

Information management according to BS EN ISO 19650

Guidance Part C

Facilitating the common data environment (workflow and technical solutions)

Edition 1

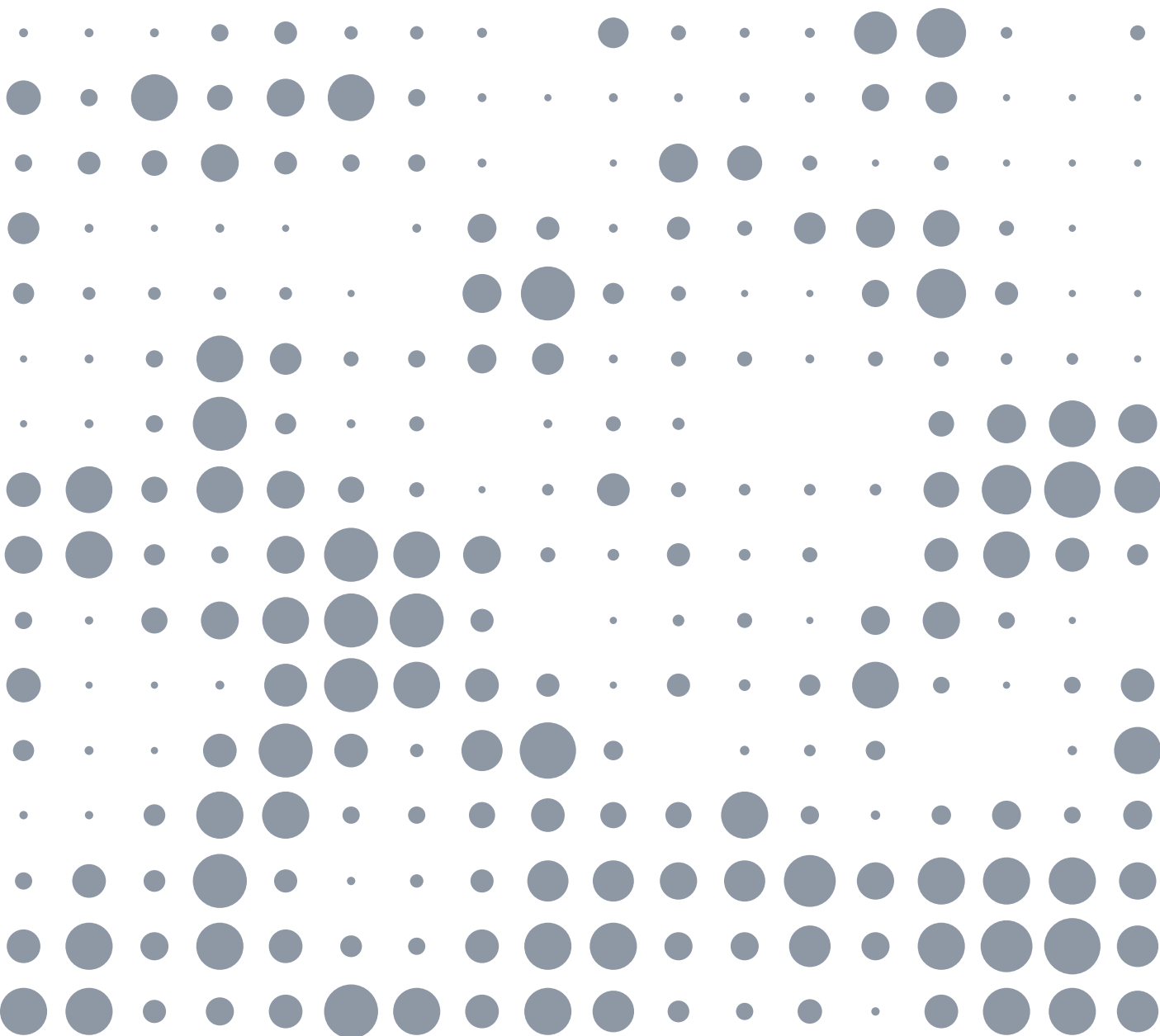
Published by

The logo for the UK BIM Framework, featuring the text "UK BIM" in a bold, sans-serif font above "FRAMEWORK" in a similar font. The text is enclosed within a stylized, multi-colored frame consisting of blue, purple, orange, and teal lines.

bsi.

The logo for the Centre for Digital Built Britain (cddb), featuring the lowercase letters "cddb" in a bold, sans-serif font, with the full name "Centre for Digital Built Britain" in smaller text below.

The logo for the UKBIM Alliance, featuring the text "UKBIM ALLIANCE" in a bold, sans-serif font, with "Enabling Digital Transformation" in smaller text below. To the right of the text is a stylized graphic of a building or structure composed of small dots.



Editions

Edition 1 September 2020

First release as Guidance C. Note that this guidance text first appeared in ISO 19650 Part 2 guidance edition 2.

Nothing in this guidance constitutes legal advice or gives rise to a solicitor/client relationship. Specialist legal advice should be taken in relation to specific circumstances.

The contents of this guidance are for general information purposes only.

Permission to reproduce extracts from the ISO 19650 series is granted by BSI Standards Limited (BSI) and the copyright in Figure 2 and Table 2 used in this report belongs to BSI. No other use of this material is permitted.

British Standards can be obtained in PDF or hard copy formats from the BSI online shop: <http://www.bsigroup.com/Shop> or by contacting BSI Customer Services for hardcopies only: Tel: +44 (0)20 8996 9001, Email: cservices@bsigroup.com

Any data or analysis from this guidance must be reported accurately and not used in a misleading context. If using any information from this report, then its source and date of publication must be acknowledged.

Table of contents

| | |
|---|-----------|
| Message from the UK BIM Alliance Chair | 3 |
| Acknowledgments | 4 |
| About BS EN ISO 19650 | 5 |
| About this guidance document(executive summary) | 6 |
| Abbreviations and acronyms | 8 |
| 1.0 About the common data environment (CDE) | 9 |
| 1.1 Introduction | 9 |
| 2.0 Components of the CDE | 10 |
| 2.1 Information container states | 11 |
| 2.2 Metadata | 12 |
| 3.0 Information container management through metadata assignment | 13 |
| 3.1 Metadata management through CDE Solutions | 13 |
| 3.2 Transition of metadata between CDE Solutions | 14 |
| 4.0 Classification through metadata assignment | 16 |
| 4.1 Information container classification | 16 |
| 4.2 Assigning metadata within CDE solutions | 16 |
| 5.0 Revision control through metadata assignment | 17 |
| 5.1 Revision control during Work in Progress (WIP) | 18 |
| 5.2 Revision control of Shared information | 19 |
| 5.3 Revision control of Published information containers | 20 |
| 6.0 Status allocation through metadata assignment | 21 |
| 6.1 Status codes | 21 |
| 6.2 UK defined standard status codes | 22 |
| 6.3 Status codes driving CDE workflow | 23 |
| 6.4 Examples of status codes | 27 |
| 7.0 Checklist of actions/key points to consider | 28 |
| 8.0 Summary | 30 |

List of figures

| | |
|--|----|
| Figure 1: ISO 19650 guidance framework | 6 |
| Figure 2: CDE concept as demonstrated in ISO 19650-1 Figure 10 | 11 |
| Figure 3: An example of a range of metadata that can be assigned in a cloud based CDE solution | 13 |
| Figure 4: Illustration of two different CDE solutions where metadata assignment must transfer | 14 |
| Figure 5: Explanation of the 19650-2 National Annex revision system | 17 |
| Figure 6: Illustration of the benefits of having a WIP version control using the 19650-2 National Annex approach | 18 |
| Figure 7: Demonstration of WIP and Shared revisions using ISO 19650-2 National Annex approach | 19 |
| Figure 8: Illustration of how revision metadata distinguishes between different states | 20 |
| Figure 9: Illustration of an information container transitioning between states | 24 |

List of tables

| | |
|--|----|
| Table 1: Abbreviations and acronyms | 8 |
| Table 2: ISO 19650-2 Table NA.1 - Status codes for information containers within a CDE | 22 |
| Table 3: Example of the iterative development of an information container | 25 |
| Table 4: Application of status codes | 27 |

Message from the UK BIM Alliance Chair

Author: Dr Anne Kemp OBE
Chair - UK BIM Alliance



The UK BIM Framework provides the fundamental step towards digital transformation of the UK's built environment industry. The Framework is based on the ISO 19650 series, which first developed out of the UK's former BIM Level 2, but incorporates and anticipates global and future digital perspectives.

The UK BIM Framework embraces and assists in the implementation of the standards for managing information for the whole life of assets of the built environment. The Framework anticipates the potential for integration across portfolios. The Framework provides extensive Guidance which continues to be developed, including the addition of supplementary tools and materials to enable a firm basis for the evolving National Digital Twin Programme.

This Guidance has been developed to help industry to implement the concepts and principles of the ISO 19650 series upon which the UK BIM Framework is based. It has been continually updated to keep track of the publication of the different parts of ISO 19650, and to reflect lessons learnt as further experience is gained in its implementation.

The key parts of ISO 19650 are now all in place, allowing us to realise information management throughout the whole life of built environment assets. It provides for traditional ways of working entailing exchange of information via files, but also caters for shifts towards data exchange. The key is being specific about what information is required and how it is to be delivered. This needs forethought around what should be

the "end in mind" and consideration from an organizational, whole life perspective. This then informs the detailed requirements right down to appointment level.

The work behind developing this Guidance has been considerable. I would like to thank Sarah Davidson and David Churcher for their tireless commitment in continuing to bring this work together - I so enjoy working with you both. Secondly, I would like to thank the many authors who have contributed so generously to the writing of the Guidance - and been so patient in the criticisms and changes that have been required of them. Finally, I would like to thank the many people who have spared time to review and feedback on the Guidance - the Focus Groups in particular, but also those who have contacted us separately. Without this feedback we would not be able to incorporate the wide-ranging experience and testing which is occurring around the industry.

We welcome your continued feedback and shared experiences. You can provide this via guidancefeedback@ukbimframework.org.

Acknowledgments

This guidance represents the collaborative efforts of the following people and organizations

Editors

| | |
|----------------|---------------------------|
| David Churcher | Hitherwood Consulting Ltd |
| Sarah Davidson | University of Nottingham |
| Anne Kemp | Atkins |

Authors

| | |
|-----------|---------------|
| John Ford | Galliford Try |
|-----------|---------------|

Contributor

| | |
|------------|-------|
| Mo Shana'a | Morta |
|------------|-------|

Production

Centre for Digital Built Britain

About BS EN ISO 19650

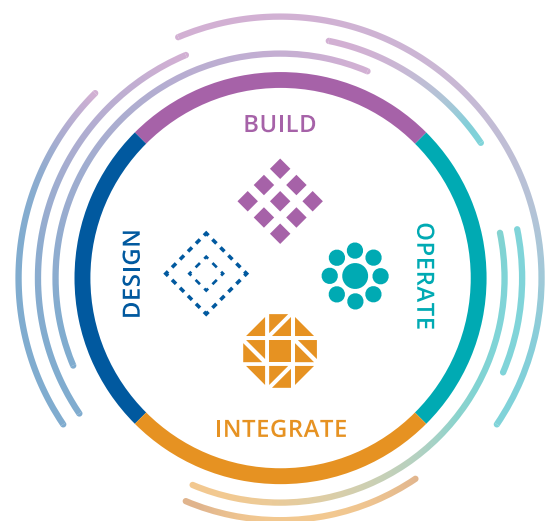
The BS EN ISO 19650 series of standards (herein after referred to as the ISO 19650 series) is an international standard of good practice. It defines information management principles and requirements within a broader context of digital transformation in the disciplines and sectors of the built environment (including construction and asset management industries). Its implementation in the UK is supported by UK National Forewords in ISO 19650 Parts 1 and 2, and a UK National Annex in ISO 19650 Part 2.

The ISO 19650 series replaces some of the existing British Standards and Publicly Available Specifications relating to information management using building information modelling (BIM). It is part of a landscape, or ecosystem, of national and international standards supporting information management processes and technical solutions. It considers all information whether it is a construction programme, a record of a meeting, a geometrical model or a contract administration certificate.

Building information modelling (BIM) plays a key part in the management of information because it provides a methodology that helps us to structure information so that technology can process it.

Structuring information using industry standards helps to improve interoperability. This means that information can be joined-up by both people and technology, which then enables us to extract more valuable knowledge from it. Using the same information structures throughout industry generates consistency, repetition and predictability. This brings real efficiency gains for businesses and provides the data architecture for the connected future.

Standards within the ISO 19650 series are available at www.bsigroup.com. Visit www.ukbimframework.org to see how the ISO 19650 standards plus other standards within the UK BIM Framework map to the design, build, operate and integrate process



About this guidance document (executive summary)

The guidance framework supports the UK implementation of the ISO 19650 series. This guidance document (guidance C) sits within an overall guidance framework as shown in Figure 1:

Guidance C is written to support the implementation of each published ISO 19650 standard.

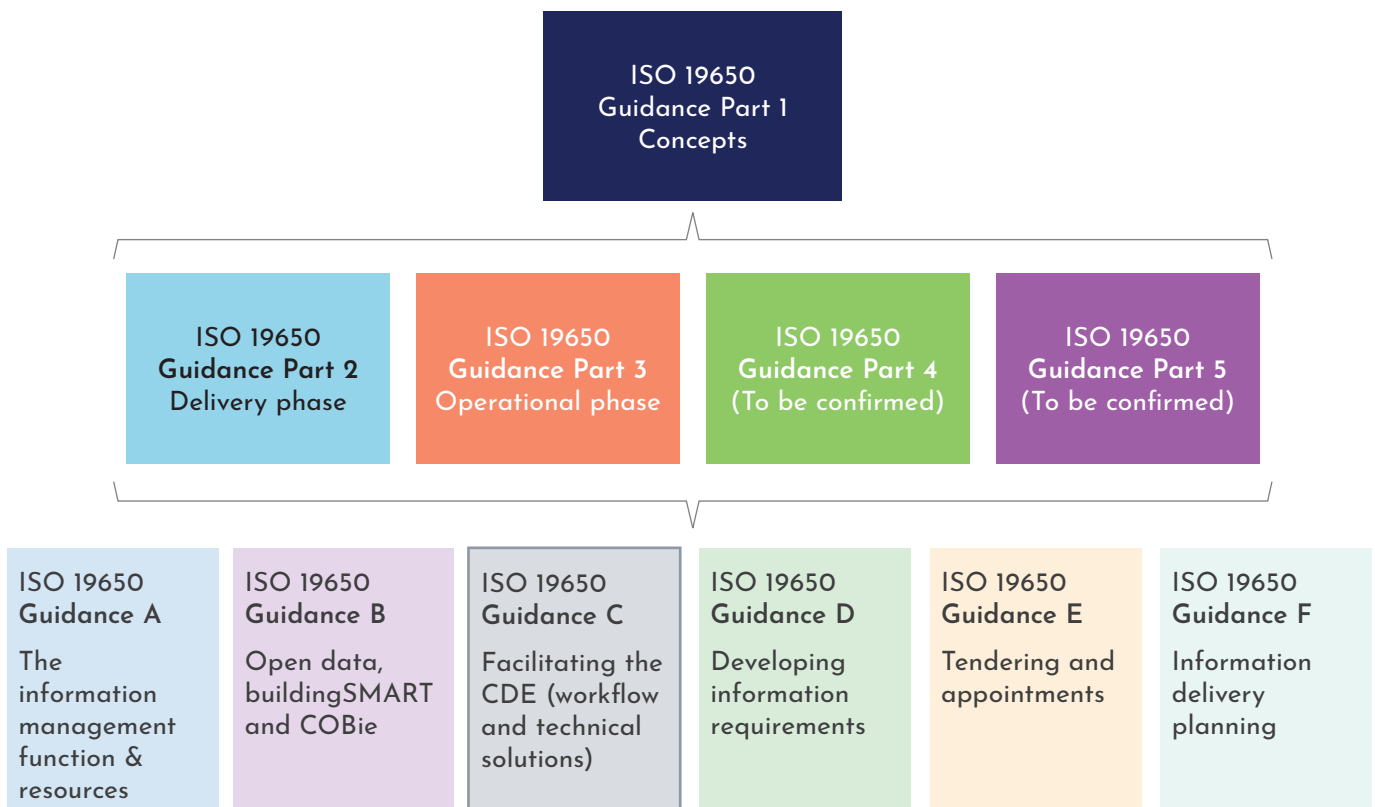


Figure 1: ISO 19650 guidance framework

Who is this guidance written for?

This guidance is for people undertaking the information management function on behalf of an appointing party (a client) or a lead appointed party (for example, a project manager, designer or a main contractor).

Who is this guidance of particular interest to and why?

This guidance is of interest to the appointing party, the lead appointed party and each of the appointed parties involved in the common data environment (CDE) in terms of workflow and technical solutions.

This first edition of ISO 19650 Guidance C is written to reflect the recommendations set out in the National Annex to ISO 19650-2 published in 2018. The second edition of this guidance will be released in 2Q 2021 to account for the revised version of the National Annex released in February 2021 (the 2021 National Annex).

For guidance setting out the changes introduced in the 2021 National Annex please refer to [ISO 19650 Guidance Part 2](#).

Key takeaways

- A CDE is provided and managed by the appointing party (or a third party acting on their behalf), for the management of all information containers that are developed and exchanged with the appointing parties throughout the project/asset lifecycle from each delivery team.
- The CDE workflow describes the processes to be used for collecting, managing and disseminating structured and unstructured information, and the CDE solution is the technology that enables these processes.
- Appointing parties, lead appointed parties and appointed parties could all have their own CDE solutions that make up the project CDE.
- It is critical to establish metadata assignment and classification and to define how it can be transferred, retained or accommodated during the CDE workflow.

As with all guidance supporting the UK BIM Framework, we invite comment and feedback on this guidance C at guidancefeedback@ukbimframework.org

Abbreviations and acronyms

This guidance includes a number of abbreviations and acronyms as set out in Table 1.

Table 1: Abbreviations and acronyms

| Abbreviation or acronym | Term |
|-------------------------|---------------------------------------|
| AIM | Asset information model |
| BIM | Building information modelling |
| CDE | Common data environment |
| EDMS | Electronic document management system |
| IFC | Industry foundation classes |
| WIP | Work in progress |

1.0 About the common data environment (CDE)

1.1 Introduction

The ISO 19650 Part 1 Concepts guidance available at the [UK BIM Framework](#) website explains how the CDE is a combination of technical solutions and process workflows.

A CDE solution could be software, or it could be another form of tool. If information is exchanged by a non-digital solution (for example, a postal service) and/or stored in an organized hard-copy cabinet (which may, for example, be required on a sensitive project where digital methods are not permitted), then this can also be described as a CDE solution that can be supported by workflows.

It is more usual though, for digital solutions like electronic document management systems (EDMS) to play a big part in implementing CDE solutions and workflows. But, it must be recognized that many different technologies can be used within a single workflow.

ISO 19650-2 envisages that a CDE is provided and managed by the appointing party (or a third party acting on their behalf), for the management of all information containers that are developed and exchanged with the appointing party throughout the life of the project from each delivery team. This is referred to in ISO 19650-2 as the project CDE.

However, ISO 19650-2 also envisages that delivery teams may implement their own (distributed) CDEs as well (but not instead of the project CDE). This guidance contains examples of this scenario, which can introduce complexities into the management of information.

2.0 Components of the CDE

There is a potential misconception that the CDE is more about technology and less about workflows. In fact, it is fundamental that workflows are developed first and solutions are selected to facilitate the workflow.

It may also be understood that single technology solutions dominate project information management. This is not the case and many solutions exist to deal with different types of project information. There may, for example, be document management tools for design files, contract management tools that manage commercial information, email management tools for correspondence and mobile based tools for site quality data. Each solution may have multiple and different workflows ensuring that information is carefully planned, shared, stored, managed and retrieved and that it is timely, correct, complete and consistent.

There are various components of the CDE that this guidance will cover to provide context for the reader in understanding the language of the ISO 19650 series. These include:

- Information States (see [section 2.1](#))
- Classification of information containers using metadata assignment (see [section 4.0](#))
- Revision control using metadata assignment (see [section 5.0](#))
- Permitted use of information using metadata assignment (see [section 6.0](#)).

2.1 Information container states

As an information container develops, it exists in various states. Figure 2 (ISO 19650-1 Figure 10) illustrates these states as part of an information container workflow.

This figure is a simplification of the actual process and information containers can go through different workflows, potentially using multiple solutions, as noted elsewhere in this guidance.

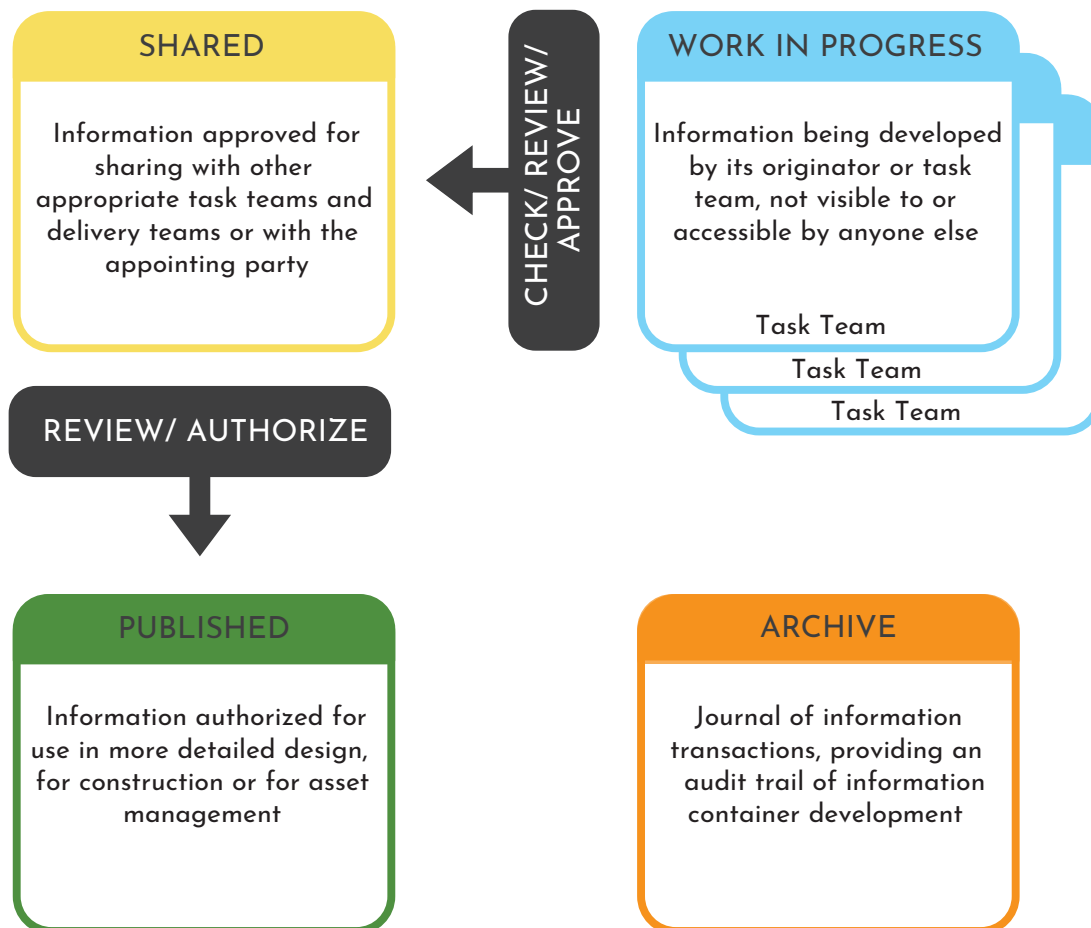


Figure 2: CDE concept as demonstrated in ISO 19650-1 Figure 10

Did you know...

...that equivalents to these information container states occur in most information production processes including emails although these are often invisible to the user. For example, if you start to write an email, this is like Work in Progress. Your email tool may also auto Archive your emails as you progress. Perhaps your email needs to be approved by your manager before you hit send on the final version due to its sensitivity - this is like Share. When you do send the email to its proper recipient, this is like Publishing it. All whilst yours and the recipient's email tools continuously Archive each step of the email trail.

It is possible to manage emails and other correspondence related to project delivery via the CDE, and consciously use the CDE workflow and information container states in Figure 2. The selection of the appropriate items to be managed in this way could be a project specific or a delivery team specific decision. It is suggested that correspondence (including email) with a contractual implication is always managed via the CDE.

2.2 Metadata

It is important to establish what is meant by metadata as the ISO 19650 series offers no formal definition. Metadata is defined as “A set of data that describes and gives information about other data” (Oxford Dictionary, 2019).

To put this into context, the information container unique ID (see ISO 19650-2 National Annex), can be thought of as metadata because it “describes and gives information about other data”. However, ISO 19650-2 requires additional metadata to be assigned but it should not be part of the unique ID.

The ISO 19650 series makes it clear that authors keep strict control of their information throughout its development. It is recommended that this is achieved by the author using metadata assignment. This communicates what version the information container is at and the purpose for which it can be used.

ISO 19650-1 clause 12.1 recommends the following metadata assignment to information containers within a CDE:

- A revision code
- A status code.

ISO 19650-2 clause 5.1.7 then requires that the CDE enables assignment of these codes plus the assignment of:

- A classification code.

The scope of the metadata assignment may expand beyond the recommendations and requirements of the ISO 19650 series, for example to include asset-focused information.

3.0 Information container management through metadata assignment

3.1 Metadata management through CDE Solutions

CDE solutions on the market today offer varying degrees of metadata assignment capability.

Figure 3 illustrates how a CDE solution, in this case a cloud based EDMS can have many different metadata assignments against the information container.

Note that this figure extends metadata beyond ISO 19650-2 requirements of status, revision and container classification metadata.

| Container Name | Description | Status | Revision | Author | Submittal Date | Container Classification |
|---------------------------|------------------|--------|----------|-----------|----------------|-------------------------------|
| 7001-BBH-ZZ-ZZ-DR-A-00301 | First Floor Plan | S3 | PO4 | Joe Blogs | 12/11/2017 | PM_40_30 : Design information |
| 7001-BBH-ZZ-ZZ-DR-A-00312 | West Elevation | A3 | CO6 | Joe Blogs | 12/11/2017 | PM_40_30 : Design information |

Figure 3: An example of a range of metadata that can be assigned in a cloud based CDE solution

3.2 Transition of metadata between CDE Solutions

The requirement for metadata creates the challenge of how the metadata can be transferred between CDE solutions. Appointing parties, lead appointed parties and appointed parties could all have their own CDE solutions that are part of the overall project CDE workflow and solutions. It is important that these CDE solutions work efficiently together while information is being developed and exchanged as part of the CDE workflow. These solutions however, may not interface with one another perfectly, making automated transfer of metadata impossible.

In the email analogy used in section 2.1 almost all email tool providers have adopted a standard exchange protocol (for example, POP) to allow emails to flow seamlessly no matter what tool/solution is used to send or receive them.

There is not currently, however, a standard exchange protocol adopted by our industry. This means that some thought has to go into how a single information container and its metadata can be transferred from one system to another. In reality, this is often a manual process which requires re-registration of metadata for each information container in

the receiving system.

Figure 4 illustrates how two different CDE solutions are required to work together as part of the project's CDE workflow. Each solution manages information containers differently.

CDE solution 1 (a distributed CDE) is managed by the lead appointed party for its delivery team. CDE solution 1 manages information containers as a single group regardless of type. It uses metadata assignments to enable the user to filter information containers accordingly. For example, a user can filter using the status code to provide a more focused view of all the stored information containers.

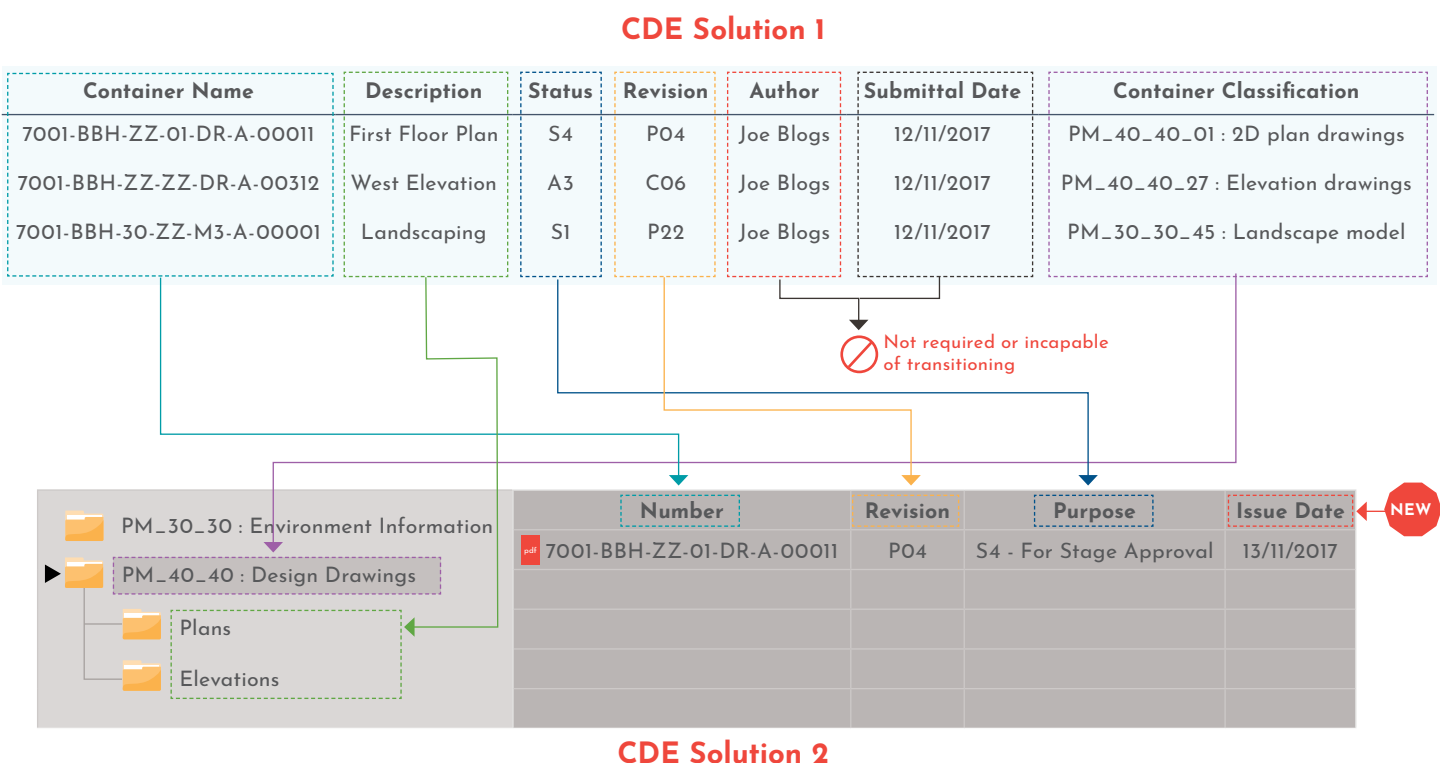


Figure 4: Illustration of two different CDE solutions where metadata assignment must transfer

CDE solution 2 is a project CDE managed by the appointing party and it manages information with a mix of folder structures and metadata assignments.

Before transferring an information container from CDE solution 1 to CDE solution 2 it is critical to agree how the metadata can be retained or accommodated during the transfer process.

For example, CDE solution 2 does not allow for a dedicated classification metadata field. As a result, the appointing party has accommodated the classification metadata field via a folder name (in this case to separate drawings according to the nature of each drawing). The arrangement in CDE solution 2 would need to reflect the use of the classification metadata in CDE solution 1. This kind of approach can result in most of the metadata being transferred manually (because it has to be typed or pre-selected at the time of exchange). Care should be taken that folder structures complement the metadata rather than duplicate it.

Although Figures 3 and 4 provide examples using drawings and models, metadata assignment is relevant to all information containers regardless of their type.

4.0 Classification through metadata assignment

4.1 Information container classification

ISO 19650-2 clause 5.1.7 requires that information containers be assigned classification metadata in accordance to ISO 12006-2. Uniclass 2015 is compliant with ISO 12006-2 and is the preferred classification system in the UK. It is referenced in the ISO 19650-2 National Annex. Uniclass 2015 contains multiple classification tables which can be used to classify different types of information containers.

The appointing party defines the classification method in the project's information standard (if they have a specific preference). This would indicate which of the Uniclass 2015 tables are used for classifying information containers. If the appointing party does not have a preference then the lead appointed party would define requirements. It is important to ensure no other metadata or element of the unique ID is duplicated through the classification.

4.2 Assigning metadata within CDE solutions

Assigning classification metadata to information containers within a CDE solution requires consideration of:

1. How to identify the information container and/or its contents
2. How to transfer information containers between whichever CDE solutions are being used.

Figure 4 illustrates how classification information can be transferred between two CDE solutions that approach the use of metadata differently.

A drawback of the CDE solution 2 approach, is the manual creation of (potentially) many folders. But if implemented correctly, it gives the benefit of a consistent assigned classification that allows each user to filter information containers consistently. For example, by "PM_40_40 Design drawings".

ISO 19650-2 does not provide further details about classification, but it is important that classification is used beneficially to indicate the contents of the information container not the type of information container (as this is dealt with by the Type field in the information container unique ID - see ISO 19650-2 National Annex clauses NA.2.2 and NA.3.6).

It is also important to be aware that:

1. Uniclass 2015 is a developing resource, which is subject to regular updates. The granularity of classification available may not be consistent for all information containers and may change over the lifetime of a project
2. Uniclass 2015 comprises a number of classification tables. The classification used should be appropriate to the information container it is being assigned to.

5.0 Revision control through metadata assignment

As information containers are developed it is important to keep track of the changes between previous and current revisions and versions. It is equally important to also keep track of which revision and version is shared with whom.

ISO 19650-1 recommends that the information container revision system should follow an agreed standard. ISO 19650-2 National Annex provides a system (refer to National Annex clause NA.4.3) as shown by Figure 5.

Revision metadata made up of three components

See ISO 19650-2 National Annex

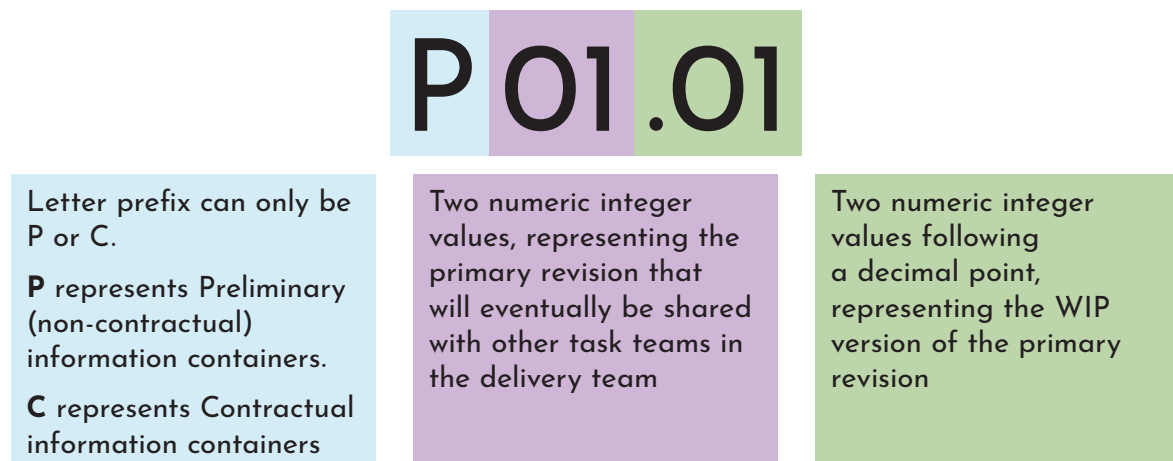


Figure 5: Explanation of the 19650-2 National Annex revision system

5.1 Revision control during Work in Progress (WIP)

Revision management for WIP information containers enables the author to manage their work and avoid losing information during its development. Figure 6 illustrates the benefits of revision management. The scenarios shown in Figure 6 demonstrate that when revision control is adopted during WIP, the author has clear oversight of how their information has evolved and can revert to an earlier version if required.

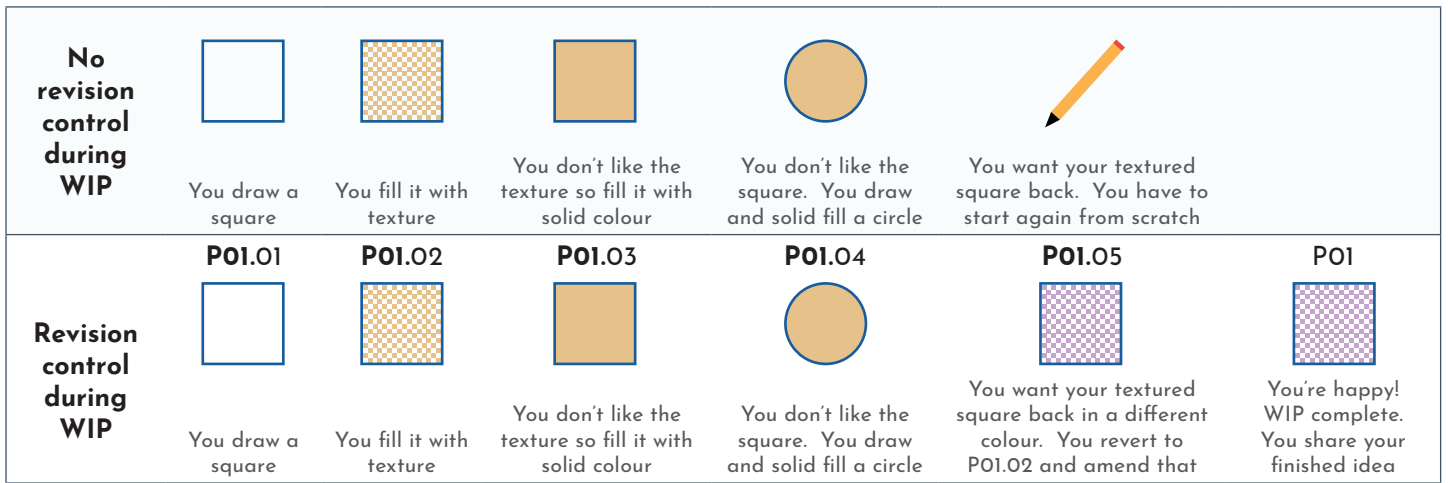


Figure 6: Illustration of the benefits of having a WIP version control using the 19650-2 National Annex approach

5.2 Revision control of Shared information

Figure 5 identifies the Shared state revisions as a two-digit integer (shown in the purple text box). This tracks the revision that is being shared outside of the author’s task team.

It is important that the revision system consistently accommodates this iterative approach of multiple WIP and Shared revisions for a single information container.

Figure 7 shows the process beyond the first pass of WIP and Shared information by illustrating a further two iterations of information development.

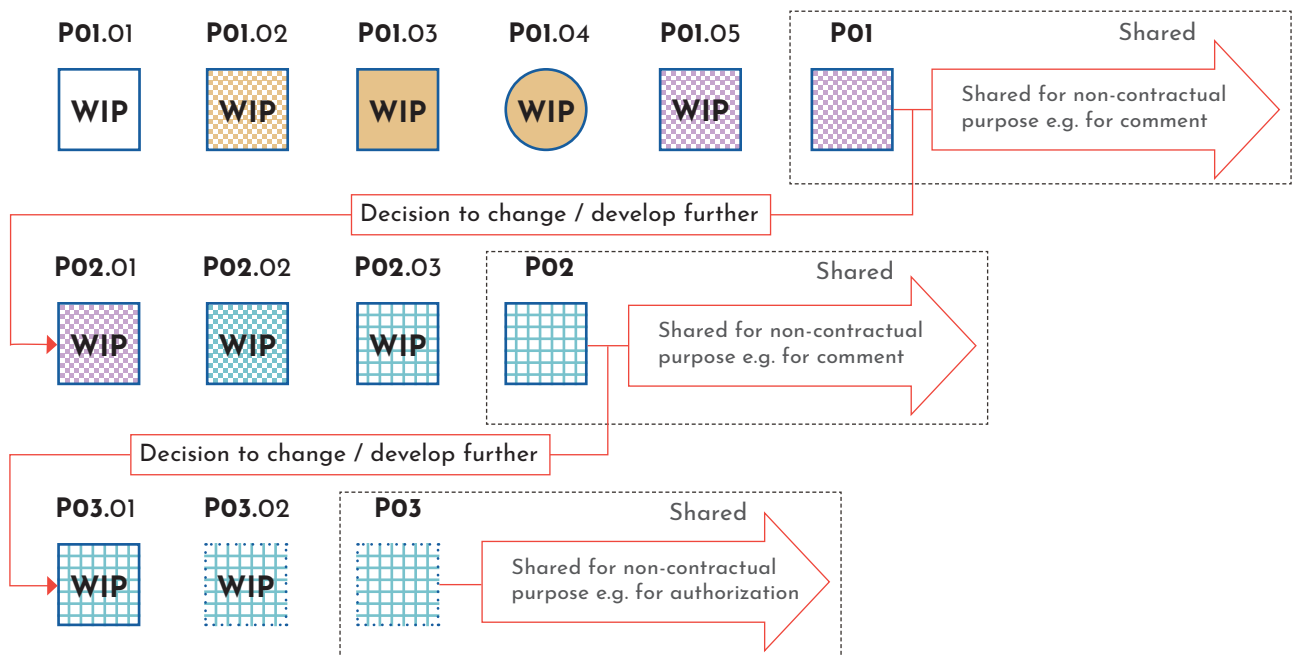


Figure 7: Demonstration of WIP and Shared revisions using ISO 19650-2 National Annex approach

5.3 Revision control of Published information containers

Published (contractual) information is information that has been authorized by the lead appointed party and then accepted by the appointing party. An information container is recognizable as Published through the C prefix in its revision code (see National Annex clause NA4.3 and this guidance Figure 8). This helps recipients of an information container to clearly distinguish between preliminary (P) and published (C) contents.

Note that some information container types may never reach the Published state. For example, structural geometrical models often used only for coordination purposes may remain preliminary. However, other information container types, including those generated from the structured geometrical models for example, 2D drawings and schedules may indeed be needed for appointment and contract purposes.

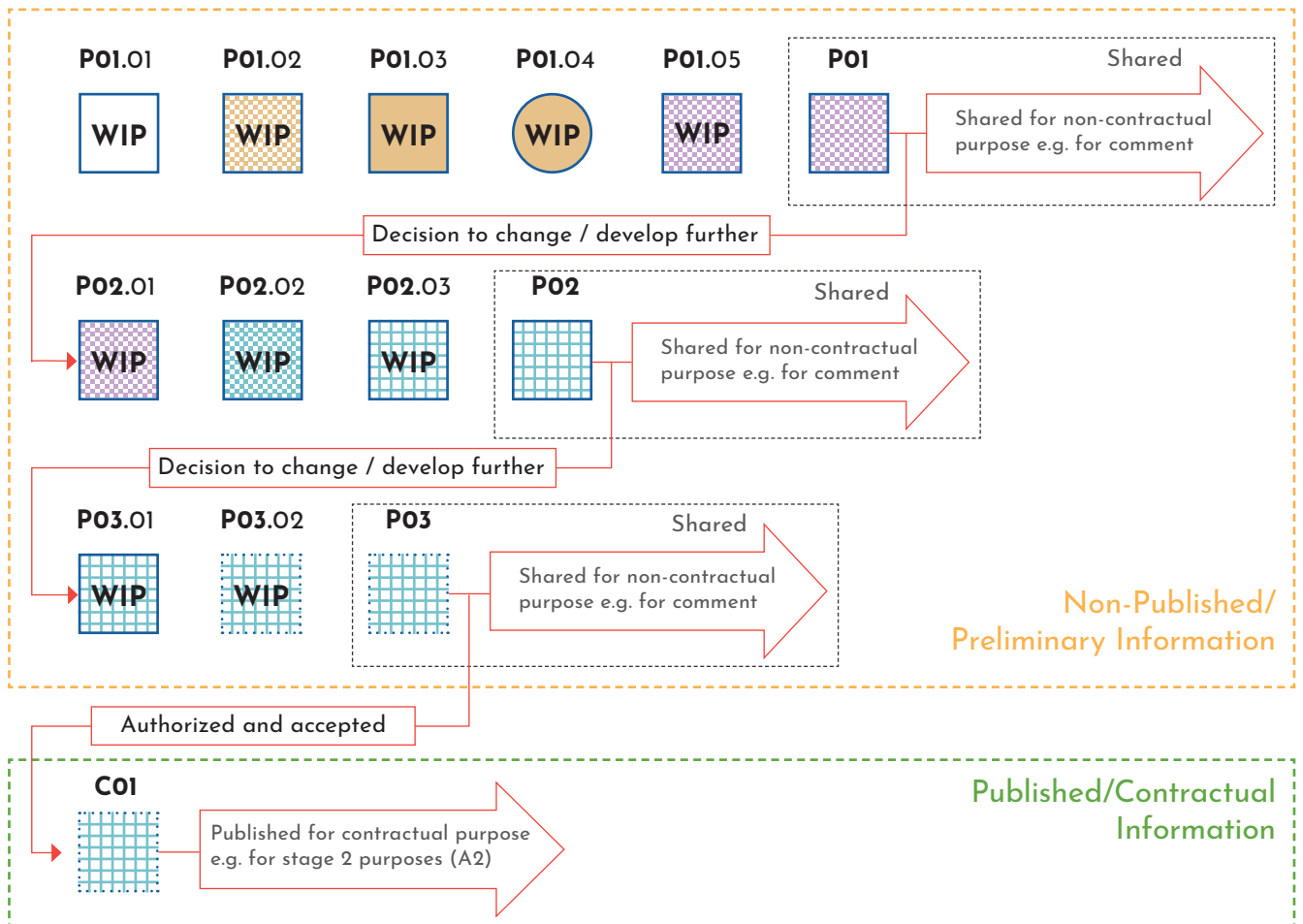


Figure 8: Illustration of how revision metadata distinguishes between different states

6.0 Status allocation through metadata assignment

6.1 Status codes

The ISO 19650 series identifies that an information container should be assigned a status code as metadata to show the permitted use of the information container (see ISO 19650-1 clause 12.1).

The reason for assigning a status code is to:

1. Make it clear to the recipient what the information container should be used for, and by extension, what it should not be used for.

Example 1: An information container with the status code S3 (refer to Figure 9) informs recipients that it is only suitable for review and comment.

Example 2: An information container with the status An (where the “n” represents a project stage) informs the recipient that it has been authorized and accepted to be used for whatever stage of the project the “n” represents. If “n” represents Stage 2 (Concept) thus making the status code A2, this indicates to others that the information container is part of the accepted concept design. This would become part of the reference information for stage 3 WIP.

2. Make it clear where in the CDE workflow the information resides.

For example, information containers with S1 or S2 metadata are in the Shared state, whereas information containers with A4, A5 or A6 metadata are in the Published state. This avoids the need to create physical segregations within the CDE solution using folders or other types of dedicated areas that can fragment the CDE workflow.

It is important to understand that a status code is different from a purpose of issue, although there are some fixed relationships between the two. For example, information issued for construction should have a Published status code.

6.2 UK defined standard status codes

The ISO 19650-2 National Annex provides standardized status codes for metadata assignment. Each code in Table 2 has a corresponding description to inform others. There is also a revision guideline for authors when allocating status codes. For example, an information container that is currently being reviewed (status code S3) should not be used for contractual purposes such as procuring materials, agreeing contract costs or constructing the works.

Within the status codes for the Shared information state, codes S1, S2 and S3 are typically used during the iterative development of information. These are the codes likely to be used during a work stage. Codes S4, S6 and S7 are typically used towards or at the end of a work stage or when a formal information exchange with the appointing party (client) is being submitted.

See also Table 4 in [section 6.4](#) for more detail on the use of different status codes from the National Annex.

Table 2: ISO 19650-2 Table NA.1 - Status codes for information containers within a CDE

| Code | Description | Revision |
|---------------------------------------|----------------------------------|----------------------------------|
| Work in progress (WIP) | | |
| S0 | Initial status | Preliminary revision and version |
| Shared (non-contractual) | | |
| S1 | Suitable for coordination | Preliminary revision |
| S2 | Suitable for information | Preliminary revision |
| S3 | Suitable for review and comment | Preliminary revision |
| S4 | Suitable for stage approval | Preliminary revision |
| S5 | Withdrawn* | N/A |
| S6 | Suitable for PIM authorization | Preliminary revision |
| S7 | Suitable for AIM authorization | Preliminary revision |
| Published (contractual) | | |
| A1, An, etc. | Authorized and accepted | Contractual revision |
| B1, Bn, etc. | Partial sign-off (with comments) | Preliminary revision |
| Published (for AIM acceptance) | | |
| CR | As constructed record document | Contractual revision |

* Status code S5 is no longer used and has been withdrawn

6.3 Status codes driving CDE workflow

Figure 9 and Table 3 illustrate how status codes drive information container development and exchange as part of the CDE workflow in line with clause 5.6 and 5.7 of ISO 19650-2. This particular illustration relates to Stage 3 in the RIBA plan of work, and shows:

- How the ISO 19650-2 clauses apply iteratively for each information container in reality
- How information containers can cycle through the WIP and Shared states several times before they become Published
- How the status code tells the recipient what action is required
- How this task team, appointed at Stage 3, create their information in a geometrical model, which is coordinated with other geometrical models and/or their renditions (a rendition provides the underlying information in a particular form, in this case geometrical model content as a section, elevation or plan)
- How the coordinated information is then exported from its native format as a drawing ready for comment
- How, after comments are received, the native information must be updated as WIP before the drawing is reissued
- How the authorization and acceptance of the reissued drawing must occur before it becomes Published information
- For simplicity, Figure 9 indicates the progression of a drawing from its native geometrical model to authorization and acceptance. In reality, all of the information containers needed to satisfy the information exchange, as defined in the information exchange requirements, would move through a similar process (one such information container would be the geometrical model that has generated the drawing referred to).

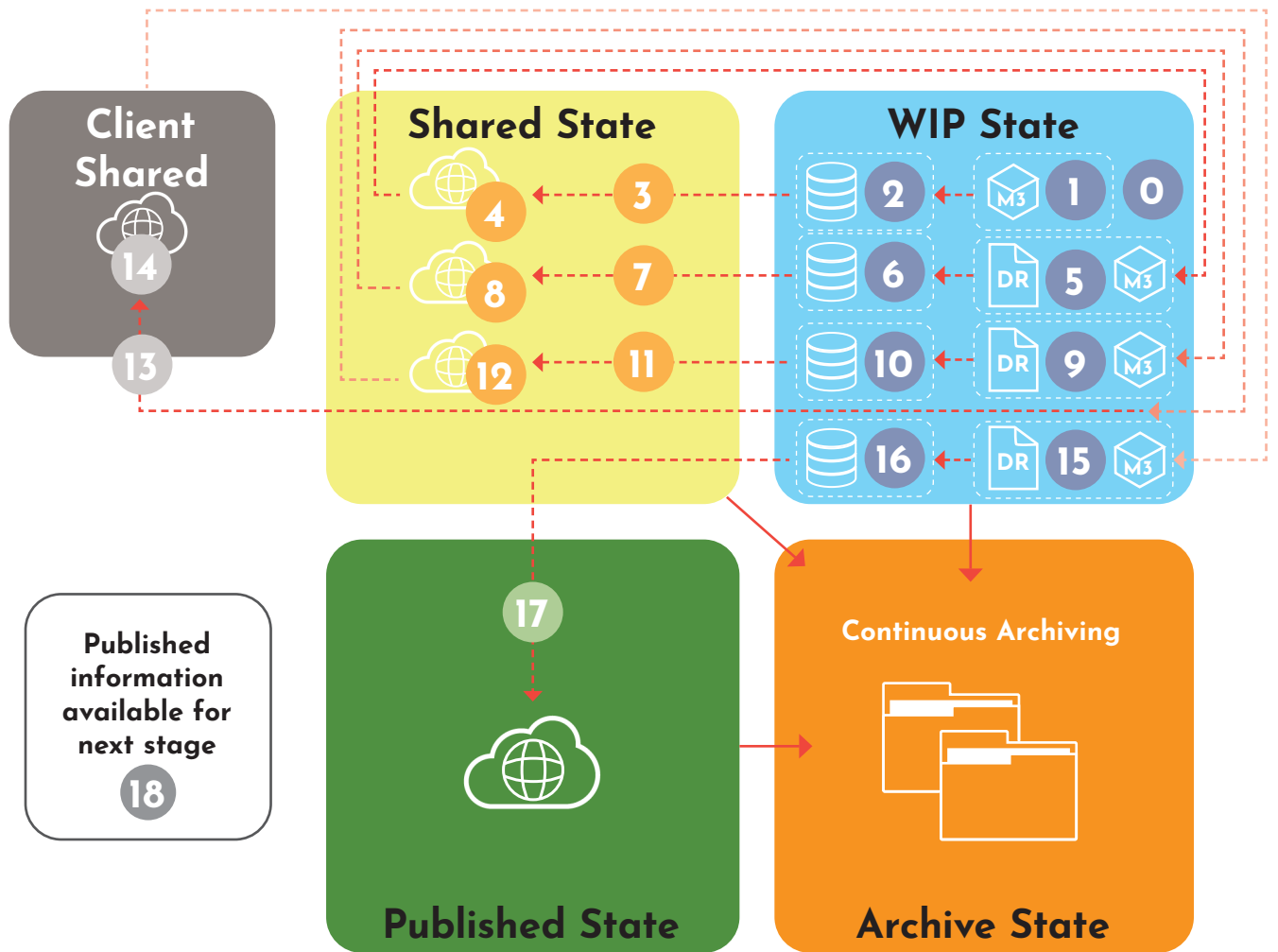


Figure 9: Illustration of an information container transitioning between states

Table 3: Example of the iterative development of an information container

| Step | Details | State | Revision | Status | ISO clause |
|--|---|--------|----------|--------|------------|
| 0 | Collate and review all necessary information ready for start of Stage 3. | WIP | - | - | 5.6.1 |
| 1 | Information production commences, using other referenced sources for coordination purposes. | WIP | - | - | 5.6.2 |
| 2 | Several WIP iterations of a geometrical model by the author which are saved to a local CDE solution and assigned a metadata status SO. The geometrical model undergoes a quality assurance check within the task team to review the container (not its contents) against the project information standard. | WIP | P01.05 | SO | 5.6.3 |
| 3 | The contents of the geometrical model go through a final review within the task team. The geometrical model in its native or in an open format is assigned an S1 status, suitable for coordination only, and released for sharing. The task team has decided not to export documents/drawings from the geometrical model until the coordination review is complete. | Shared | P01 | S1 | 5.6.4 |
| 4 | The geometrical model is shared via the CDE solution managed by the lead appointed party. The delivery team review the model alongside other information containers to "facilitate the continuous coordination of the information across each element of the information model". | Shared | P01 | S1 | 5.6.5 |
| 5 | Following the review, the authoring task team updates the geometrical model in the WIP state, based on feedback from the delivery team following their coordination review. The geometrical model is also refined and developed to allow a general arrangement drawing sheet to be exported. | WIP | P02.01 | SO | 5.6.2 |
| <p>Drawing exported from geometrical design model. The revision and status columns now track the metadata of the drawing not the geometrical model. The geometrical model will, however, continue to be updated as part of the WIP steps below.</p> | | | | | |
| 6 | The drawing is assigned a metadata status SO and saved to a local CDE solution with a metadata revision P01.01 until such time as it passes its quality assurance checks within the task team. | WIP | P01.01 | SO | 5.6.3 |
| 7 | The contents of the drawing go through a final completeness and coherency review by the manager of the task team. The drawing is assigned status S3, suitable for review and comment. As this drawing is not being issued for coordination purposes but for comment, the drawing is shared directly with the lead appointed party. | Shared | P01 | S3 | 5.6.4 |
| 8 | The drawing, along with any other supporting information, is reviewed by the lead appointed party to ensure it is compliant with project requirements. The lead appointed party comments and instructs the task team to update and reissue for authorization. | Shared | P01 | S3 | 5.6.5 |
| 9 | Following the review, the authoring task team update the geometrical model in the WIP state based on the drawing comments from the lead appointed party. The drawing is re-exported. | WIP | P02.01 | SO | 5.6.2 |
| 10 | The drawing is assigned a metadata status SO and saved to a local CDE solution with a metadata revision P02.01 until it passes its quality assurance checks within the task team. | WIP | P02.01 | SO | 5.6.3 |

Table continues over page

| Step | Details | State | Revision | Status | ISO clause |
|------|---|---------------|----------|--------|----------------|
| 11 | The contents of the drawing go through a final completeness and coherency review by the manager of the task team. The drawing is assigned an S6 status, suitable for Information model authorization (PIM in relation to capital stage, refer to ISO definition). The drawing is shared directly with the lead appointed party | Shared | PO2 | S6 | 5.6.4 5.7.1 |
| 12 | The lead appointed party reviews the drawing along with any other information issued as part of the information model against the appointment requirements. The lead appointed party is satisfied and authorizes the task team to issue to the appointing party for acceptance. To save time, the lead appointed party may seek permission from the task team to issue directly to the appointing party on their behalf. This can be done so long as the permission is given and the CDE records and manages the process. This may remove the need for step 13 and would also remove the need for the S4 status in 14 | Shared | PO2 | S6 | 5.7.2 |
| 13 | Following authorization, the drawing requires no physical update so no WIP effort is required. The drawing is re-issued with status S4, noting the drawing meets the stage requirements and the task team requests that it be accepted by the appointing party. If the physical drawing came with the status metadata physically printed on the drawing, then a WIP effort would be required to amend the drawing contents to make this update. | Client Shared | PO2 | S4 | 5.7.3 |
| 14 | The appointing party reviews the drawing along with any other information issued as part of the information model against the appointment requirement. The appointing party is satisfied and accepts that the information meets stage requirements. The task team is permitted to publish the information container. | Client Shared | PO2 | S4 | 5.7.4 |
| 15 | Following appointing party acceptance, the authoring task team update the geometrical model in the WIP state to change the preliminary revision to a contractual revision. The drawing is re-exported and contains a physical contractual revision so the CDE solution used by the task team will record the drawing as PO3.01. | WIP | PO3.01 | S0 | 5.6.2 |
| 16 | The drawing is assigned a metadata status S0 and saved to a local CDE solution with a metadata revision PO3.01 until it passes its quality assurance checks within the task team to confirm that the contractual revision has been made correctly. | WIP | PO3.01 | S0 | 5.6.3 |
| 17 | The contents of the drawing go through a final completeness and coherency review by the manager of the task team. The drawing is then approved and the revision updated to reflect a contractual revision. The drawing is assigned status A3 denoting that it has been authorized and accepted as suitable for stage 3 purposes and published onto the CDE for the project team to use. The appointing party will keep a record of this along with all other information that forms the completed stage 3 project information model. | Published | CO1 | A3 | 5.7.4 |
| 18 | Published information from stage 3 is now available to be used during stage 4. This might be as reference information, if a new information container is being produced based on content in the published information. Or it might be developed further itself, in which case the same container goes back to WIP state with the next sequential preliminary revision code and a status of S0. | | | | |

Although this process appears lengthy, it illustrates the application of the ISO clauses through iterative information container development.

In reality, efficiencies can be found to streamline the process through intelligent use of the workflows that some CDE solutions provide.

6.4 Examples of status codes

Table 4 provides insight into when some of the status codes may be used in certain situations. These codes are referenced in the National Annex (ISO 19650-2 Table NA.1). As stated in ISO 19650-2 clause NA.4.2

Note 2, the codes can be expanded (or by the same principle, excluded) to suit specific project requirements providing the required codes are documented in the project's information standard and agreed.

Table 4: Application of status codes

| | |
|---------|--|
| S0 | Assigned by task teams to identify information containers as Work in Progress and not yet suitable to be Shared outside the task team. |
| S1 | Assigned by task teams to limit the information container's use to coordination activities only by its recipients. Information containers assigned this status should only be used to understand or advance their own deliverables in a coordinated manner. It is likely to be assigned to a geometrical information container but it is important to understand that S1 can be assigned to any information container. |
| S2 | Assigned by task teams to limit the information container's use for any specific activity by its recipients. This status denotes that the author is providing it for information only to help others in certain situations. For example, reference information provided by the appointing party such as a dilapidations report would be given this status code. Another example would be an email file containing site photos. |
| S3 | Assigned by task teams to limit the information container's use to commenting and review activities only by its recipients. Information containers assigned this status should only be used to review their contents against the information requirements or to provide feedback on their development. For example, an outline proposal to solve a technical design problem during Concept stage. |
| S4 | Assigned by task teams to limit the information container's use to stage approval activities only by its recipients. The outcome of the review following this status should be the acceptance of the information container that it meets stage requirements. |
| S5 | This status code is not used in the National Annex |
| S6 | Assigned by task teams to limit the information container's use to the lead appointed party's authorization of the project information model (see ISO 19650-2 clauses 5.7.1 and 5.7.2). The information should not be used for contractual purposes, for example, construction until the project information model that it forms part of has been authorized by the lead appointed party and accepted by the appointing party. If the project information model is rejected but the information container itself does not require amendment its status will remain at S6 until the project information model is authorized. If the project information model is rejected and the information container requires amendment then it is assigned the S0 status until it can be shared again. Note that a project information model could be a single information container or it could be multiple information containers depending on the exchange information requirements. |
| S7 | Assigned by task teams to limit the information container's use to authorization activities for Stage 6 (Handover) only by its recipients. The outcome of this status should be the authorization of the information model that it meets the requirements for handover to facilities and asset management teams. |
| A0 - An | Assigned by task teams to represent the Stage the authorized and accepted information container relates to in accordance with the task information delivery plan. For example A1 would represent an authorized and accepted information container generated in Stage 1, A2 would represent Stage 2 and so on |
| CR | Assigned by task teams to represent an information container that has been authorized and accepted and was previously assigned an S7 status. |

7.0 Checklist of actions/key points to consider

ISO 19650-2 clause references are shown in brackets.

- ✓ Has any project-specific expansion of the standard status codes and revision system been defined in the project's information standard by the appointing party (5.1.4) and has that been reviewed or amended (and agreed with the appointing party) to suit delivery requirements by each lead appointed party (5.3.2, 5.4.1)?
- ✓ Has a classification system been defined in the project's information standard by the appointing party (5.1.4) and has that been reviewed or amended (and agreed with the appointing party) to suit delivery requirements by the lead appointed party (5.3.2, 5.4.1)?
- ✓ Has an information container ID codification standard been defined in the project information standard by the appointing party (5.1.4) and has that been reviewed or amended (and agreed with the appointing party) to suit delivery requirements by the lead appointed party (5.3.2, 5.4.1)?
- ✓ Does the codification standard define how model renditions/exports are to be given different container names? For example, IFC step files should be named differently from their native source geometrical models and PDF files should be named differently from their native 2D drawing equivalents (so that no two containers have the same ID). Note that each time the native information container is updated, associated exports should also be updated (as far as they are impacted by the update of the native information container). This requires the author of the information container to pay careful attention to
 - a) exporting associated updates and
 - b) ensuring there is an audit trail of updates to the native information container and its exported information containers.
- ✓ Have all the potential CDE solutions been reviewed to ensure they support the agreed metadata assignment (5.1.5, 5.5.2)?
- ✓ Have security considerations been considered when selecting the potential CDE solution(s) to ensure that access permissions can be set at an individual and organizational level (5.1.5, 5.3.2, 5.5.2)?
- ✓ If multiple CDE solutions are being used to implement the CDE workflow, some of which maybe owned or managed by different organizations, has the CDE workflow been reviewed to ensure information containers pass seamlessly through each CDE solution (5.5.2)?
 - ✓ Have the CDE solutions been tested to ensure metadata assignments can be transferred between them?
 - ✓ Has it been agreed how information containers will be transferred between solutions manually or automatically?
- ✓ Has a clear CDE workflow been implemented and documented for how each type of information container will be developed> checked> shared> authorized> accepted> published> archived? (associated with Clause 5.5.2)

- ✓ Has the project got a clear documented set of standard methods and procedures for how metadata assignments defined in the information standard shall will be assigned to the information containers (Clause 5.5.3)?
- ✓ Has it been confirmed which tables/ sets of the classification system shall be applied to which types of information/ information container?
- ✓ Has it been confirmed what each status code means and its constraints for use?
- ✓ Has it been confirmed how new project specific codes will be generated, agreed and documented?
- ✓ Has it been made clear how each metadata assignment is made in (each of) the CDE solution(s)

8.0 Summary

ISO 19650 guidance C has provided further insight into facilitation of the common data environment.

It should be referred to by practitioners and those implementing the ISO 19650 series across a project, within an appointment or within an organization.

Please note that the ISO 19650 series is still new, albeit based on former UK standards. As experience of implementing the ISO 19650 series is gained over the coming months and years, this guidance will be updated to reflect both this experience and any comments/ feedback received from users.

Please do let us have your feedback by emailing us at guidancefeedback@ukbimframework.org .

Please also remember that standards within the ISO 19650 series are available at www.bsigroup.com.

Visit www.ukbimframework.org to see how the ISO 19650 standards plus other standards within the UK BIM Framework map to the design, build, operate and integrate process.

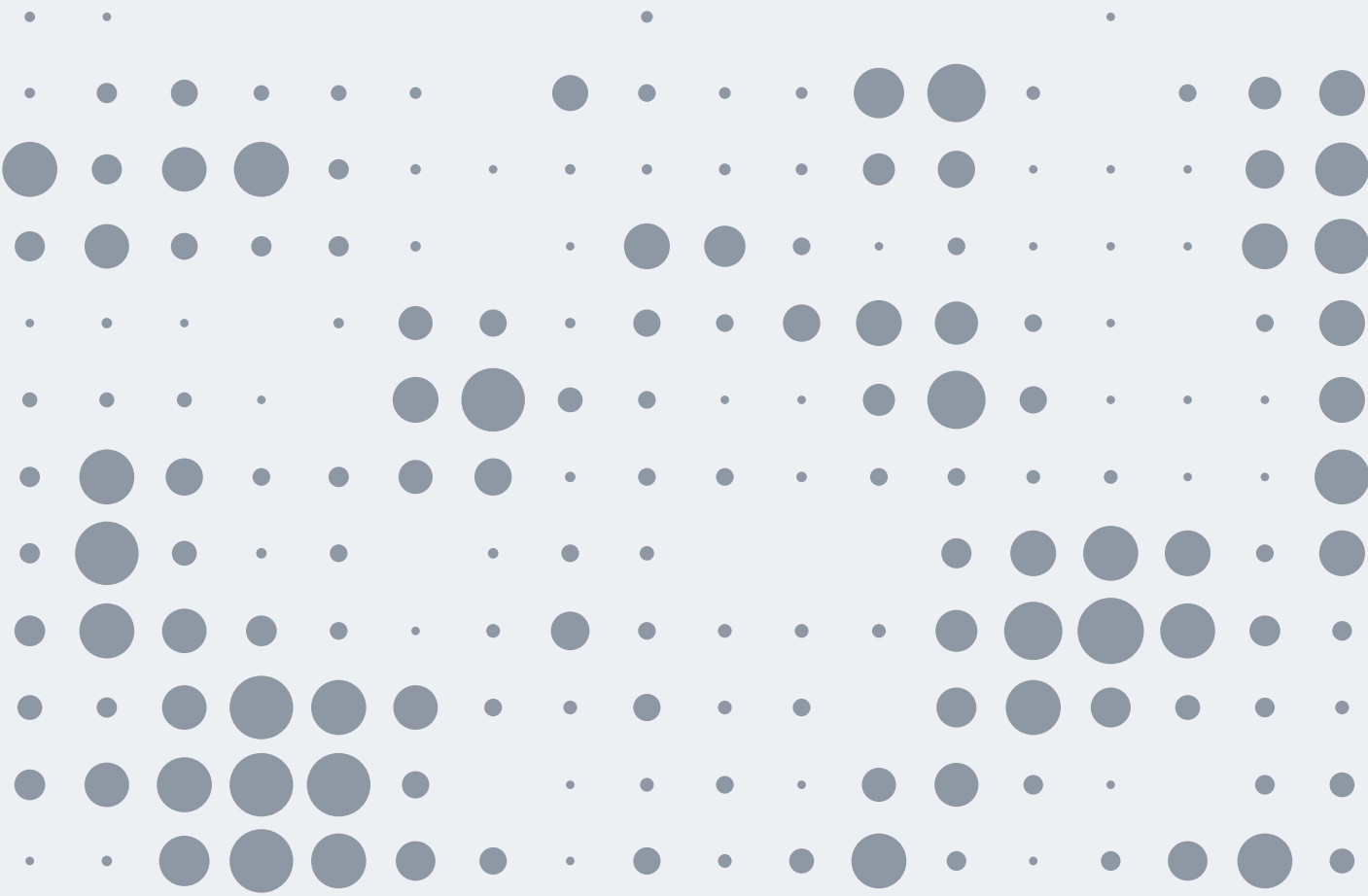
Engage with the UK BIM Framework

✉ info@ukbimframework.org

🐦 @UKBIMFramework

🌐 <https://ukbimframework.org/>

in UKBIMFramework



UK BIM FRAMEWORK

bsi.

cdbb
Centre for Digital Built Britain

UKBIM
ALLIANCE
Enabling Digital Transformation

The Centre for Digital Built Britain is part of the Construction Innovation Hub programme, funded by UK Research and Innovation through the Industrial Strategy Challenge Fund.

