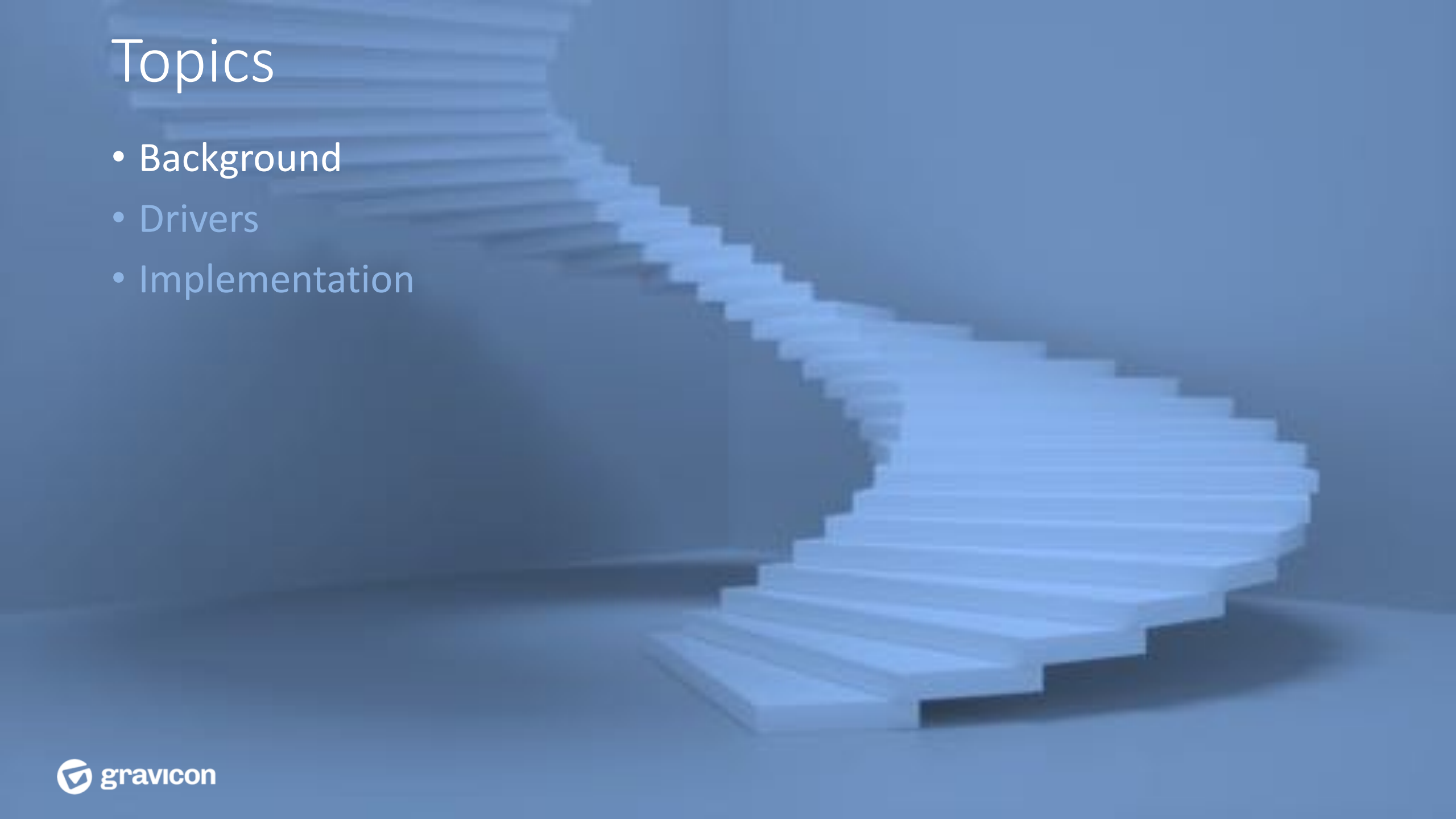
Roadmap to automated code checking Finnish approach

Tomi Henttinen, M.Sc. (Arch), Founder, CINO, Gravicon Oy

ABOUT ME

Topics

- Background
- Drivers
- Implementation



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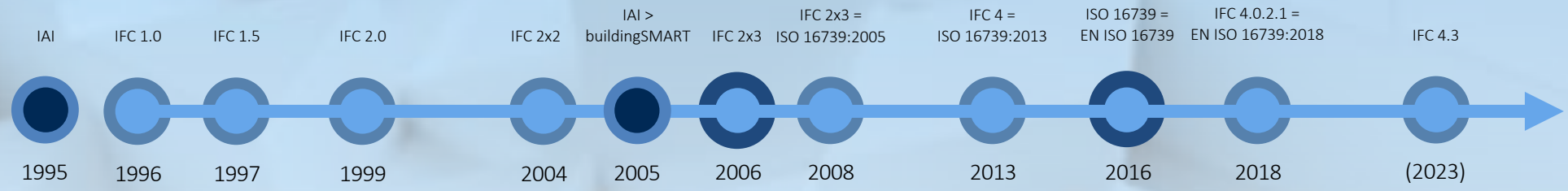
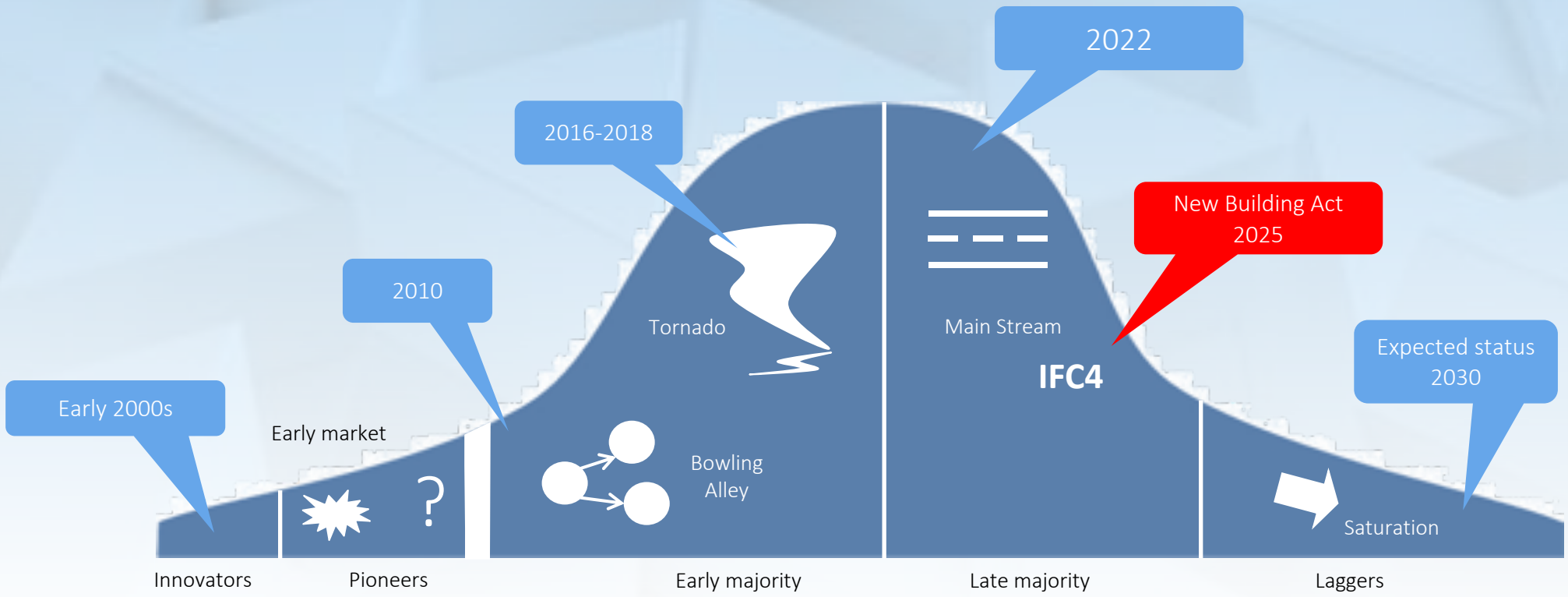
IFC and BIM in AEC sector in Finland

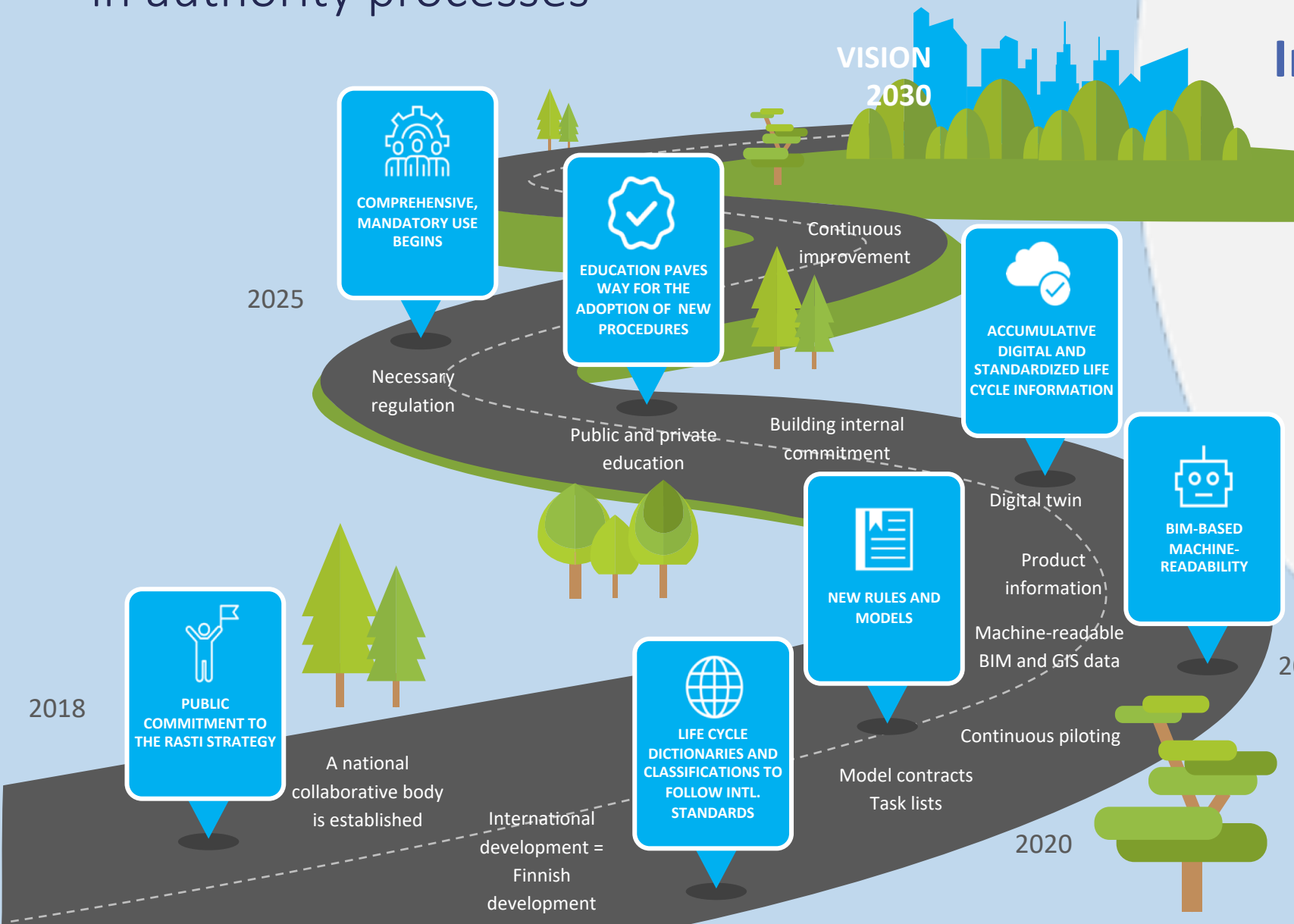


IFC (EN ISO 16739)

- Developed by buildingSMART International
- Approved and published ISO and CEN
- Version 4.0.2.1 includes FM extensions
- Version 4.3 adds support to infra structures



Road map for implementing digital information in authority processes



Information flows smoothly across the whole life cycle

Information and data systems are interoperable

Information is based on international standards

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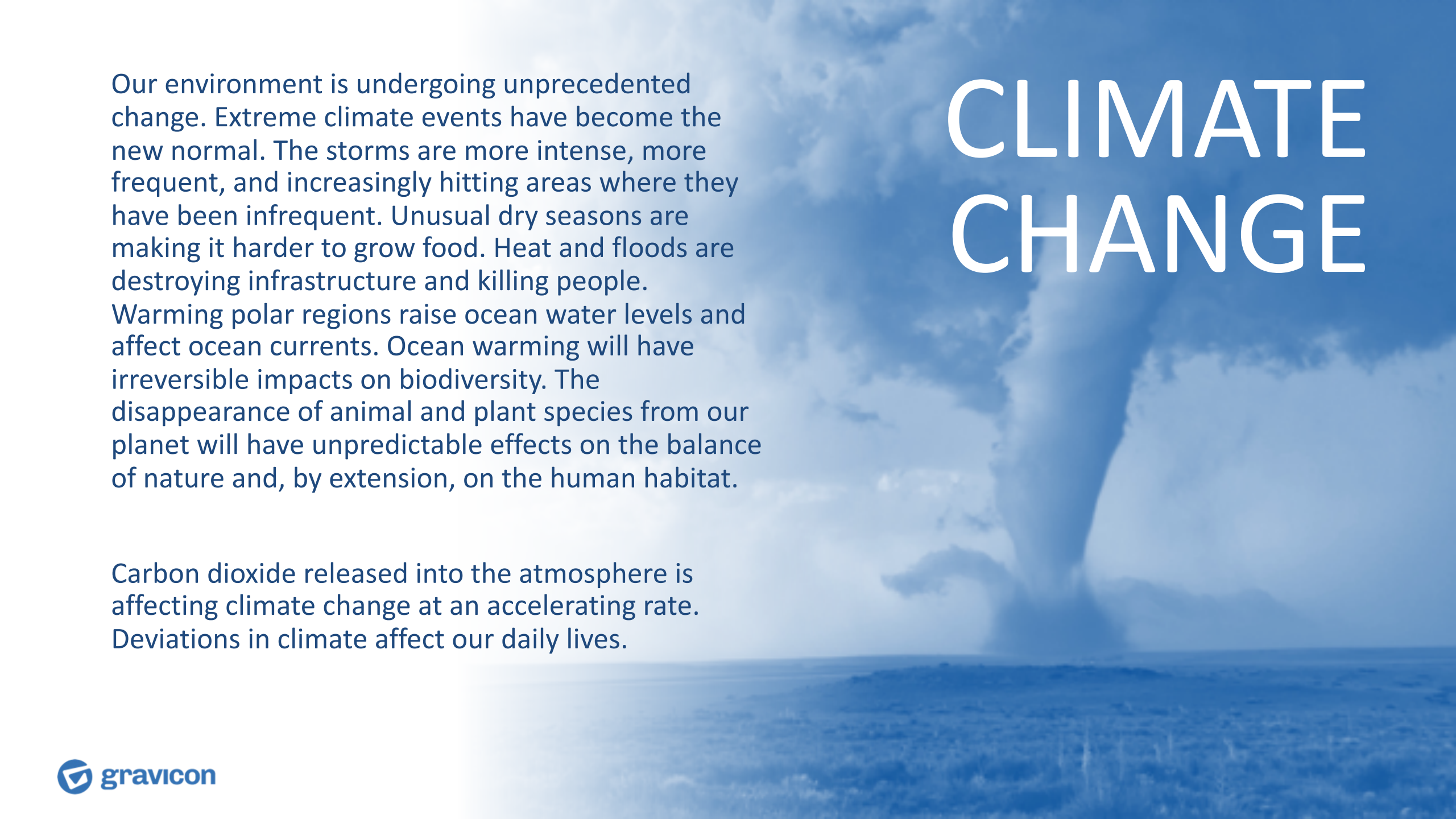
CLIMATE CHANGE

Our environment is undergoing unprecedented change. Extreme climate events have become the new normal. The storms are more intense, more frequent, and increasingly hitting areas where they have been infrequent. Unusual dry seasons are making it harder to grow food. Heat and floods are destroying infrastructure and killing people. Warming polar regions raise ocean water levels and affect ocean currents. Ocean warming will have irreversible impacts on biodiversity. The disappearance of animal and plant species from our planet will have unpredictable effects on the balance of nature and, by extension, on the human habitat.

Carbon dioxide released into the atmosphere is affecting climate change at an accelerating rate. Deviations in climate affect our daily lives.



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Ympäristöministeriö
Miljöministeriet
Ministry of the Environment

CO2

The built environment is the platform for human life and activity on Earth. Living, working, and moving around are fundamental values in our lives. We all have a close relationship with the built environment. At the same time, it is one of the primary producers of carbon dioxide.

To control and regulate the emissions of the built assets, we need a vast mass of data that can only be managed through digital tools and procedures that enable the automatic flow of information.

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DATA

The flow of information between the different registers is still manual in many respects. The lack of harmonisation of the format of the data in the different repositories means that transformations have to be made when data is exchanged. Conversions are often man-made. Changes to the content of data in one repository are not updated in other repositories. The information is not in a standardised format, making it difficult to interpret.

The workload for public authorities is constantly increasing, while municipalities are struggling to find qualified staff to carry out building control tasks. At the same time, legislation on building permits is becoming more complex. Municipalities are already facing financial challenges and the pressure to speed up administrative processes is in conflict with the resources available.

RESOURCES

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interoperable europe

Interoperable Europe is the initiative of the European Commission for a reinforced public sector interoperability policy. The Interoperable Europe Act proposes a strategic interoperability cooperation mechanism across the European Union.

Learn more

We support the public sector in understanding digitalisation

Maria Vuorensola
23.10.2019 - 07:41

The needs of Finland's abundant and diverse public sector challenge us to develop support for the development of public digital services. How do we develop Suomidigi, the self-sustaining service that supports public sector employees and the developers who work for the public sector?

Topics

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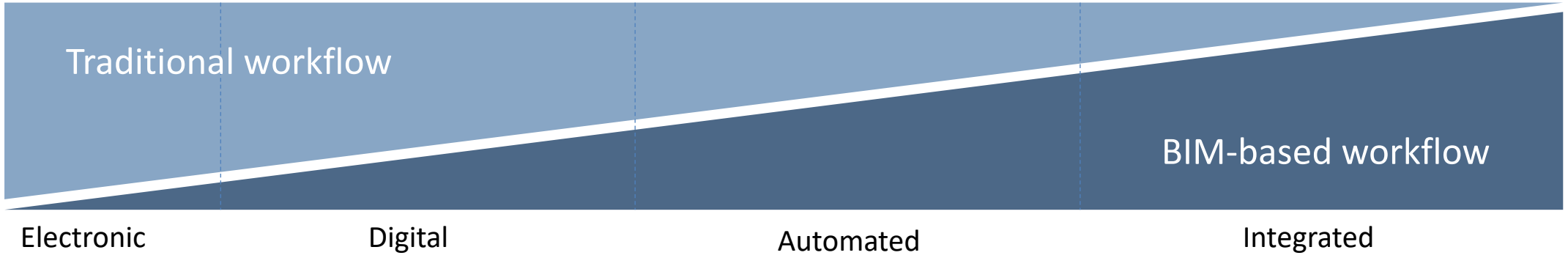
Building Act 2025 - BIM objectives

Vision

Automated regulatory processes that support also environmental and industry needs.

Mission

Adopt digital, BIM-based workflows and enable data integration between different registries and stakeholders.



Objectives

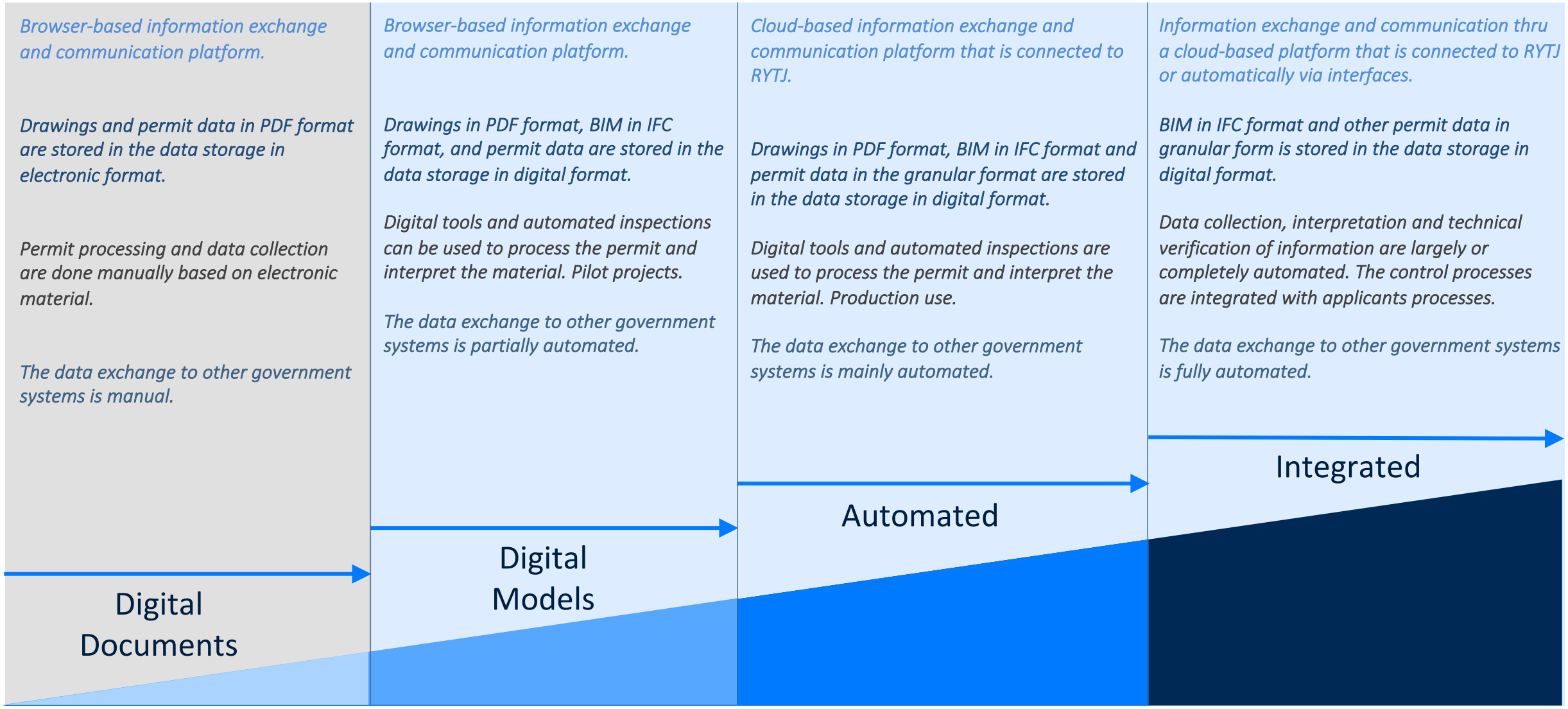
All data is digital and in granular form.

Key processes are automated.

BIM-based city plans and building permit applications are delivered and maintained in international, open standard format.

Data flows seamlessly between city planning and permitting systems, registries and other databases.

Roadmap to BIM-based building control



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Towards BIM-based building control

2015
- Electronic Building Permit processing started by Cloudpermit and Trimble ePermit

2018
- Digital permitting covers all building permit activities in 90% of municipalities
- First IFC-based permit experiment

2020
- Standardisation and harmonisation started

2022
- IFC 4 OpenBIM format approved as a permanent archiving format by The National Archives of Finland (decision 10/2022)
- 15 week BIM coordinator program for building controllers (100 people/year, totally 500, supported by the Ministry 0,3 M€/year)

2023
- First automated code checking solutions (Cloudpermit, Trimble ePermit)
- Rava3pro (23 municipalities, 1 M€, specifications and tools for automated code checking 22/23)

2025
- IFC becomes compulsory for building permits (Building Act 1.1.2025)
- National Building Information Register in use 2024-27, investment cost 20 M€ (2021-24)

2027
- As-built BIM desings stored in National Building Information System Archive 2027

Actors

Ministry of the Environment

- Legislation
- National registry for built assets
- Digital interoperability of the built environment

Municipalities

- Requirements for building control
- Short-term storage of digital assets

National Archives

- Rules for digital archives
- Long term archiving of digital assets

Industry

- Consulting
- Content creation

IFC as a mandatory format for building permits

National Archives decision 2022-10-19

The IFC 4.0.2.1 STEP file has been adopted as an official file format for long-term archiving.

Building Act

All projects shall deliver to building control authority a three dimensional model in machine-readable form in two stages: building permit model, as-built model

Act on Public Administration Data Management

All data managed by public authorities shall be archived

Archives Act

The accepted archiving formats shall be decided by the National Archives of Finland

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Supporting legislation and requirements

Ministry of the Environment

Secondary legislation for design and as-built models

Secondary legislation for low-carbon construction

Secondary legislation for material report and environmental impacts

Building control authorities

IFC requirements

Rules for automated code checking

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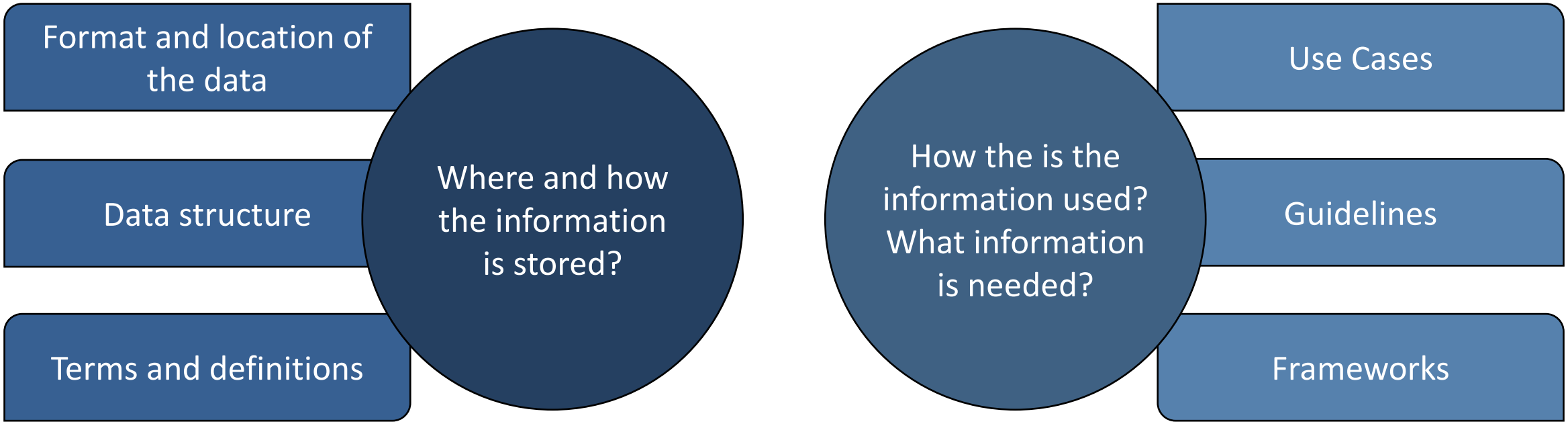
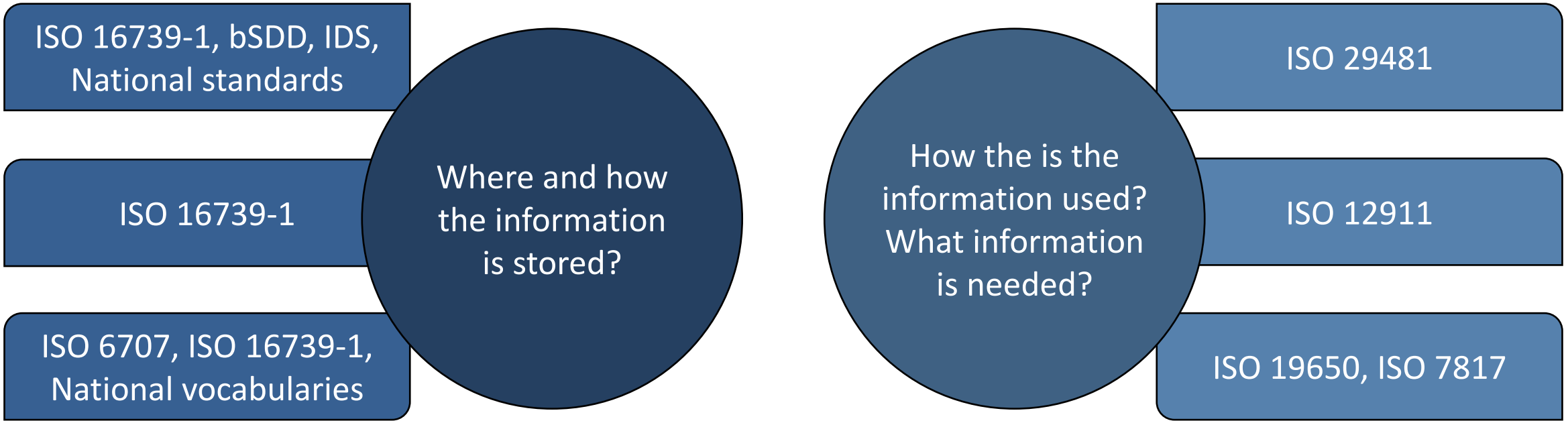
BIM requirements

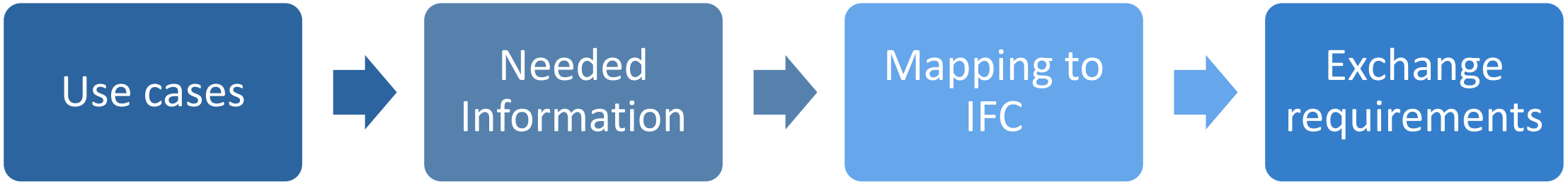


BIM requirements



Setting up the requirements

Methodology



Setting up the IFC requirements

Use cases

Identifying and selecting the use cases together with the building permitting authorities:

- Fire safety
- Operational safety
- Acoustic requirements
- Accessibility
- IFC to city model

Setting up the IFC requirements

Information

Analysing the requirements and needed information:

- Walking thru each clause in the secondary legislation
- Analysing whether or not the clause can be turned into a machine-readable form

Setting up the IFC requirements

Mapping to IFC

Starting with IFC Entities and IFC standard properties

- Finding out and documenting the missing items

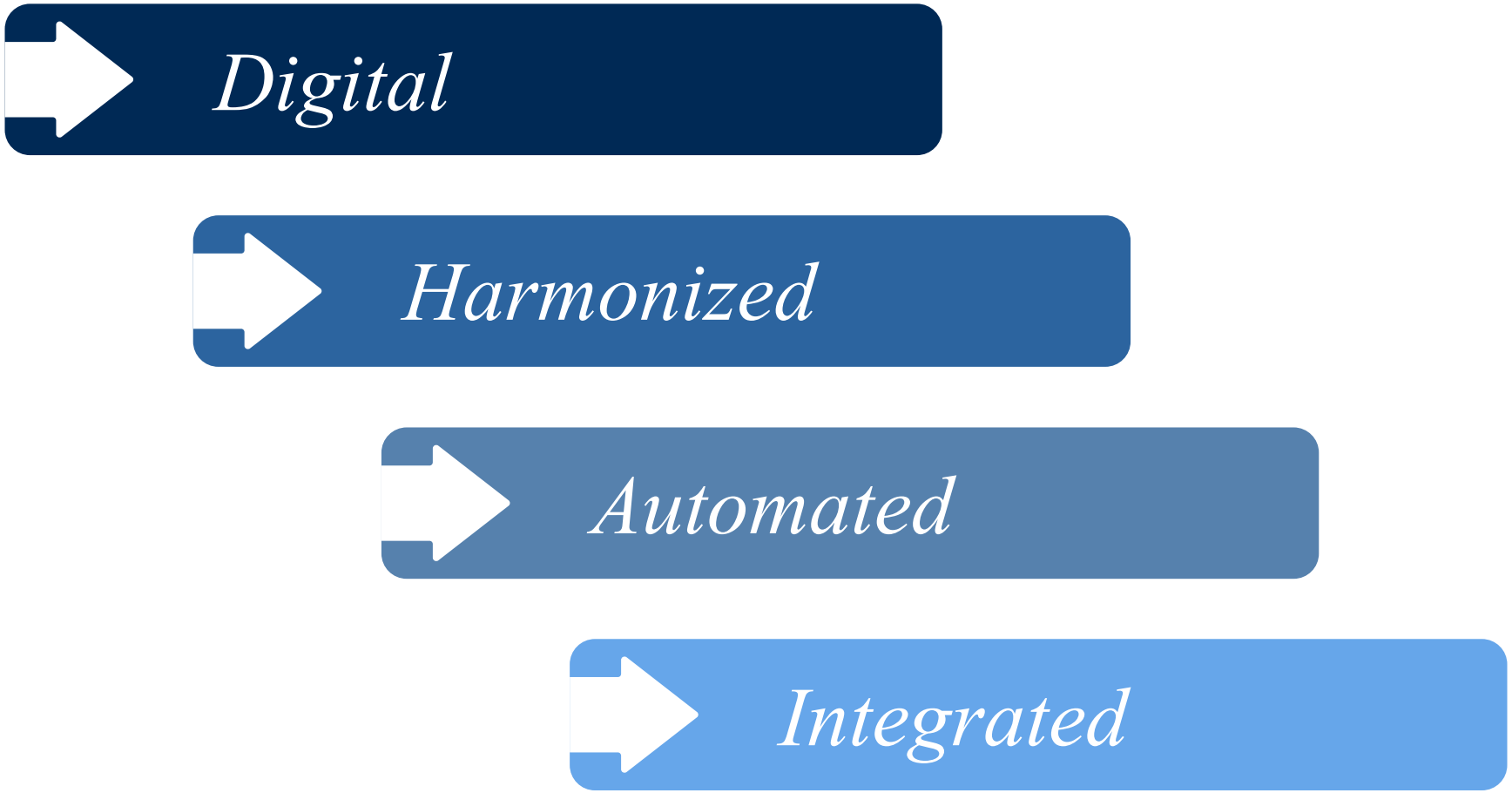
Setting up the IFC requirements

Exchange requirements

Specifying the geometry, properties and harmonized data contents

Documenting the requirements

Summary – BIM-based regulatory process




THANK-YOU
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