

MAKING BIM REAL

"INTEROPERABILITY IN RAIL" NETWORK RAIL COMMON INFORMATION MODEL (CIM) AND GOVERNMENT TASK GROUP ON INTEROPERABILITY.



Wed 23rd November 2022 17.30 pm to 18.15pm GMT

Hosted by COMIT with Speakers from Network Rail , GIIG, COMIT David White, Chair BIM4Rail, HS2 Head Strategic Planning & Asset Management







QR code readers at the ready for later!







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Questions?

Join the community:

https://www.linkedin.com/groups/8548306

https://www.bim4rail.org/



Supported by:







David White, HS2 Head Strategic Planning & Asset Management

Chair BIM4Rail

Meet today's team:



Graham Meaden Network Rail Representative Member BIM4Rail

Panelist



Paul Wilkinson AEC technology and communications consultant, writer, speaker, facilitator, nima ambassador

Panelist



lain INISKimmin National Digital Twin (BIM & Digital Twins) advisor

> Question Time Host



Supported by:





David White, HS2 Head Strategic Planning & Asset Management Chair BIM4Rail

..... Session Introduction



Iain Miskimmin National Digital Twin (BIM & Digital Twins) advisor

..... Question Time









Graham Meaden Network Rail Representative Member BIM4Rail





Interoperability & Integration of Intelligent Infrastructure Information



INTELLIGENT INFRASTRUCTURE DELIVERING THE DATA-DRIVEN RAILWAY

Graham Meaden Lead Data Architect Programme Architecture 23 Nov 2022

Introduction



How Network Rail is using a Common Information Model (CIM) to enable its predict and prevent asset maintenance strategy.

How Network Rail is managing and evolving its CIM to drive greater alignment and consistency of data across systems and asset disciplines and positioning itself to achieve greater sharing and inter-operability of data across GBR and the rail industry.



NetworkRail

Context

The Common Information Model has been built out as part of NR's **Intelligent Infrastructure Programme**.

Intelligent Infrastructure is a digital transformation programme focused on improving asset management and helping maintenance become proactive rather than reactive.

NR is using technology to turn data into intelligent information so front line and supporting teams can work safely, smarter, and seamlessly. A range of easy-to-use online applications will provide our teams with the right information at the right time, making it easier to deliver improved services for passengers and freight customers.

For more information follow the link:

https://www.networkrail.co.uk/running-the-railway/intelligent-infrastructure/



Scope by Information Domains







Scope by Asset Lifecycle Stage





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What is the CIM and what is it not?



What is in the CIM?



Before using CIM, understanding the underlying data concepts is necessary pre-requisite.



Metadata	Data that describes other data.
Reference	Structured data that provides common and reusable definitions for classification and categorisation of other structured data. Reference data may be maintained internally by the organisation or sourced from third party organisations.
Master	Structured data generated by systems of record used to maintain electronic representation of key things under management of the organisation, e.g. assets, services.
Transactional	A special kind of data representing a fact pertaining to activity of the organisation. Transactional data is held in structured form.

This data classification gives us an immediate sense of its nature, how it could be implemented and how it should be operationally managed.

What is in the CIM?







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What is the breakdown of content by subject area?



Why the CIM exists?



Standardises data and thus standardises processes and systems

Provides the common language and structures for the systems integration layer

Enables easier joining of data together

Enables "asset system" management

Enables cross-discipline asset management

Enables projects to reduce the time to develop their LDMs



LDM – Logical Data Model

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What is the CIM based on, where do the requirements come from?



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It is more stable







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How do we use the CIM ?



A project's logical data model content is harvested back into the CIM if it has wider applicability.

How does CIM fit with IFCs and NR AIS?



AIS – NR Asset Information Specification

How does the CIM differ from NR Asset Information Specifications ?





The CIM factors everything down into generic entities that are capable of representing things real world things. The colour coding depicts the equivalent constructs.





Integration Architecture

Hundreds of APIs have been developed using the CIM. Here is a snapshot from our analytics dashboard

Business Capability Impact by System APIs



Business Capability Impact by ExperienceAPIs



Business Capability Impact by Business/Process APIs



Summary





INTELLIGENT INFRASTRUCTURI

The Common Information Model is one of the core assets we use to govern asset

information systems build and how we increase inter-operability and reduce

integration costs going forward.

For correspondence please email: graham.meaden@networkrail.co.uk

Conceptual Model



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Inventory

Adjustment Adjustment Item

Inventory

Store

Bill of Material Item

Issue Requisition

Transfer Requisition

Transfer Requisition Item

(from Network Rail)

Issue Requisition Item

Stock Keeping Unit (SKU)

Miscellaneous

📑 Item Hazard

Access Point Asbestos Risk

Hazard

Location

Location

Postal Address Location Type

Geometric Model

Railway Network

Location Type Instances

_____ Network

Model

Utilisation

Train Services

Delay

Delay Cause

Rail Vehicle

Signal Berth

Timetable

Train Service

Train Consist

Train Movemen

(from Operations)

Permissible Speed Zone

Incident

Notification

Shift Code

Timesheet

Notification Entry

Timesheet Entry

Timesheet Week

Week Number

Notification Configuration

(from Work)

Work Record Attribute

Timesheet Recording

Work Category Instances

Work Request

Workbank

Worksite

Work Type



System Security

Account

Account Resource Permission

Business Role Member

Access Group Permission

Business Role Type Access Group Access Group Member

Account Preference

IT Resource Group

IT Resource Permission

System Role Function

Logical Metadata

Physical Metadata

Management

Reference Data

Range Code

Reference Code

Reference Group

Media

3D Object

IT Resource Group Member

(from Central Services)

(from Information Management)

(from Information Management)

Business Role

IT Resource

System Role

Metadata



Asset Core Class Model – Entity Only



Asset Core Class Model – Attributed







Paul Wilkinson AEC technology and communications consultant, writer, speaker, facilitator, nima ambassador







Fiona Moore 23 November 2022

Government & Industry Interoperability Group

BIM4Rail

Interoperability definition



'The ability to exchange and use information <u>securely</u>, ensuring that information is independent of the technologies used to deliver it.'







The whole-life information journey and the importance of interoperability



Interoperability definition - context



'The ability to exchange and use information <u>securely</u>, ensuring that information is independent of the technologies used to deliver it.'

Some of the context:

- Information for a defined purpose
- An audit trail of information
- Information quality / reliability
- Information longevity for use during the whole asset lifecycle
- Information exchanged digitally across many contract lines



'Further embed digital technologies'

Construction playbook, updated Sept 2022

Clients need:

'a standard interoperable approach for the secure exchange and use of data and information throughout the procurement and project lifecycle.'

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/atta chment_data/file/1102386/14.116_C0_Construction_Playbook_Web.pdf Page 23



| 淡 | HM Government

THE CONSTRUCTION PLAYBOOK

Government Guidance on sourcing and contracting public works projects and programmes





'Information to drive benefit through life'

Transforming Infrastructure Performance Roadmap to 2030 Annex B

8. The client (shall)...

'e) have a digital mechanism for defining its information requirements and then procuring, receiving, assuring, and immutably storing, via a system of record, the information that it procures;'

https://assets.publishing.service.gov.uk/government /uploads/system/uploads/attachment_data/file/101 6726/IPA_TIP_Roadmap_to_2030_v6__1_.pdf





'A robust golden thread of key information'

(should be) 'passed across to future building owners to underpin more effective safety management throughout the building life cycle'

'use digital tools and systems' to enable key information 'to be stored and used effectively to ensure safer buildings'

'make information easily available to the right people at the right time'

https://www.gov.uk/government/publications/building-regulations-advisory-committeegolden-thread-report/building-regulations-advisory-committee-golden-thread-report













GIIƏ

Information activities:

- Specify
- Procure
- Deliver
- Assure
- Store
- Present
- Exploit



GIIG Workstreams

A. Classification

(Sarah Delany / Chris Vickers)

- B. Industry Foundation Classes (IFC) & COBie (Emma Hooper / Nick Nisbet)
- C. Information Management Platform (IMP) (Graeme Tappenden / John Hall)
- D. Technologies & Openness (Paul Wilkinson)
- E. Procurement for Interoperability (Simon Lewis)
- F. Standard Information Approach

(Anne Kemp / Julian Schwarzenbach / Shahida Rajabdeen)

With input from industry, working collaboratively.



Our Ethos - Debate and Consensus



- 1. Have a clear understanding of the objectives
- 2. Always share your opinion and your reasoning
- 3. Listen and learn this is the strength of the team
- 4. **Respect** one another, with the aim of understanding different viewpoints
- 5. Be prepared to adapt your opinion
- 6. Accept that no individual can provide all the answers
- 7. Lead by example
- 8. Help to grow consensus across all stakeholders







Published Resources

Published to date:

- Glossary
- IMP Guidance Document
- IMP Case Study
- JCT & NEC4 Contract Clauses
- IMP Functional Requirements Tool

https://www.cpni.gov.uk/informa tion-interoperability













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POLL QUESTIONS:

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Question Time

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https://www.bim4rail.org/

Join the Linked in page

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