

## Solution Stream – United Kingdom Agenda

EST (Toronto) 7-Feb-24	GMT (London) 7-Feb-24	AEDT (Melbourne) 7-Feb-24	Session Title	Speakers	Abstract
3:45 AM	8:45 AM	7:45 PM	Introduction	Mark Enzer	
4:00 AM	9:00 AM	8:00 PM	Keynote- The UK's National Digital Twin Programme	Alex Luck	National Digital Twin Programme is the government-led programme committed to growing national capability in digital twinning technologies and processes throughout the country. The primary purpose of the programme is to develop the standards, processes, and tools that will build the foundation of a functioning market in digital twins and create growth. This work will enable the creation of digital twins that are safe, secure, trustworthy and ethical. As the Head of the NDTP, Alex will provide an expert overview of the programme, giving key insights into its progress and benefits.
4:30 AM	9:30 AM	8:30 PM	Break		
4:40 AM	9:40 AM	8:40 PM	The Virtual Energy System	Simon Evans	The Virtual Energy System is a real-time replica the entire energy landscape that will work in parallel with the physical system. It is an industry-wide programme that aims to create an ecosystem of connected digital twins of the physical components of the energy system, such as power plants, transmission lines, distribution networks, and consumers. The Virtual Energy System will enable real-time data sharing, simulation, forecasting, and innovation to support the transition to net zero and a carbon-free future. The Virtual Energy System is a collaborative project that requires the participation and contribution of every element of the GB energy industry. As a key contributor to the Virtual Energy System, Simon will present this industry-leading example of digital twin integration.
5:10 AM	10:10 AM	9:10 PM	Break		

5:20 AM	10:20 AM	9:20 PM	Connected digital twins for enabling cross-domain interoperability	Dr. Amit Bhave	The Climate Resilience Demonstrator (CReDo) is a pioneering climate change adaptation digital twin project that provides a practical example of how connected data can improve climate adaptation and resilience across a system of systems. CReDo looks specifically at the impact of flooding on energy, water and telecoms networks. It demonstrates how those who own and operate them can use secure, resilient, information sharing across sector boundaries to mitigate the effect of flooding on network performance and service delivery. As a key technical leader in CReDO, Amit will explore how connected digital twins can be used to enable cross-domain interoperability. The underlying technical approach including the proposed distributed architecture has also enabled CMCL to extend the dynamic knowledge graph to represent assets from transport and healthcare sectors.
5:50 AM	10:50 AM	9:50 PM	Break		
6:00 AM	11:00 AM	10:00 PM	TransiT – digital twinning for decarbonising transport	Professor Phil Greening	TransiT is a UK research hub established in 2023 dedicated to digital twinning for transport decarbonisation. With the backing of the Engineering and Physical Sciences Research Council (EPSRC), the hub is scoping potential digital capabilities to manage the reduction of carbon emissions from transport, which currently accounts for a third of emissions across the country. As the Principal Investigator for the TransiT Hub, Phil will provide expert insights into the progress of the hub and the use of digital twins in the priority area of decarbonising transport.
6:30 AM	11:30 AM	10:30 PM	Panel Discussion		Review of the morning. Panelists: Mark Enzer, Prof. Phil Greening, Dr. Kumutha Swampillai, John Holden

## Application Stream – North America Agenda

EST (Toronto) 7-Feb-24	GMT (London) 7-Feb-24	AEDT (Melbourne) 8-Feb-24	Session Title	Speakers	Abstract
8:45 AM	1:45 PM	12:45 AM	Welcome	Arthur Berrill	
9:00 AM	2:00 PM	1:00 AM	Digital Twins in Finance – An Example	Arthur Berrill & Janette Wong	The Royal Bank of Canada (RBC) has built a complete digital twin firmly within the domain of a financial institute (FI). In the process, most of the challenges of a functional digital twin were encountered. For this presentation we'll explain the use case we used, the competency questions, the fit and rationale of a digital twin in a FI and the various technology choices we had to make. We'll show a little of the project (code named Flamel) in action and a quick look at the data we used. We'll also show why the business case for a digital twin makes sense and where we expect the technology to be used next in RBC and perhaps outside the RBC firewall.
9:35 AM	2:35 PM	1:35 AM	Knowledge Graph Powered Digital Twins	Peio Popov	After defining the foundational capabilities of the knowledge graph, the presentation will focus on examples of why the knowledge graph makes sense for the digital twin and the technologies within that knowledge graph that power effective digital twins.
10:00 AM	3:00 PM	2:00 AM	Ontology as the Defining Structure of a Digital Twin	Professor Michael Gruninger	The fundamental structure of the knowledge graph was framed on a federated ontology generated from 8 different (and in some cases inconsistent and differently scoped) ontologies. We'll follow Peio's session with a presentation from Professor Gruninger to explain how we solved the various problems and an explanation of how we are approaching the future challenge of generating more

					comprehensive ontologies for larger and even more exciting digital twins.
10:30 AM	3:30 PM	2:30 AM	Break		
10:40 AM	3:40 PM	2:40 AM	From Farm to Table: Towards Knowledge Centric Agricultural Digital Twins	Dr. François Scharffe	From the farmer on a plot of land in rural Dakota to macroeconomics of crops products many variables are at play. It is not an easy task for farmers to control the quality of their production, while at the same time trying to adapt to ever changing economic and climate situations. It is similarly not an easy task for large stakeholders such as governments, or large landowners to get an overall vision on the state of farms. In this presentation, we present a system based on a combination of a farming digital twin, a knowledge graph, and an application that actually helps farmers in their day-to-day life. We extract intelligence at the plot, the field and up to the regional level, perform analytics, and push recommendations back to the plot level. The system makes recommendations such as: "next year, you should be growing soy on plot A" based on factors such as soil moisture on that plot, market prices, production diversification at the regional level to name a few. Our presentation will end with a system demonstration.
11:10 AM	4:10 PM	3:10 AM	Starting points and Success stories with Digital Twins	Kamran Baqai	This session will cover the following topics: <ol style="list-style-type: none"> <li>1. Generating business value from Digital Twin deployments- Success Stories</li> <li>2. Digital Twins in Virtual Reality and Augmented Reality</li> <li>3. How to get started with Digital Twins</li> </ol>
11:40 AM	4:40 PM	3:40 AM	Digital Twins and the Quantum Age of ABC: AI, Blockchain and Cybersecurity	Dr. David Metcalf	Fintech is undergoing significant changes in structure, regulation, customer requirements and employee best practices. Come and explore the latest enterprise platforms that can meet and empower next generation technologies. How will the power of AI, Blockchain and next generation

					Cybersecurity, (ABC) affect banking, finance and the future of wealth? Join this lively discussion on the future of fintech, happening NOW.
12:10 PM	5:10 PM	4:10 AM	A Knowledge Graph for Integrated Information Management in Farming, Agriculture, and Climate Dynamics	Dahong Zhang	Irrigation timing is a big challenge for farmers for enhancing production yield, optimizing natural resources, combating climate change, and leading The Next Green Revolution. Excessive or insufficient irrigation impact plant health and crop yields. To address this, there is a need to analyze the relationships between crop yield, farm characteristics, soil properties and weather conditions. We proposed the Flamel Ontology by integrating structures from existing ontologies, climate, and farms data. The design successfully models intricate relationships between weather conditions, soil moisture, and their impact on farms. We used OWL2 and evaluated our ontology using the ELK reasoner and SPARQL queries. Our design paves the way for future applications in digital twin technologies. By providing valuable insights into the complex interplay of agricultural factors, our design contributes to promoting sustainable and efficient farming practices, benefiting both the agricultural sector and the broader society.

## Governance Stream – Australia/New Zealand Agenda

EST (Toronto) 8-Feb-24	GMT (London) Feb 8-9, 2024	AEDT (Melbourne) 9-Feb-24	Session Title	Speakers	Abstract
4:00 PM	9:00 PM	8:00 AM	Introduction & Welcome, including acknowledgement of Country		
4:30 PM	9:30 PM	8:30 AM	The NSW Digital Twin Journey	Narelle Underwood	The New South Wales Digital Twin programme has delivered a one-stop-shop for government spatial data, products and services. In this presentation Narelle will describe some of the key highlights of Live. NSW and share use cases of how it is solving real world challenges.
5:00 PM	10:00 PM	9:00 AM	Digital Twins in Wellington	Sean Audain	Sean will share key Digital Twin innovations from Wellington, New Zealand, that he has championed as the City Innovation Lead at Wellington City Council.
5:30 PM	10:30 PM	9:30 AM	An Ocean Digital Twin for Supply Chain Resilience	Dr. Colin Robertson	This work describes an ocean digital twin as the basis for improving supply chain resilience in the maritime sector. We provide an overview of the system architecture and sample analyses afforded by a digital twin representation. As well, we discuss how an ocean digital twin can interface with other emerging technologies in the shipping sector such as digital twins of ports and vessels.
6:10 PM	11:10 PM	10:10 AM	Break		
6:45 PM	11:45 PM	10:45 AM	Accelerating digital twin readiness with a CSIRO Early Adopter Program	Marie Truelove & Amber Standley	Although many of Australia's Spatial Digital Twin initiatives have been running for numerous years, challenges remain to collaboration and the technologies wide-spread adoption. In response CSIRO's Terria team designed an Early Adopter Program (EAP) to enable rapid engagement with numerous organisations to learn and co-design spatial

					digital twin projects tightly focused on well-defined use cases. In this presentation the team will share some of the key insights and learnings from the EAP so far.
7:15 PM	12:15 AM	11:15 AM	Spatial WA- A Benefits Driven Digital Twin Approach	Darren Mottolini	Spatial WA will deliver Western Australia an Advanced Spatial Digital Twin providing a common platform for government and industry to collaborate, plan and generate scenarios within a highly accurate virtual environment. Spatial WA will enable better data discovery and access with advanced tools for analytics, modelling, workflows and collaboration spaces. This presentation will provide an overview of the plan to deliver Spatial WA and the expected use cases that will deliver benefit for the State of Western Australia.
7:45 PM	12:45 AM	11:45 AM	Beyond Connected Digital Twins: The World Avatar	Professor Markus Kraft	The advent of digitalization brings forth new opportunities for data-centric engineering, leading to increased efficiency in the realms of science, engineering, and society. However, the implications of digitalization for environmental and social sustainability remain uncertain. We suggest that knowledge graph technology plays a pivotal role in addressing this challenge. In this presentation, I will introduce "The World Avatar," a dynamic knowledge graph (dKG) designed to construct a comprehensive digital replica of the world at large. I will elucidate the core concepts and principles underpinning this initiative, showcasing how it can facilitate seamless integration among various data formats and software systems, enabling data-centric decision making and operation. Additionally, I will present a variety of use cases that demonstrate how The World Avatar can aim to enhance efficiency, reduce costs, diminish carbon emissions, and bolster resilience,

					ultimately showing a path to master the challenges of the Energy Transition into a smart future.
8:15 PM	1:15 AM	12:15 PM	Digital Twins in New Zealand	Sam Wiffen	Through his experience with working on underground Digital Twins in New Zealand, Sam will highlight key learnings around governance, including data sharing in order to realise the value of Digital Twin technology.
8:45 PM	1:45 AM	12:45 PM	Digital Twin Initiatives in Australia	Tony Wheeler	In this presentation, Tony will summarise key initiatives in the region, and describe highlights and learnings from a broad industry perspective.
9:15 PM	2:15 AM	1:15 PM	Program close		