure & Water, AVEVA
We are connected

Visibility and multi-org collaboration enabled through agnostic connectivity, visualization, and sharing

Addressing the challenges
• Data silos hampering coordinated response
• Supporting multiple entities and stakeholders
• Integrating disparate systems
• Optimizing workflows and efficiencies

Addressing business imperatives
• Agility and resiliency
• Operational efficiency
• Transformation of work
• Asset reliability and safety
• Sustainability and net zero
Savings with data-driven decisions at Pimpri-Chinchwad, India

- 2 million people in Western India
- 4,600 individual municipal systems and applications – traffic to water

**IMPACT**
- Reduced energy use by >15%
- Cut water losses by 18%
- Cut traffic congestion by >20%

**Full video:**
[https://www.youtube.com/watch?v=BNJSS4nDIn4](https://www.youtube.com/watch?v=BNJSS4nDIn4)
Many stakeholders connecting the value chain

- Engineering, Procurement, Construction (EPCs)
- Contract Manufacturer
- Supply Chain Partners
- Building Owner
- Customers
- Service Provider
- Analytics Company
- Equipment Vendor, OEM
- Systems Integrators & App Developers
- Local Government
- Regulatory Agency
- Utility
- Smart City
- University
- Joint Venture
- Your Company
- Smart City Systems Integrators & App Developers
- Local Government
- Regulatory Agency
- Utility
- Smart City
- University
- Joint Venture
- Your Company
WHA Thailand turns industrial properties into smart facilities

- Comprehensive deployment covers environmental and CCTV monitoring
  - Water and air quality
  - Rainfall
  - Water & wastewater production
  - CCTV for infrastructure, road, utilities
  - Solar, and more
- Supporting predictive maintenance and energy optimization
- IMPACT: Reduced 75 tons of CO2 GHG emissions / year
AVEVA is helping transform the world’s infrastructure

Network Rail
Enables energy-efficient travel for 8,000 daily commuters

UC Davis
On track to be carbon neutral by 2025 with estimated savings of $197M over 60 years

Cosatron
Utilizes the cloud to deliver remote air quality monitoring services in real time

OCWA
Increased efficiency and cost control, scalability and standardization

sabesp
Increased customer satisfaction and reduced water shortages from 14% to 5%

Kansai Electric Power
Improved efficiency and saved $3 million a year in one plant alone

Shanghai Laogang Project
Digital design of 9000 KwH waste-to-energy plant

Veolia
Connects 260 global engineering teams driving 20% better collaboration

Taswater
Reduced response times by up to 13 hours to protect ecologically sensitive environments

AVEVA
On track to be carbon neutral by 2025 with estimated savings of $197M over 60 years

Network Rail
Centralized all infrastructure systems to enable seamless management in real time

HELEN SÄHKÖVERKKO
Improved data management saves time and money, making power distribution more efficient

Raipur SMART CITY
Real-time insight and management of critical infrastructure systems across the city

AVEVA
Improved safety and saved more than $1.4 million per year

AVEVA
Utilizes the cloud to deliver remote air quality monitoring services in real time

AVEVA
EPCOR uses real-time data to drive situational awareness and improve resiliency

**Challenge**
- Increased risk of large rainfall events necessitated a new approach to prevent and reduce the impact of stormwater and urban flooding in the City of Edmonton
- Distinct and isolated systems prevented a real-time view of system performance
- Needed to create secure access to centralized data for user groups and business applications to access actionable information for monitoring, reporting and analysis

**Solution**
- Implemented AVEVA™ PI System™ to predict and manage the movement of stormwater through smart sensors and technologies that integrate into the collection system

**Results**
- Unlocked data and made it accessible to users and applications
- Developed system allows people to discover process interdependencies, improving operational performance and cutting response times from days to minutes
- Enabled dynamic management of stormwater systems during flood events, ensuring public safety, avoiding environmental releases and saving thousands in regulatory fines
The AVEVA™ PI System™ at CSL integrated by Maya HTT

1- Digitizing Vessel Data
Systems data and crew inputs are captured and archived in a digital twin located onshore

2- Expanding with Context
Vessel data is enriched with voyage, geofencing, traffic, compliance, weather, and user inputs

Voyage (IMOS)
Traffic
Geofencing (ESRI)
Weather
Compliance

3- Advisory and Analytics
Produces decisional Advisory Dashboards and Analytics Reports using algorithms and third-party plugins. Helps crew and office make better-informed decisions.
Energy Management with custom AVEVATM PI VisionTM widgets

Speed Optimization Trial Results

In 2022, 8 Canadian vessels trialed and sailed 219 days in open water. 299 MT of fuel was saved, equivalent to 956 MT of CO₂ reduction.

No negative side impact on the business due to fuel savings.
MARINE | CANADA & WORLDWIDE

CSL reduces fuel consumption by ~3-5% per trial vessel per year and achieves asset failure avoidance goals

Challenge

- Improving operations has always been a primary drive of CSLers, and remains a key business priority
- Regulations not always easy to follow (there are no street signs on waterways)
- Lots of manual entries and paperwork
- Distributed fleet worldwide

Solution

- Deployed AVEVA™ PI System™ to streamline data collection, access, analysis, and reporting

Results

- Estimated 3-5% fuel saved per vessel per year – validated with trial on 8 vessels
- Estimated ~120 MT CO₂ saved per vessel per year – validated with trial on 8 vessels
- Potential failure avoidance by applying ~80+ preventive repairs thus far

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Inframark A&I

ERIC CONDER
Who is Inframark?

- **Largest US-based Operations Company in North America**
- **180+ Employees**
- **33+ Years of Service Excellence**
- **1,500+ Clients Served**
- **1,200 Treatment Projects Completed**
- **9 Office Locations**
- **CISSP Certified Cybersecurity Services**
- **1 MILLION Data Points Managed on Cloud Hosted SCADA**
Who is Inframark A&I?

• 500+ business and municipal clients
• Combined capability of treating more than 1 billion gallons of water and wastewater daily
• Manages more than 8,000 miles of collection and distribution lines
• 200+ wastewater and 170 water facilities
• Manages more than 100,000 dry tons of biosolids annually, much of which is reused
• More than 1,500 employees across North America in 19 states
• Serves over 4 million water and wastewater customers
Eric Conder

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TIFFANY GISPANSKI
Connecting Communities for a Sustainable Future

Tiffany Gispanski
Water & Wastewater Business Development Manager
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The Impact of Water

Average water use in the U.S. is \(~82\text{ gal per person per day}\), which means that \(~10\text{M gal}\) is equivalent to the daily consumption of 1 small city (pop. 122k).

2\% of the U.S. energy usage is being accounted to the water industry = 45 million tons of GHG per year.

Global water use has increased 6\times over the past 100 years and continues to grow steadily at a rate of about 1\% per year.

Global warming is accelerating the access to water issue. By 2030, we will only have 60\% of the water supply we need.

Challenges of water resource conservation (water basin, desalination, water leakage); sustainability commitments (energy efficiency, carbon footprint); aging workforce; aging infrastructure; increasing regulations; extreme weather events; lack of data strategy.

Energies & Chemicals

3x - 5x barrels of water needed for every barrel of oil.

6.6T gal of water is needed for green hydrogen production by 2050.

Mining, Minerals & Metals

Water is \~15\% of total mining spend.

132B gal of water is required for copper production in Chile.

Semiconductors

8.5 gal of water is needed to make a single chip for a laptop or smartphone.

3.1M gal of ultra-pure water is needed per day to extensively clean the silicon wafers.

\approx\text{Tens of millions gal per day at one plant}

Consumer Packaged Goods

6,600 gal of water is needed to grow and produce a day’s supply of food for a family of four.

160B gal/year of water is used by five global F&B manufacturers.
The Digital Transformation Journey

It all starts with the right strategy, partners… and data.

**Siloed management**

**Basic connectivity**
- Smart, IoT devices
- Cybersecure, reliable network
- Basic automation & control
- Use of software tools & data

**Advanced management**

**Connected systems**
- Real-time, aggregated data contextualization
- Advanced automated control
- Asset & Predictive maintenance
- Energy management
- Empowered workforce, increased bandwidth
- IT/OT Collaboration

**Enterprise management**

**Integrated system-of-systems**
- Business integration and optimization
- Closed-loop process optimization
- End-to-end visibility
- Cybersecure hybrid networks (cloud)
- Digital twin
- IT/OT Convergence

**Digitally Evolved**

41% of water utilities are collecting data but not leveraging effectively
32% of water utilities are collecting some data
Largest supplier of raw water (250 miles of pipeline) in the Eastern region of Thailand to industrial estates, municipalities & households. [Link to news article](https://www.eastwater.com/en/MediaCenter/CorporateNewsDetails/27)

“Smart water initiative” – AVEVA’s Unified Operation Center with Schneider Electric’s EcoStruxure Solutions established EastWater as Thailand’s most advanced, efficient & ‘smart’ water supplier.

**Project reduced water loss by 17%, reduced energy cost up to 3%, & increased overall operation efficiency up to 30%.**

For Water & Wastewater

Water Resources & Networks

**Smart Water Initiative - Operation Command Center**

- EcoStruxure Water Simulation
- AVEVA UOC WWW
- AVEVA System Platform
- AVEVA Workflow
- AVEVA Insight
- Asset Performance
- AVEVA Power Advisor

**Edge control**

- Modicon M340
- EcoStruxure Power Monitoring Expert
- AVEVA Plant SCADA

**Connected products**

- PowerLogic Meters
- Schneider Electric’s High Voltage Switch Gear & Instrumentation

Moreover, East Water is able to reduce energy consumption by 2-3 percent a year.

[YouTube video](https://www.youtube.com/watch?v=diGOJYJavNg)
Infrastructure of the future: Digital connectivity for efficiency and sustainability.
Connect to drive the circular economy
Questions?
Please wait for the microphone.
State your name and company.

Please remember to...
Navigate to this session in the mobile app to complete the survey.

Thank you!
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ABOUT AVEVA

AVEVA is a world leader in industrial software, providing engineering and operational solutions across multiple industries, including oil and gas, chemical, pharmaceutical, power and utilities, marine, renewables, and food and beverage. Our agnostic and open architecture helps organizations design, build, operate, maintain and optimize the complete lifecycle of complex industrial assets, from production plants and offshore platforms to manufactured consumer goods.

Over 20,000 enterprises in over 100 countries rely on AVEVA to help them deliver life’s essentials: safe and reliable energy, food, medicines, infrastructure and more. By connecting people with trusted information and AI-enriched insights, AVEVA enables teams to engineer efficiently and optimize operations, driving growth and sustainability.

Named as one of the world’s most innovative companies, AVEVA supports customers with open solutions and the expertise of more than 6,400 employees, 5,000 partners and 5,700 certified developers. The company is headquartered in Cambridge, UK.

Learn more at www.aveva.com