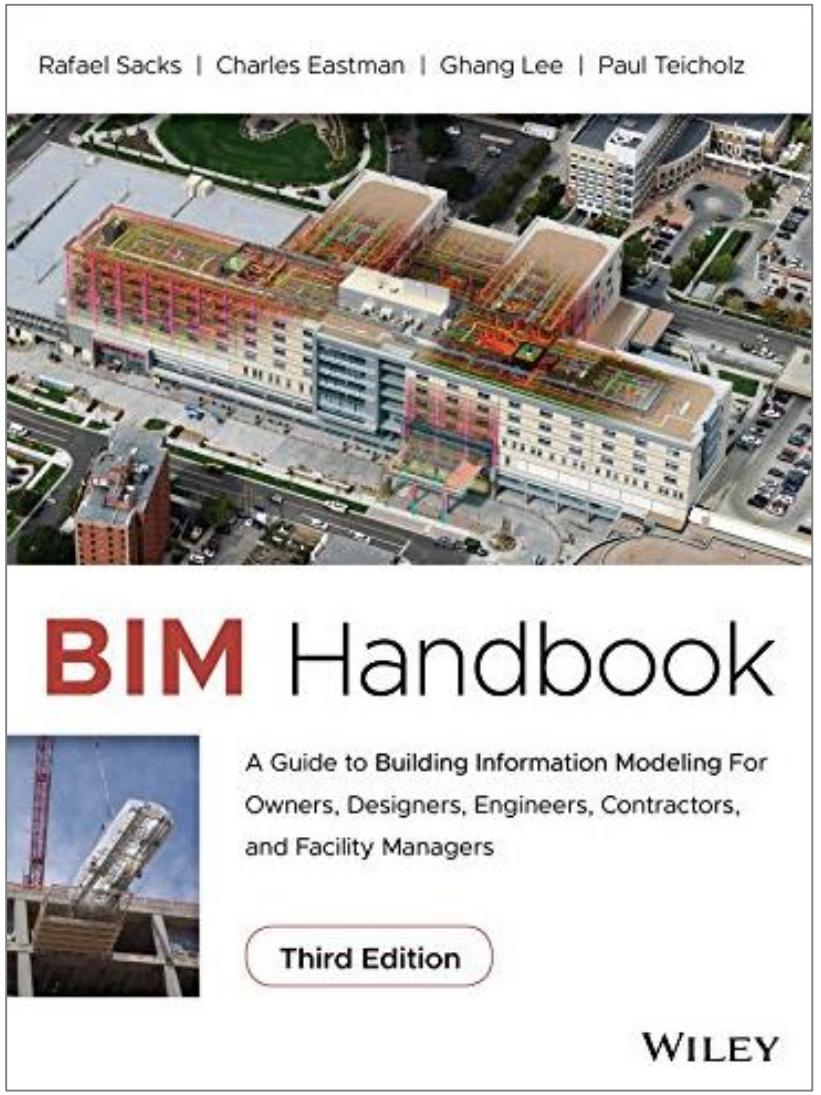
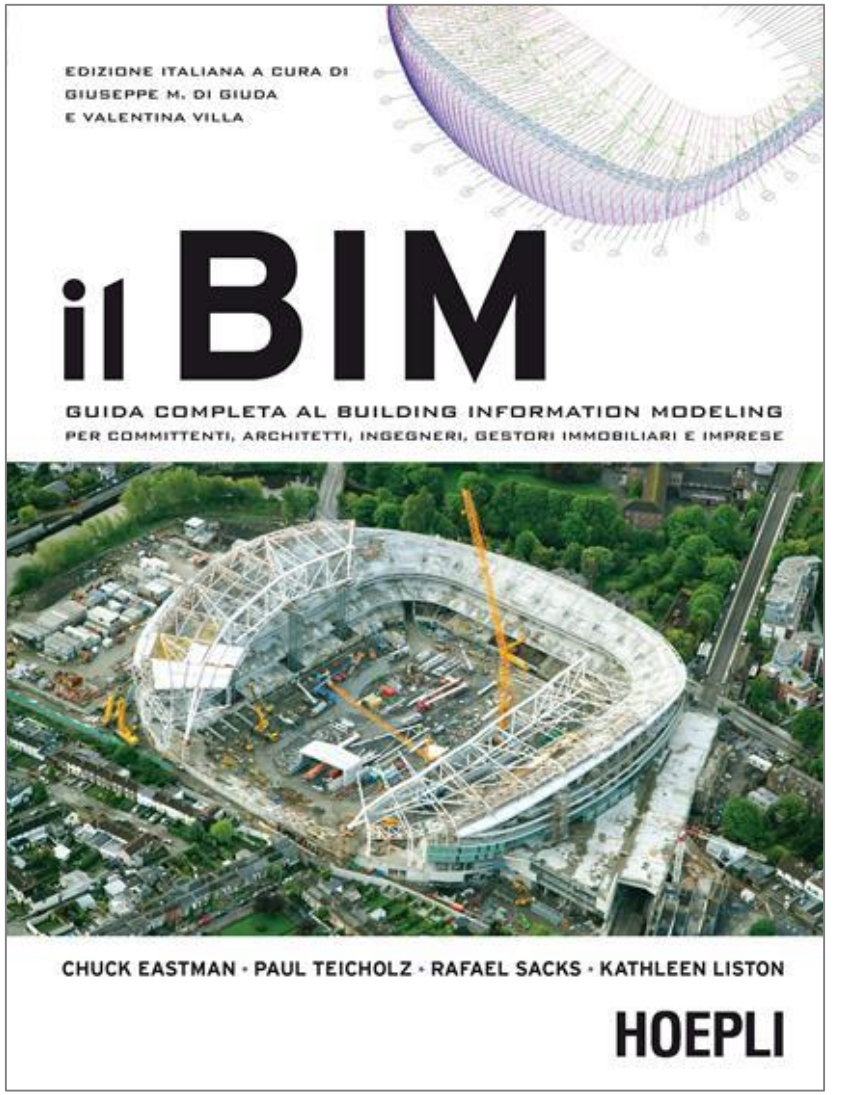
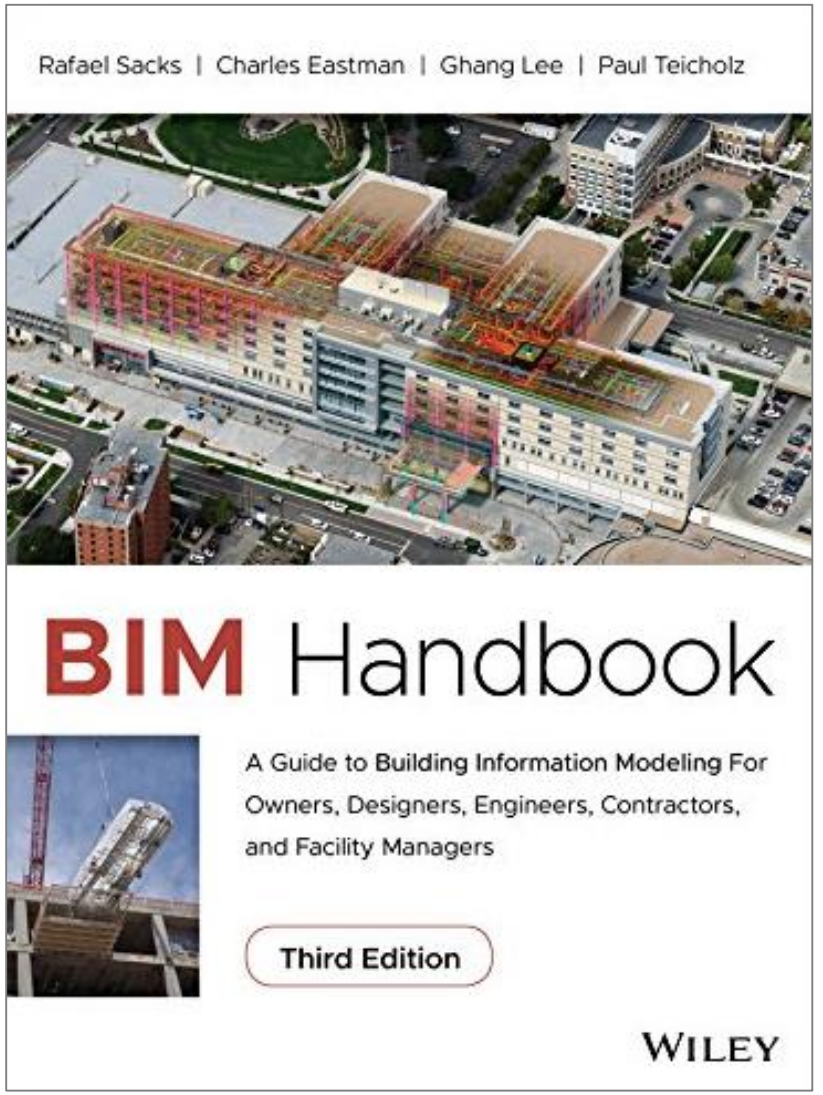
UNIVERSITÀ DI PARMA
DIPARTIMENTO DI INGEGNERIA E ARCHITETTURA
CORSO DI LAUREA IN ARCHITETTURA E CITTA' SOSTENIBILI

BUILDING INFORMATION MODELING:
DIGITAL MODELING OF ARCHITECTURE
DIGITAL VISUALIZATION OF PROJECT

A.A. 2022-2023, Prof. Sandra Mikolajewska
07/03/2023


Rafael Sacks | Charles Eastman | Ghang Lee | Paul Teicholz
BIM Handbook
A Guide to Building Information Modeling For Owners, Designers, Engineers, Contractors, and Facility Managers
Third Edition
WILEY


EDIZIONE ITALIANA A CURA DI
GIUSEPPE M. DI GIUDA
E VALENTINA VILLA
il BIM
GUIDA COMPLETA AL BUILDING INFORMATION MODELING
PER COMMITTENTI, ARCHITETTI, INGEGNERI, GESTORI IMMOBILIARI E IMPRESE
CHUCK EASTMAN · PAUL TEICHOLZ · RAFAEL SACKS · KATHLEEN LISTON
HOEPLI



CHAPTER 1. INTRODUCTION.
CHAPTER 2. CORE TECHNOLOGIES AND SOFTWARE.
CHAPTER 3. COLLABORATION AND INTEROPERABILITY.
CHAPTER 4. BIM FOR OWNERS AND FACILITY MANAGERS.
CHAPTER 5. BIM FOR ARCHITECTS AND ENGINEERS.
CHAPTER 6. BIM FOR CONTRACTORS.
CHAPTER 7. BIM FOR SUBCONTRACTORS AND FABRICATORS.
CHAPTER 8. FACILITATORS OF BIM ADOPTION AND IMPLEMENTATION.
CHAPTER 9. THE FUTURE: BUILDING WITH BIM.
CHAPTER 10. BIM CASE STUDIES.

THE ACRONYM, **BIM**, HAS UNDERGONE AN INTENSE PROCESS OF EVOLUTION, CHANGING ITS MEANING OVER TIME.

IN 1974, **CHARLES EASTMAN** (1940-2020) PUBLISHED A PAPER ”AN OUTLINE OF THE BUILDING DESCRIPTION SYSTEM” DESCRIBING A PROTOTYPE CALLED BUILDING DESCRIPTION SYSTEM (BDS). IT DISCUSSED IDEAS OF PARAMETRIC DESIGN, HIGH QUALITY COMPUTABLE 3D REPRESENTATIONS, WITH A “**SINGLE INTEGRATED DATABASE FOR VISUAL AND QUANTITATIVE ANALYSES**”. EASTMAN’S PAPER BASICALLY DESCRIBED BIM AS WE KNOW IT NOW.

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IN THAT PAPER EASTMAN REFERS TO BIM AS AN **ACTIVITY** OF BUILDING INFORMATION MANAGEMENT (**A PROCESS**) RATHER THAN A 3D MODEL.

IT WAS A REVOLUTIONARY WAY OF THINKING ABOUT THE BUILDING: THE BUILDING WAS NO LONGER DESCRIBED BY SEPARATE DRAWINGS (PLANS, SECTIONS, ELEVATIONS), BUT BY **ELEMENTS WITH SPECIFIC CHARACTERISTICS**.

TODAY BIM IS A PROCESS THAT “MERGES” WITH THE BUILDING CONSTRUCTION PROCESS IN WHICH NUMEROUS ACTORS COLLABORATE. THIS PROCESS INVOLVES ALL PHASES OF THE BUILDING’S LIFE.

THERE IS NO UNIQUE DEFINITION OF BIM:

BUILDING INFORMATION MODELING (BIM) IS ONE OF THE MOST PROMISING DEVELOPMENTS IN THE ARCHITECTURE, ENGINEERING AND CONSTRUCTION (AEC) INDUSTRIES. WITH BIM TECHNOLOGY, ***AN ACCURATE VIRTUAL MODEL*** *OF A BUILDING IS CONSTRUCTED DIGITALLY. WHEN COMPLETED,* ***THE COMPUTER-GENERATED MODEL CONTAINS PRECISE GEOMETRY AND RELEVANT DATA NEEDED TO SUPPORT THE CONSTRUCTION, FABRICATION, AND PROCUREMENT ACTIVITIES NEEDED TO REALIZE THE BUILDING****. BIM ALSO ACCOMMODATES MANY OF THE FUNCTIONS NEEDED TO MODEL THE* ***LIFECYCLE*** *OF A BUILDING, PROVIDING THE BASIS FOR NEW CONSTRUCTION CAPABILITIES AND CHANGES IN THE ROLES AND RELATIONSHIPS AMONG A PROJECT TEAM. WHEN IMPLEMENTED APPROPRIATELY, BIM FACILITATES A MORE INTEGRATED DESIGN AND CONSTRUCTION PROCESS THAT RESULTS IN BETTER QUALITY BUILDINGS AT LOWER COST AND REDUCED PROJECT DURATION*. [EASTMAN ET AL., 2008, P. 1].

BIM OR BUILDING INFORMATION MODELLING IS A ***PROCESS*** *FOR CREATING AND MANAGING INFORMATION ON A CONSTRUCTION PROJECT ACROSS THE PROJECT LIFECYCLE. […] BIM IS A* ***WAY OF WORKING****. BIM IS INFORMATION MODELLING AND INFORMATION MANAGEMENT IN A TEAM ENVIRONMENT, ALL TEAM MEMBERS SHOULD BE WORKING TO THE SAME STANDARDS AS ONE ANOTHER. BIM CREATES VALUE FROM THE COMBINED EFFORTS OF PEOPLE, PROCESS AND TECHNOLOGY*. [NBS, NATIONAL BUILDING SPECIFICATION FOR THE UK].

SHARED DIGITAL REPRESENTATION *OF PHYSICAL AND FUNCTIONAL CHARACTERISTICS OF ANY BUILT OBJECT […] WHICH FORMS A RELIABLE BASIS FOR DECISIONS*. [ISO STANDARD, ISO 29481-1:2010(E)].

BIM ACRONYM **CANNOT** BE CONSIDERED AS:

- A SIMPLE *3D MODEL* OF A BUILDING/INFRASTRUCTURE;

- A *SOFTWARE* WE USE TO MANAGE THE MODEL;

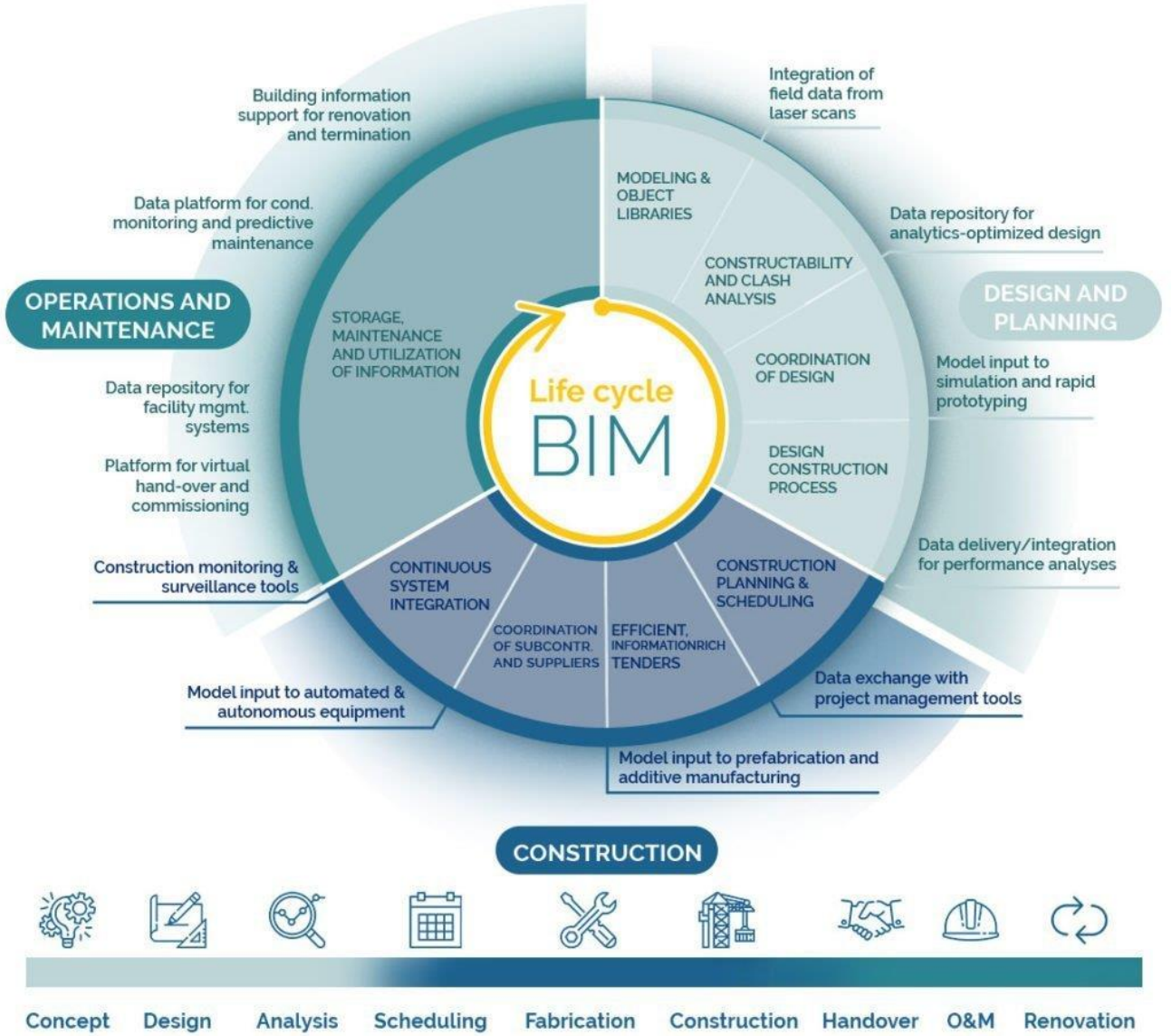
- A SIMPLE *DATABASE* THAT COLLECTS INFORMATION ABOUT A BUILDING;

- A SIMPLE PROJECT MANAGEMENT *OPERATING SYSTEM*;

-A SIMPLE *VIRTUAL REPRESENTATION* OF A BUILDING;

- …

BIM IS DEFINITELY MUCH MORE…



LIFE CYCLE BIM:

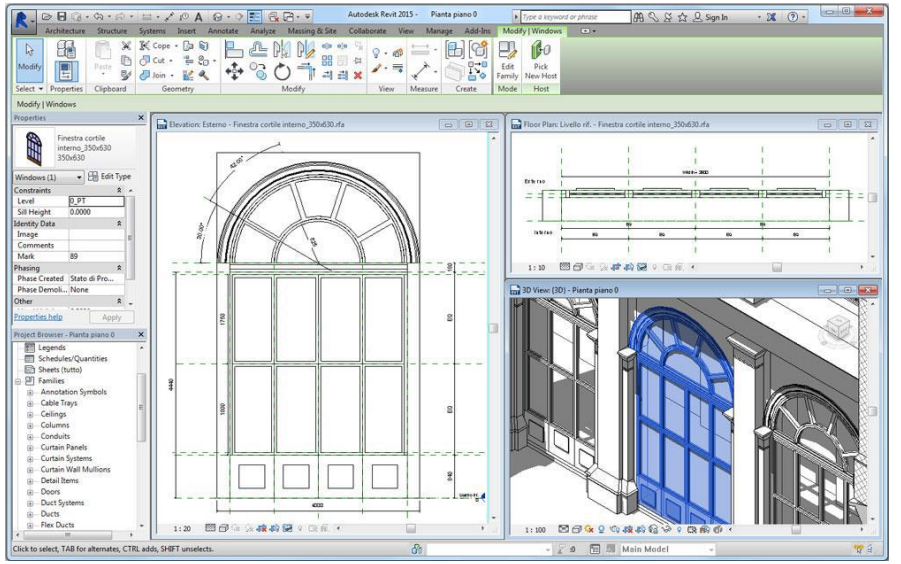
- DESING AND PLANNING
- CONSTRUCTION
- MAINTENANCE

THE LIFE CYCLE ENDS ONLY AFTER THE BUILDING IS DEMOLISHED.

THE 3D MODEL CREATED WITH BIM METHODOLOGY IS GENERALLY COMPOSED BY PARAMETRIC OBJECTS [BIM HANDBOOK, 2018, P. 17].

PARAMETRIC BIM OBJECTS ARE DEFINED AS FOLLOWS:

- CONSIST OF **GEOMETRIC DEFINITIONS AND ASSOCIATED DATA AND RULES**;



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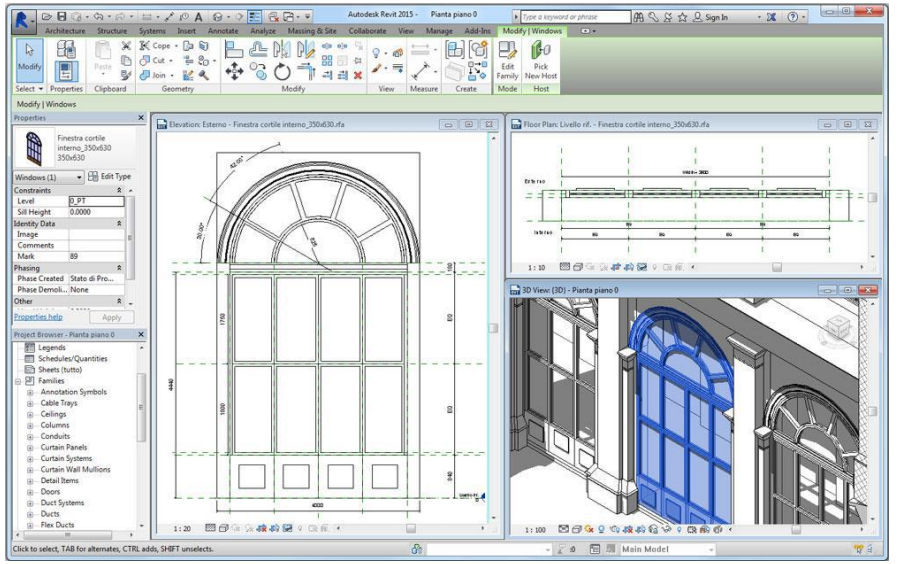

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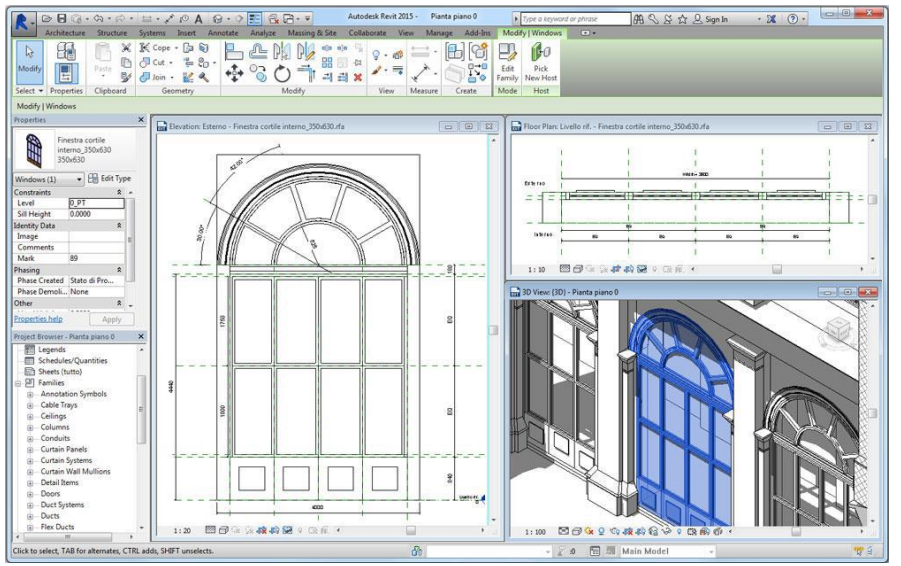

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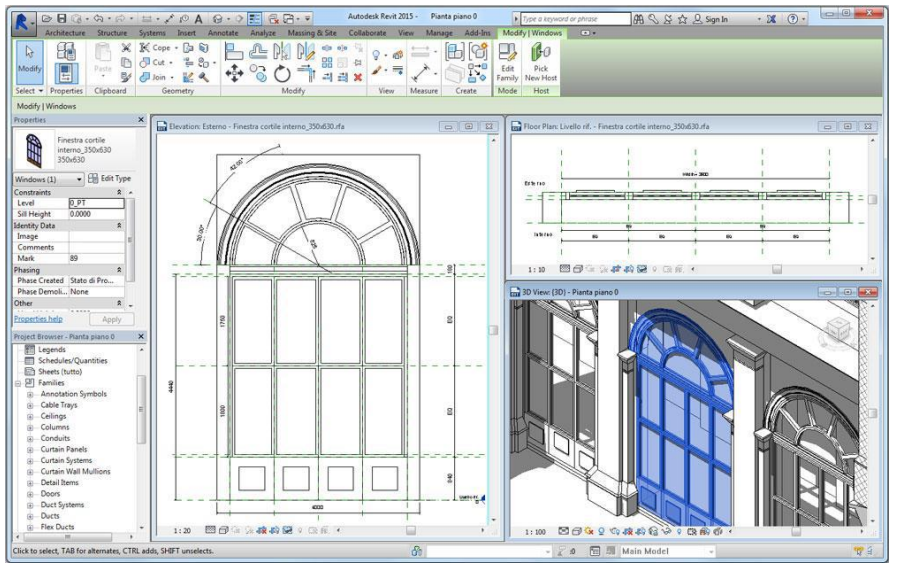

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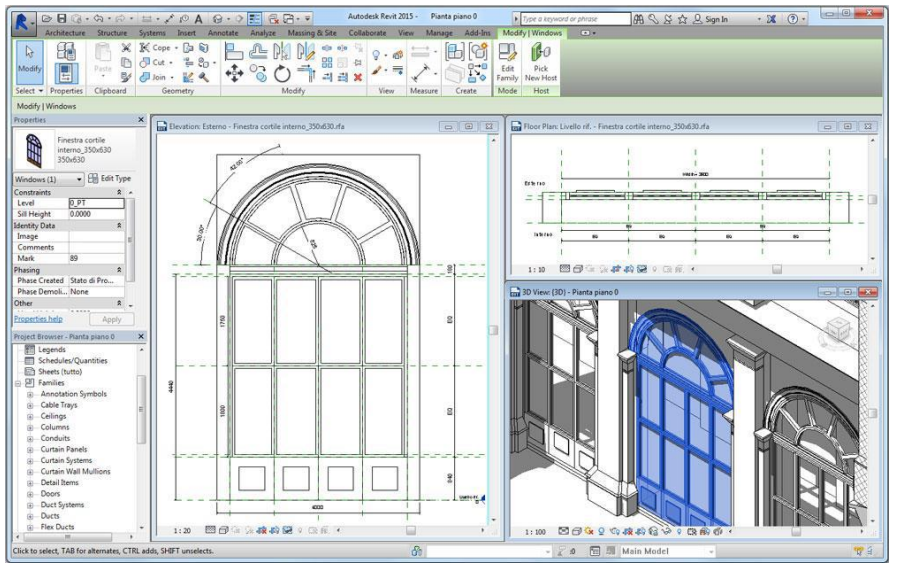
- OBJECT'S RULES CAN IDENTIFY WHEN A PARTICULAR CHANGE VIOLATES OBJECT FEASIBILITY REGARDING SIZE, MANYFACTURABILITY, AND SO FORTH;



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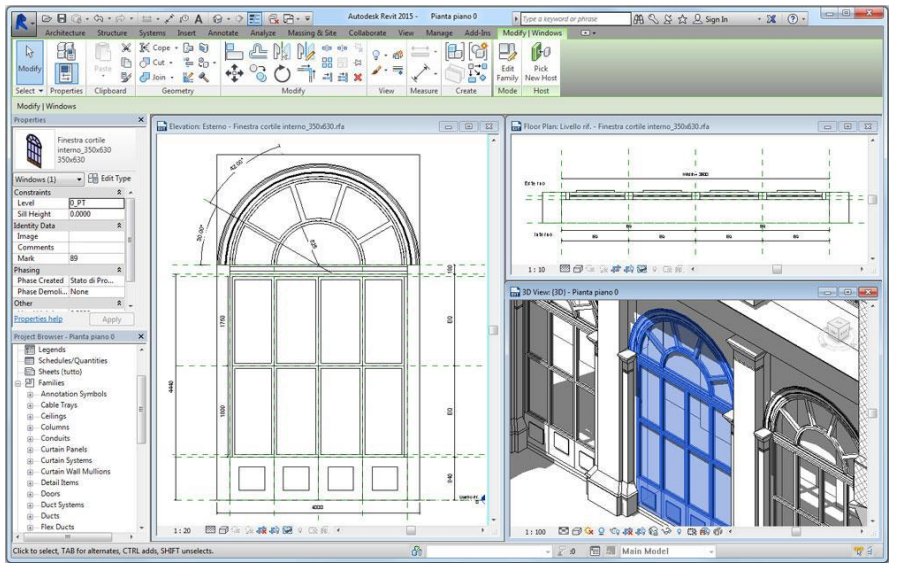
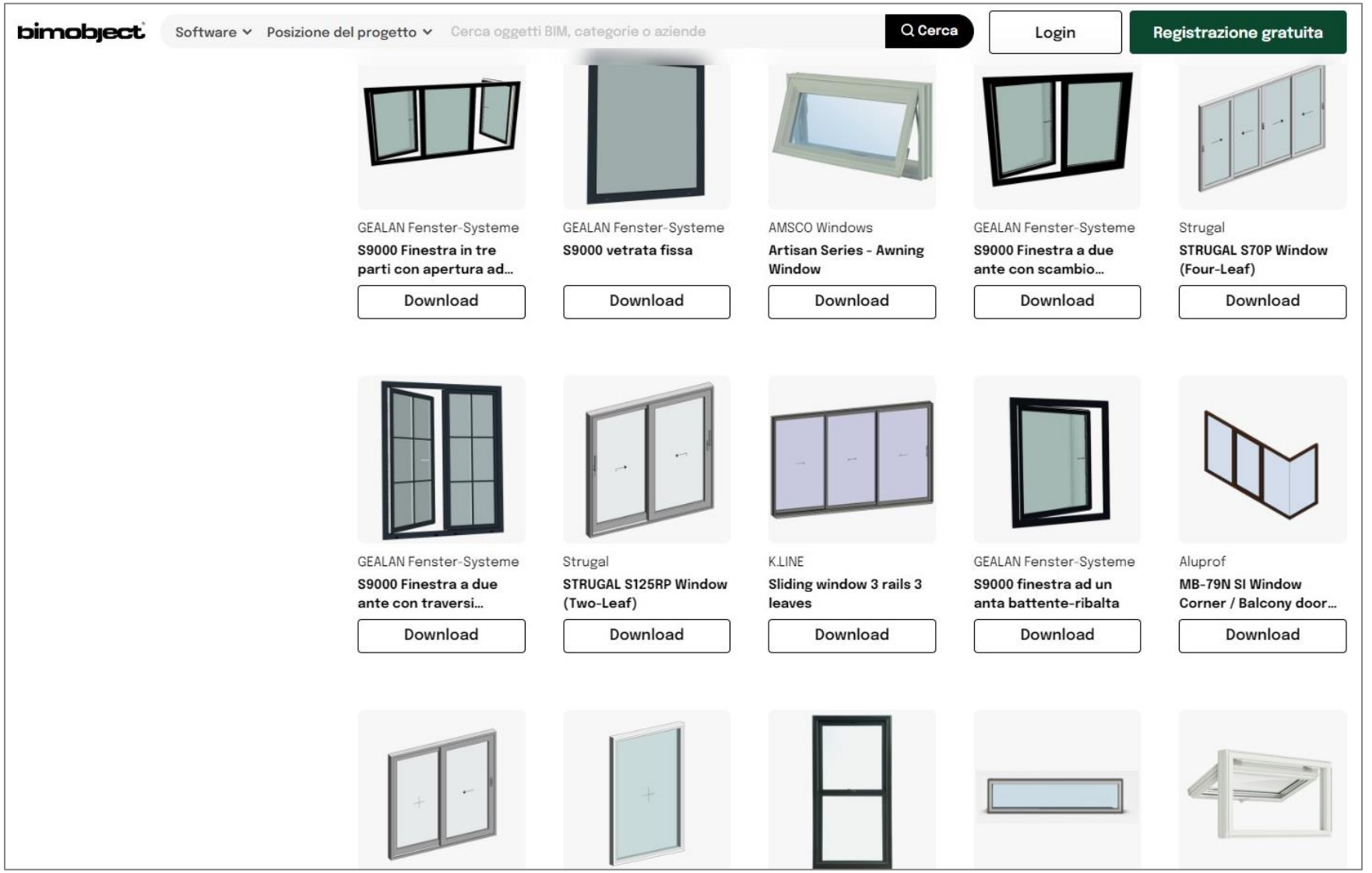
- OBJECT'S RULES CAN IDENTIFY WHEN A PARTICULAR CHANGE VIOLATES OBJECT FEASIBILITY REGARDING SIZE, MANYFACTURABILITY, AND SO FORTH;
- OBJECTS HAVE THE ABILITY TO LINK TO OR RECEIVE, BROADCAST, OR EXPORT SETS OF **ATTRIBUTES**, FOR EXAMPLE, STRUCTURAL MATERIALS, ACOUSITC DATA, ENERGY DATA, TO OTHER APPLICATIONS AND MODELS.



BIM LIBRARIES OF PARAMETRIC OBJECTS



AT THE BASE OF THE “BIM ARCHITECTURE” THERE IS A SPECIFIC **DATABASE**.

IT CONTAINS ALL THE **INFORMATION** ABOUT THE BUILDING AND ITS VARIOUS ELEMENTS, THE **RULES** AND **RELATIONSHIPS** THAT GOVERN THEIR **PARAMETRIC BEHAVIOR**, AS WELL AS ALL THE THEMATIC **ATTRIBUTES** THAT CAN BE ASSOCIATED WITH THEM.

THE DATABASE IS **UPDATABLE** OVER TIME, **IMPLEMENTABLE** AND **QUERYABLE**.

THE DATABASE CONSIDERS THE **TIME** DIMENSION, WITHOUT WHICH IT WOULD NOT BE POSSIBLE TO MANAGE IN A SINGLE MODEL THE ENTIRE LIFE CYCLE OF A BUILDING.

BIM PLATFORMS MAY BE USED IN SEVERAL WAYS IN BUILDING CONSTRUCTION: BY THE **ARCHITECT** FOR DESIGN MODELING AND DRAWING PRODUCTION; BY AN **ENGINEER** FOR STRUCTURAL OR ENERGY DATA MANAGEMENT; BY A **CONTRACTOR** FOR DEVELOPING A CONSTRUCTION COORDINATION MODEL, FOR FABRICATION DETAILING, OR FOR FACILITY MANAGEMENT.

BIM SOFTWARE CAN BE DIVIDED INTO THREE CATEGORIES:

- **BIM AUTHORING SOFTWARE**
  SOFTWARE THAT CREATES AND MODIFIES MODELS (BIM MODELING SOFTWARE, 3D MODELING SOFTWARE);

- **BIM TOOLS SOFTWARE**
  SOFTWARE THAT PERFORMS COMPUTATIONS AND VERIFICATIONS AND ENRICHES BIM MODELS WITH INFORMATONS AND DATA;

- **BIM COORDINATION SOFTWARE**
  SOFTWARE THAT ENABLES PROPER MANAGEMENT OF THE BIM PROCESS THROUGHOUT THE ENTIRE LIFECYCLE OF THE WORK.

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  SOFTWARE THAT CREATES AND MODIFIES MODELS (BIM MODELING SOFTWARE, 3D MODELING SOFTWARE);
  THESE SOFTWARE ARE ABLE TO GENERATE APPROPRIATE VIRTUAL MODELS, EACH FOR THE SPECIFIC DOMAIN FOR WHICH IT WAS DESIGNED.

AT TODAY, IN BUILDING AND CIVIL ENGINEERING DESIGNS ARE COMMONLY IDENTIFIED **AT LEAST FOUR FUNDAMENTAL DISCIPLINES** REFERRED TO BY AS MANY DESIGN MODELS:

- ARCHITECTURAL DISCIPLINE;
- STRUCTURAL DISCIPLINE;
- PLANT DISCIPLINE;
- INFRASTRUCTURE DISCIPLINE.

AUTODESK REVIT

ALLPLAN

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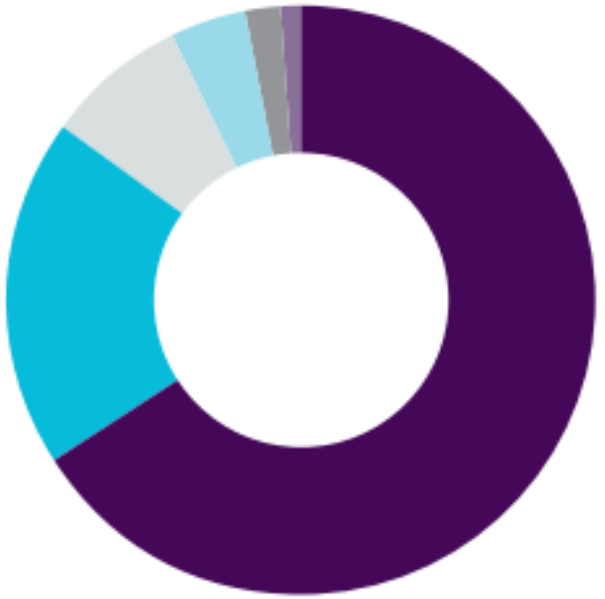
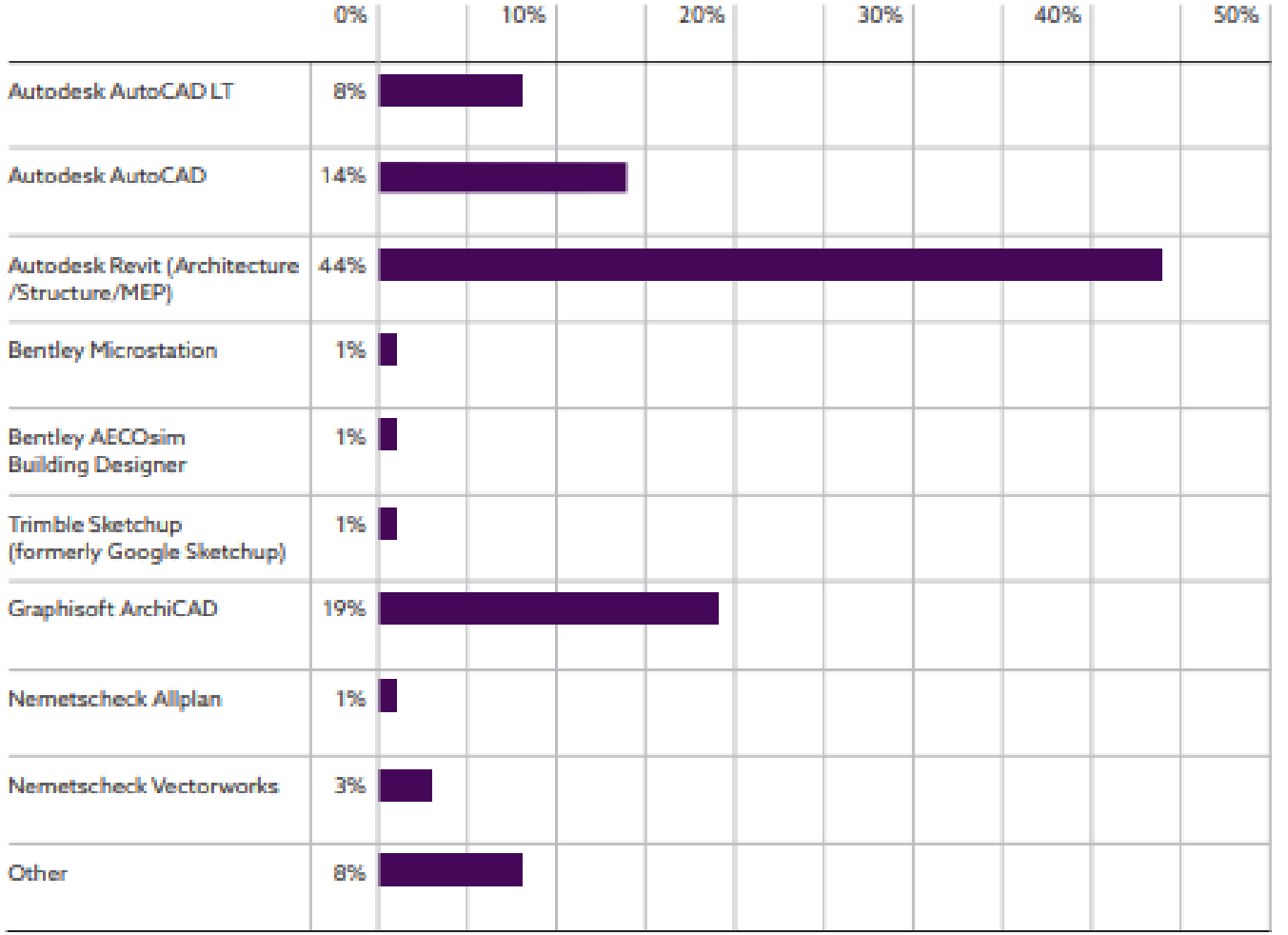
BIM METHODOLOGY ADOPTION: National BIM Report 2018 (UK)

When producing drawings or models, which of the following tools do you mainly use?



Autodesk	66%
Graphisoft	19%
Other	8%
Nemetscheck	4%
Bentley	2%
Trimble	1%

When producing drawings or models, which of the following tools do you mainly use?



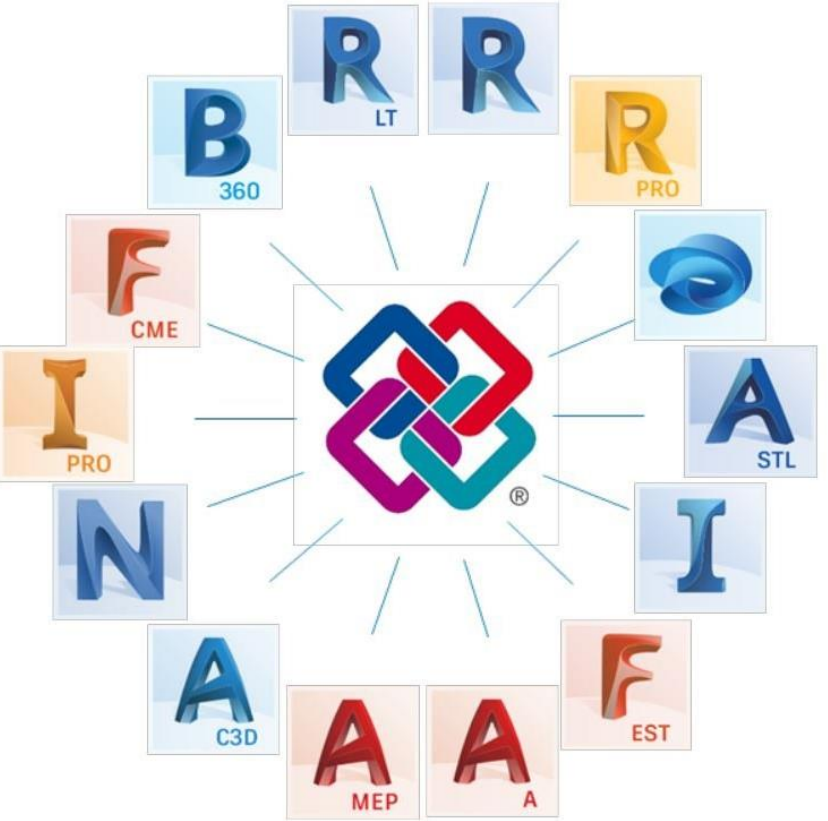
https://www.thenbs.com/

IMPROVED COLLABORATIVE WORKFLOWS ARE NEEDED FOR BETTER DESIGN AND CONSTRUCTION MANAGEMENT.

INTEROPERABILITY IS THE **ABILITY TO EXCHANGE DATA BETWEEN APPLICATIONS**, WHICH SMOOTHS WORKFLOWS AND SOMETIME FACILITATES THEIR AUTOMATION. **THE MAIN GOAL IS TO EXCHANGE DATA TRANSPARENTLY BY AVOIDING WASTE IN THEIR REGENERATION EDITING AND CONVERSION DURING THE PASSAGE FROM ONE SYSTEM TO ANOTHER.**
TO THIS AIM, **IFC** FORMAT (ACRONYM OF **INDUSTRY FOUNDATION CLASS**) WAS ESTABLISHED IN 1997. IFC IS A STANDARD FOR DESCRIBING A BUILDING ORGANISM.

IN PARTICULAR, **IFC** IS A SCHEMA DEVELOPED TO DEFINE AN EXTENSIBLE SET OF CONSISTENT DATA REPERESENTATION OF BUILDING INFORMATION FOR EXCHANGE BETWEEN AEC SOFTWARE APPLICATIONS. **IT IS A PLATFORM-NEUTRAL, OPEN DATA SCHEMA SPECIFICATION THAT IS NOT CONTROLLED BY A SINGLE VENDOR OR GROUP OF VENDORS.**

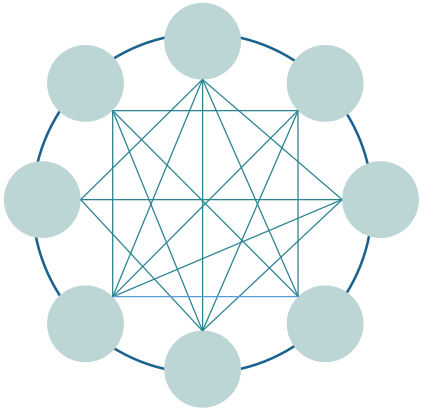
THE LATEST VERSION OF IFC: IFC4.3.RC4 (2021-07).



AUTODESK SOFTWARE SUPPORTING IFC.

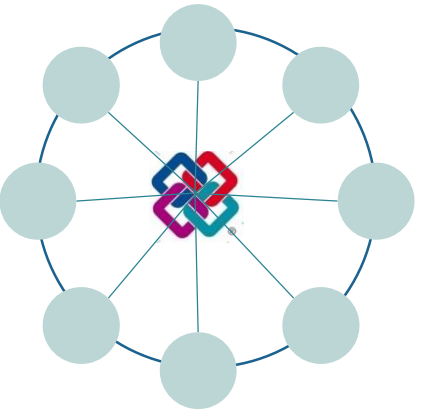
TRADITIONAL APPROACH

- INFORMATION IS EXCHANGED AS DOCUMENTS WHICH CAUSES NON-VALUE ADDING WORK, DATA LOSSES AND ERRORS;



BIM APPROACH

- INFORMATION IS SHARED IN AN EXPLOITABLE DATA FORMAT DIRECTLY BETWEEN DIFFERENT SYSTEMS;



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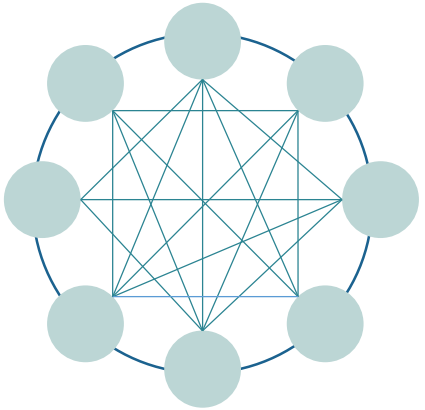

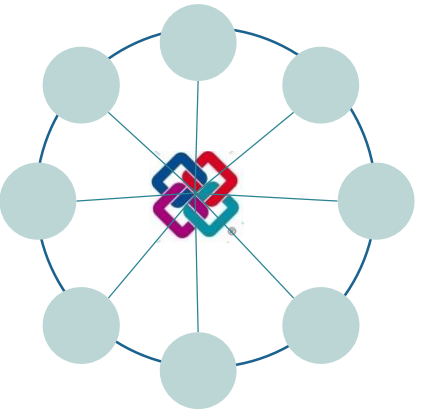

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- SEPARATE DRAWINGS (PLANS, SECTIONS, ELEVATIONS);

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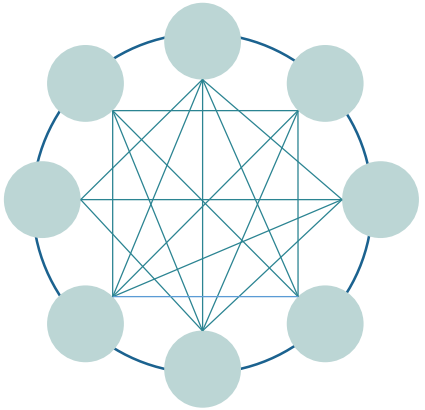
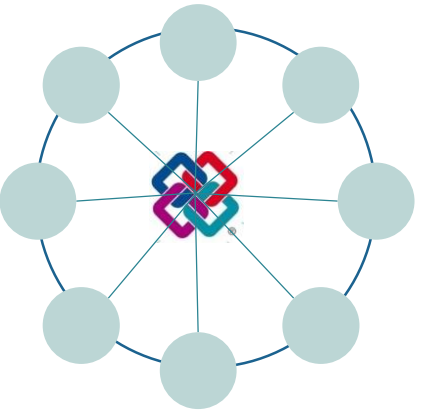
- UNIQUE 3D MODEL USEFUL TO OBTAIN 2D DRAWINGS;





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- SEQUENTIAL AND REPETITIVE WORK;

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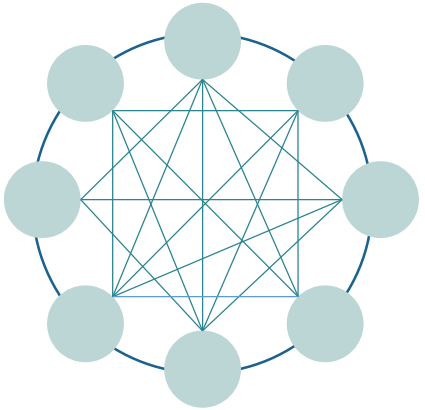
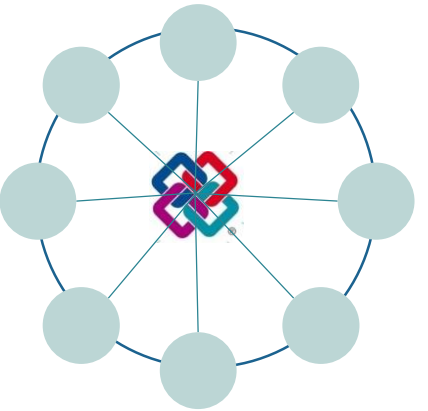
- COLLABORATIVE AND SHARED WORK;





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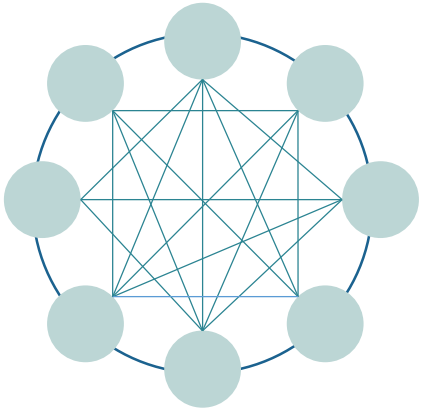
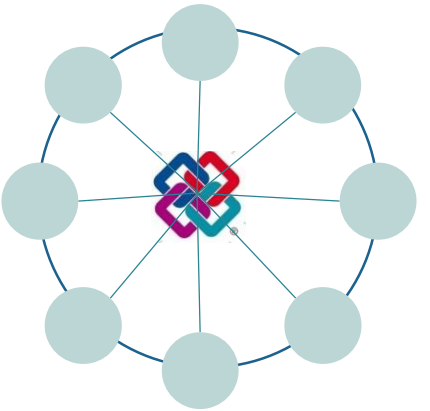
- COLLABORATIVE AND SHARED WORK;
- MANAGEMENT OF THE ENTIRE LIFE CYCLE;





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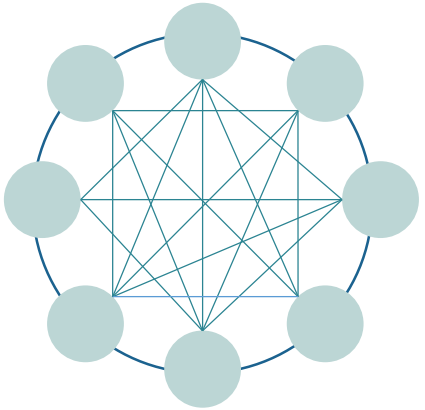
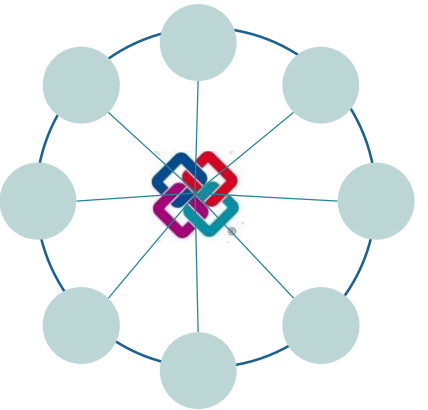
- GEOMETRIC ENTITIES;
- SEPARATE DRAWINGS (PLANS, SECTIONS, ELEVATIONS);
- OMISSIONS AND ERRORS;
- MANUAL UPDATE;
- SEQUENTIAL AND REPETITIVE WORK;
- MANAGEMENT SEPARATE PHASES;
- SCALE RATIO DECIDED IN ADVANCE;



BIM APPROACH

- INFORMATION IS SHARED IN AN EXPLOITABLE DATA FORMAT DIRECTLY BETWEEN DIFFERENT SYSTEMS;
- PARAMETRIC OBJECTS;
- UNIQUE 3D MODEL USEFUL TO OBTAIN 2D DRAWINGS;
- CONSISTENCY OF INFORMATION;
- AUTOMATIC UPDATE;
- COLLABORATIVE AND SHARED WORK;
- MANAGEMENT OF THE ENTIRE LIFE CYCLE;
- DIFFERENT DETAIL LEVEL BASED ON SCALE RATIO;



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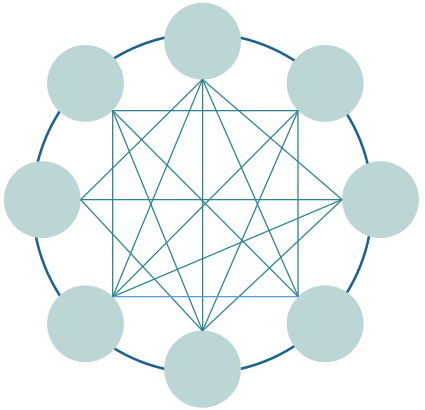
- GEOMETRIC ENTITIES;
- SEPARATE DRAWINGS (PLANS, SECTIONS, ELEVATIONS);
- OMISSIONS AND ERRORS;
- MANUAL UPDATE;
- SEQUENTIAL AND REPETITIVE WORK;
- MANAGEMENT SEPARATE PHASES;
- SCALE RATIO DECIDED IN ADVANCE;
- MANUAL CONTROL OF DATA.



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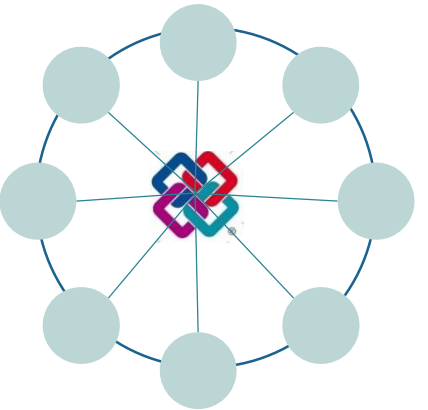
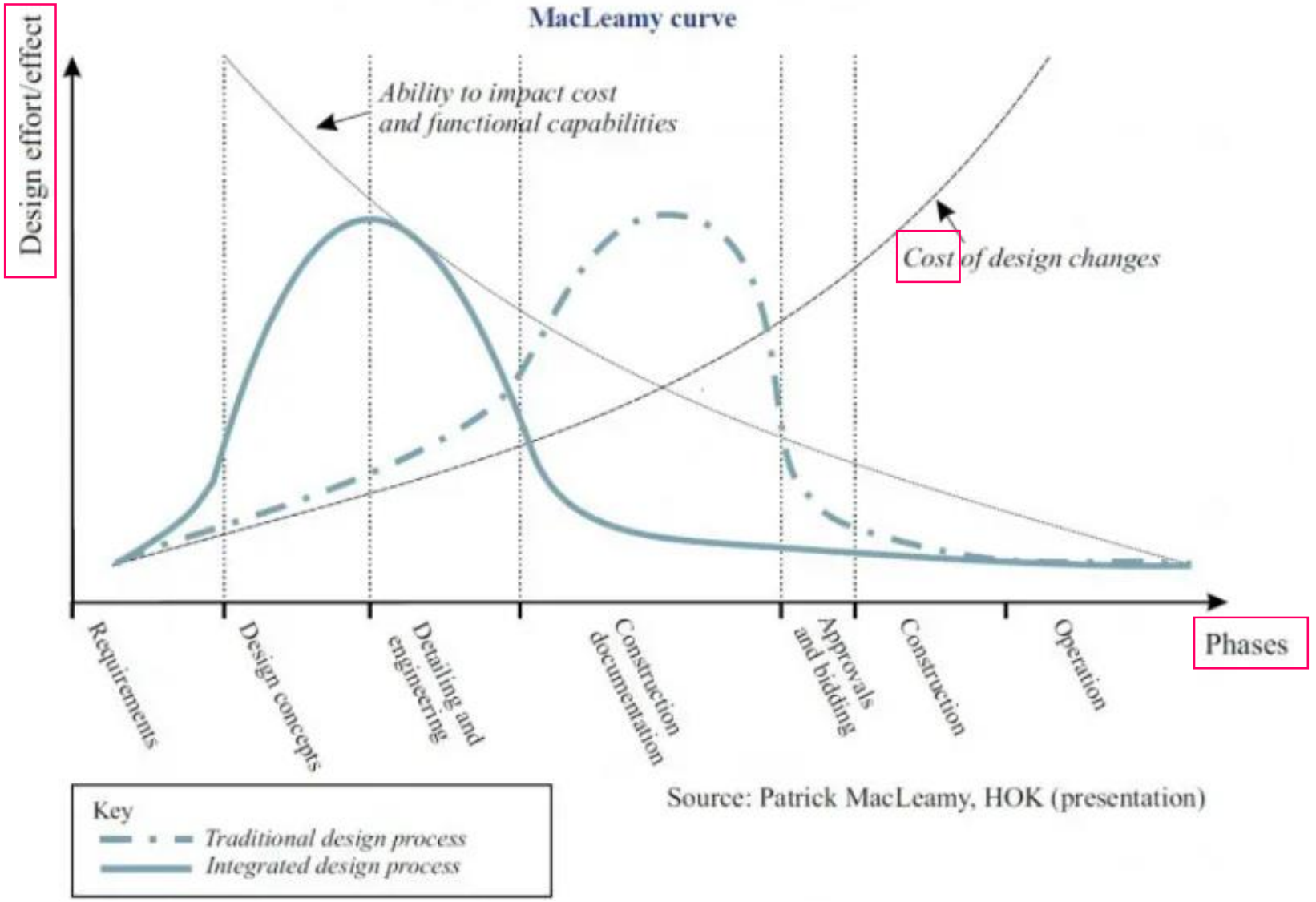
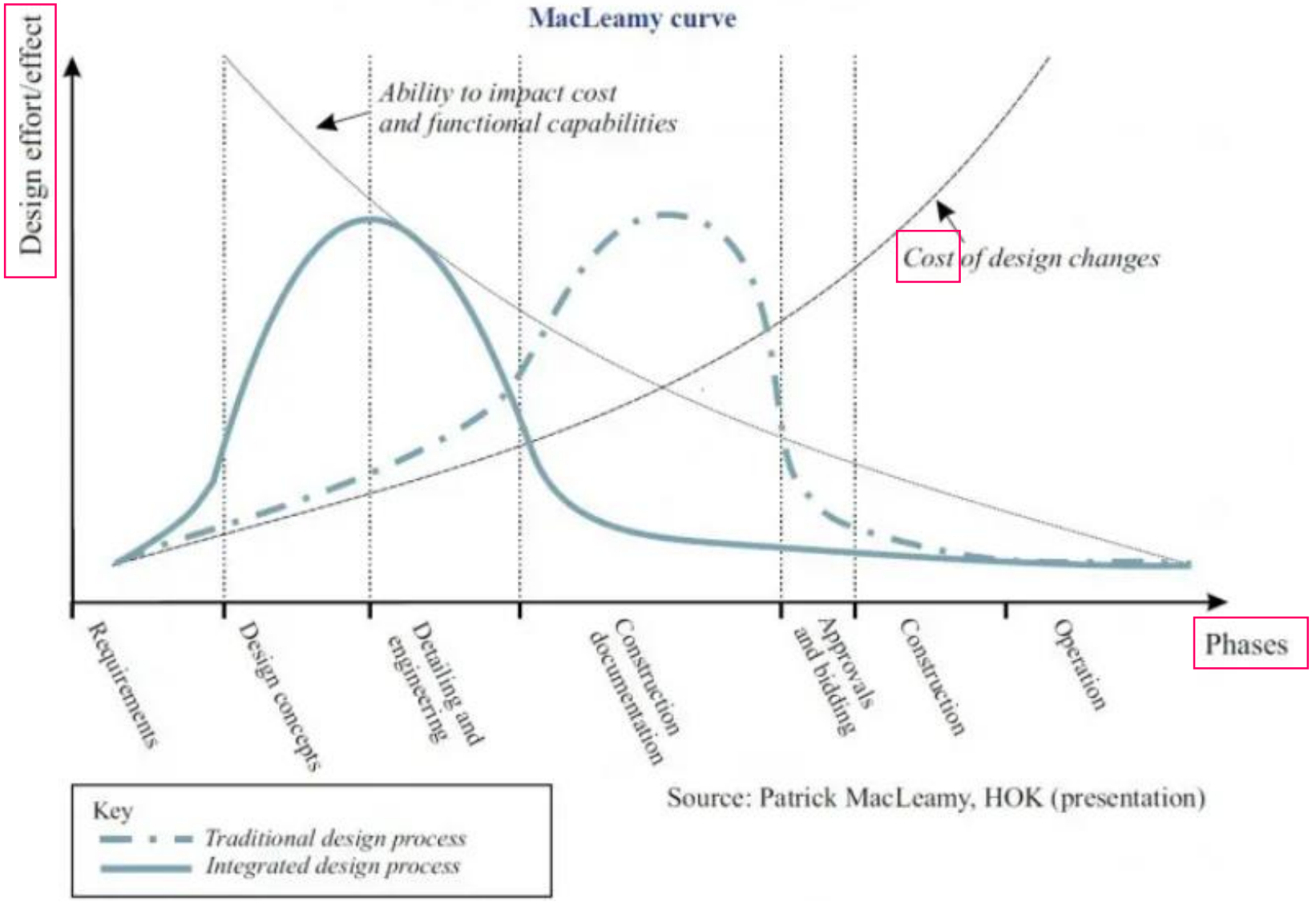
- AUTOMATIC UPDATE;
- COLLABORATIVE AND SHARED WORK;
- MANAGEMENT OF THE ENTIRE LIFE CYCLE;
- DIFFERENT DETAIL LEVEL BASED ON SCALE RATIO;
- INTERFERENCE CONTROL (CLASH DETECTION) AND COMPLIANCE CHECK (CODE CHECKING).





Source: Patrick MacLeamy, HOK (presentation)

THE **MacLeamy CURVE** COMPARES THE EFFORTS MADE IN PROJECT ACTIVITY OVER TIME.



Source: Patrick MacLeamy, HOK (presentation)

THE **MacLeamy CURVE** COMPARES THE EFFORTS MADE IN PROJECT ACTIVITY OVER TIME.

TRADITIONAL DESIGN PROCESS: AN ARCHITECTURAL PROJECT BECOMES MORE DIFFICULT TO CHANGE THE MORE DEVELOPED IT BECOMES.

INTEGRATED DESIGN PROCESS: THE EFFORT IS THE SAME AS THAT REQUIRED IN THE TRADITIONAL ACTIVITY, BUT IS ONLY ANTICIPATED (IN ORDER TO REDUCE THE COST OF DESIGN CHANGES).

PRE-CONSTRUCTION BENEFITS TO OWNER:

- CONCEPT, FEASIBILITY AND DESIGN BENEFITS (CAN A GIVEN BUILDING MEET THE FINANCIAL REQUIREMENTS OF AN OWNER?);
- INCREASED BUILDING PERFORMANCE AND QUALITY (DEVELOPING A SCHEMATIC MODEL PRIOR TO GENERATIG A DETAILED BUILDING MODEL ALLOWS FOR A MORE CAREFUL EVALUATION OF THE PROPOSED SCHEME TO DETERMINE WHETHER IT MEETS THE BUILDING'S FUNCTIONAL, SUSTAINABILITY, AND OTHE REQUIREMENTS);
- IMPROVED COLLABORATION USING INTEGRATED PROJECT DELIVERY.

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- CONCEPT, FEASIBILITY AND DESIGN BENEFITS (CAN A GIVEN BUILDING MEET THE FINANCIAL REQUIREMENTS OF AN OWNER?);
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- IMPROVED COLLABORATION USING INTEGRATED PROJECT DELIVERY.

BENEFITS FOR DESIGN:

- EARLIER AND MORE ACCURATE VISUALIZATIONS OF A DESIGN (THE 3D MODEL GENERATED BY THE BIM SOFTWARE IS DESIGNED DIRECTLY RATHER THAN BEING GENERATED FROM MULTIPLE 2D VIEWS);
- AUTOMATIC LOW-LEVEL CORRECTIONS WHEN CHANGES ARE MADE TO DESIGN;
- GENERATION OF ACCURATE AND CONSISTENT 2D DRAWINGS AT ANY STAGE OF THE DESIGN (WHEN CHANGES TO THE DESIGN ARE REQUIRED, FULLY CONSISTENT DRAWINGS CAN BE GENERATED AS SOON AS THE DESIGN MODIFICATIONS ARE ENTERED. THE AMOUNT OF TIME AND THE NUMBER OF ERRORS ASSOCIATED WITH GENERATING CONSTRUCTION DRAWINGS FOR ALL DESIGN DISCIPLINES IS SIGNIFICANTLY REDUCED);
- EARLIER COLLABORATION OF MULTIPLE DESIGN DISCIPLINES (WHILE COLLABORATION WITH DRAWINGS IS ALSO POSSIBLE, IT IS INHERENTLY MORE DIFFICULT AND TIME CONSUMING THAN WORKING WITH ONE OR MORE COORDINATED 3D MODELS IN WHICH CHANGE CONTROL CAN BE WELL MANAGED);

- EASY VERIFICATION OF CONSISTENCY TO THE DESIGN INTENT (BIM PROVIDES EARLIER 3D VISUALIZATIONS AND QUANTIFIES THE AREA OF SPACES AND OTHER MATERIAL QUANTITIES, ALLOWING FOR EARLIER AND MORE ACCURATE COST ESTIMATES);
- EXTRACTION OF COST ESTIMATES DURING THE DESIGN STAGE;
- IMPROVEMENT OF ENERGY EFFICIENCY AND SUSTAINABILITY (THE CAPABILITY TO LINK THE BUILDING MODEL TO VARIOUS TYPES OF ANALYSIS TOOLS (ENERGY ANALYSIS TOOLS) PROVIDES MANY OPPORTUNITIES TO IMPROVE BUILDING QUALITY).

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CONSTRUCTION AND FABRICATION BENEFITS:

- USE OF DESIGN MODEL AS BASIS FOR FABRICATED COMPONENTS (THE AUTOMATIC FABRICATION OF THE COMPONENTS USING NUMERICAL CONTROL MACHINERY IS FACILITATED);
- QUICK REACTION TO DESIGN CHANGES (SOME UPDATES WILL BE MADE AUTOMATICALLY BASED ON THE ESTABLISHED PARAMETRIC RULES);
- DISCOVERY OF DESIGN ERRORS AND OMISSIONS BEFORE CONSTRUCTION (CONFLICTS AND CONSTRUCTABILITY PROBLEMS ARE IDENTIFIED BEFORE THEY ARE DETECTED IN THE FIELD);
- SYNCHRONIZATION OF DESIGN AND CONSTRUCTION PLANNING (IT IS POSSIBLE TO SIMULATE THE CONSTRUCTION PROCESS AND SHOW WHAT THE BUILDING AND SITE WOULD LOOK LIKE AT ANY POINT IN TIME);
- BETTER IMPLEMENTATION OF LEAN CONSTRUCTION TECHNIQUES (LEAN CONSTRUCTION TECHNIQUES REQUIRE CAREFUL COORDINATION BETWEEN THE GENERAL CONTRACTOR AND ALL SUBS. THIS MINIMIZES WASTED EFFORT, IMPROVES WORKFLOW, AND REDUCES THE NEED FOR ON-SITE MATERIAL INVENTORIES. BIM PROVIDES THE BASIS FOR IMPROVED PLANNING AND SCHEDULING OF SUBCONTRACTORS AND HELPS TO ENSURE JUST-IN-TIME ARRIVAL OF PEOPLE, EQUIPMENT, AND MATERIALS);

- SYNCHRONIZATION OF PROCUREMENT WITH DESIGN AND COSTRUCTION (THE COMPLETE BUILDING MODEL PROVIDES ACCURATE QUANTITIES FOR ALL OF THE MATERIALS AND OBJECTS CONTAINED WITHIN A DESIGN. THESE QUANTITIES, SPECIFICATIONS, AND PROPERTIES CAN BE USED TO PROCURE MATERIALS FROM PRODUCT VENDORS AND SUBCANTROCTORS).

POST-CONSTRUCTION BENEFITS:

- IMPROVED COMMISSIONING AND HANDOVER OR FACILITY INFORMATION;
- BETTER MANAGEMENT AND OPERATION OF FACILITIES (THE INFORMATION COLLECTED CAN BE USED TO CHECK THAT ALL SYSTEMS WORK PROPERLY AFTER THE BUILDING IS COMPLETED);
- INTEGRATION WITH FACILITY OPERATION AND MANAGEMENT SYSTEMS.

A NEW APPROACH

MODELING A BUILDING MEANS FIRST **UNDERSTANDING** WHAT IT LOOKS LIKE AND HOW IT WORKS, HOW IT IS BUILT.

YOU NEED TO KNOW HOW TO DESIGN TO MODEL IN BIM, AND IT IS MORE THAN JUST A SIMPLE TECHNICAL REPRESENTATION.

IN THE BIM YOU MODEL HOW THE ELEMENTS ARE CONSTRUCTED.

A NEW APPROACH

MODELING A BUILDING MEANS FIRST **UNDERSTANDING** WHAT IT LOOKS LIKE AND HOW IT WORKS, HOW IT IS BUILT.

YOU NEED TO KNOW HOW TO DESIGN TO MODEL IN BIM, AND IT IS MORE THAN JUST A SIMPLE TECHNICAL REPRESENTATION.

IN THE BIM YOU MODEL HOW THE ELEMENTS ARE CONSTRUCTED.

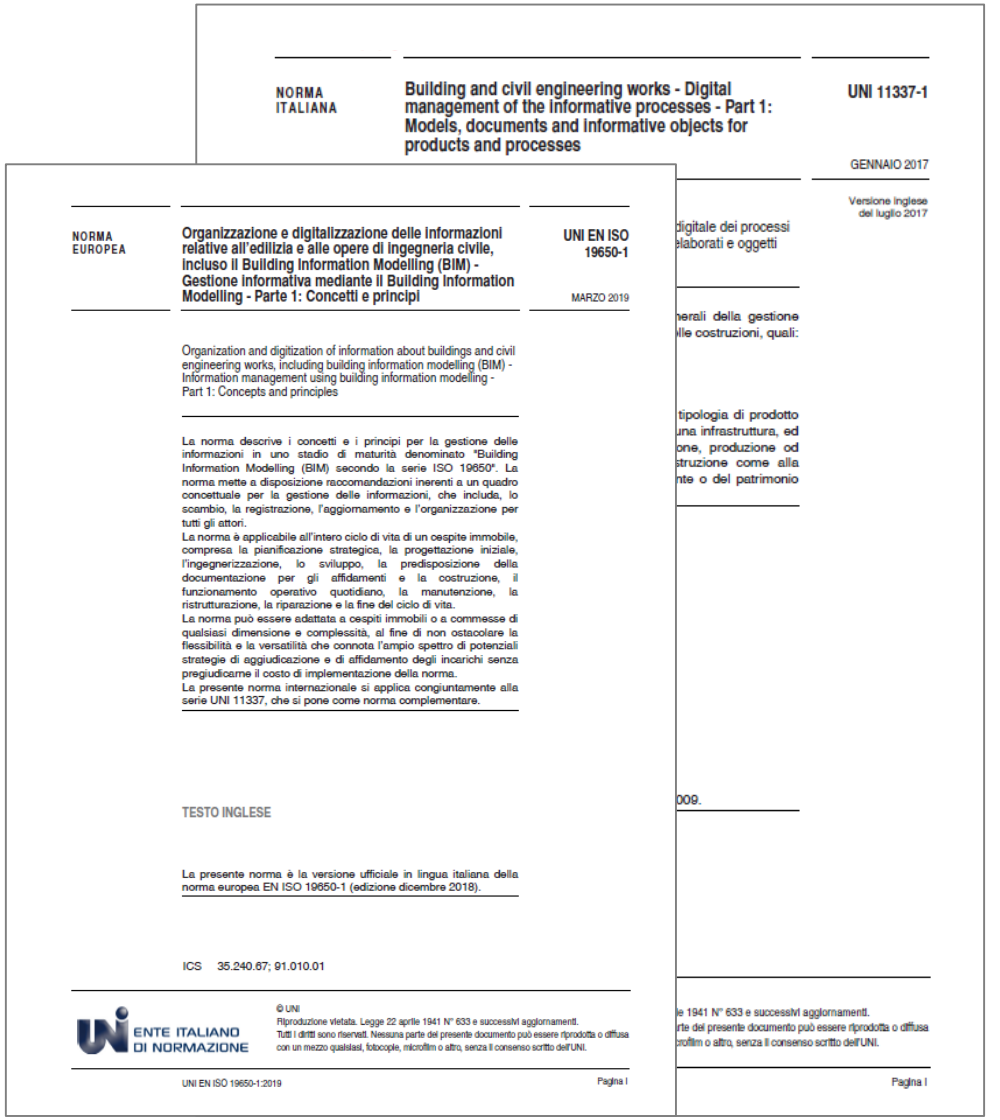
IN THE MODELING PHASE, THE FOLLOWING **WORKFLOW** IS SUGGESTED:

1. DEFINITION OF SPATIAL REFERENCES (PLAN GRIDS AND LEVELS).
2. PLACEMENT OF BUILDING ELEMENTS (WALLS, FLOORS, ROOFS, ETC.).
3. PLACEMENT OF OPENINGS (DOORS, WINDOWS, ETC.).
4. PLACEMENT OF VERTICAL CONNECTIONS (RAMPS, STAIRS, ETC.).
5. DOCUMENTATION (CREATION OF ADDITIONAL VIEWS THAN THOSE USED FOR MODELING, SCHEDULES, COMPUTATIONS).
6. DEFINITION OF CONSTRUCTION DETAILS.
7. CREATION OF TECHNICAL DRAWINGS.

THE REGULATIONS RELATED TO THE TOPIC OF BIM ARE EXTREMELY **COMPLEX** AND ARE **CONSTANTLY EVOLVING**.

OVER TIME, THE CONCEPT OF BIM HAS EVOLVED AND CONSEQUENTLY SO HAS THE LEGISLATION CONCERNING IT.

THESE SLIDES ARE NOT COMPLETELY EXHAUSTIVE AND ARE ONLY **BASIC** REFERENCE MATERIAL FOR FURTHER STUDY.



NORMA ITALIANA

Building and civil engineering works - Digital management of the informative processes - Part 1: Models, documents and informative objects for products and processes

UNI 11337-1

GENNAIO 2017

Versione inglese del luglio 2017

digitale dei processi
elaborati e oggetti

nerali della gestione
lle costruzioni, quali:

tipologia di prodotto
una infrastruttura, ed
one, produzione od
struzione come alla
nte o del patrimonio

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e 1941 N° 633 e successivi aggiornamenti.
rte del presente documento può essere riprodotta o diffusa
crofilm o altro, senza il consenso scritto dell'UNI.

Pagina I

NORMA EUROPEA

Organizzazione e digitalizzazione delle informazioni relative all'edilizia e alle opere di ingegneria civile, incluso il Building Information Modelling (BIM) - Gestione informativa mediante il Building Information Modelling - Parte 1: Concetti e principi

UNI EN ISO 19650-1

MARZO 2019

Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) - Information management using building information modelling - Part 1: Concepts and principles

La norma descrive i concetti e i principi per la gestione delle informazioni in uno stadio di maturità denominato "Building Information Modelling (BIM) secondo la serie ISO 19650". La norma mette a disposizione raccomandazioni inerenti a un quadro concettuale per la gestione delle informazioni, che includa, lo scambio, la registrazione, l'aggiornamento e l'organizzazione per tutti gli attori.
La norma è applicabile all'intero ciclo di vita di un cespite immobile, compresa la pianificazione strategica, la progettazione iniziale, l'ingegnerizzazione, lo sviluppo, la predisposizione della documentazione per gli affidamenti e la costruzione, il funzionamento operativo quotidiano, la manutenzione, la ristrutturazione, la riparazione e la fine del ciclo di vita.
La norma può essere adattata a cespiti immobili o a commesse di qualsiasi dimensione e complessità, al fine di non ostacolare la flessibilità e la versatilità che connota l'ampio spettro di potenziali strategie di aggiudicazione e di affidamento degli incarichi senza pregiudicarne il costo di implementazione della norma.
La presente norma internazionale si applica congiuntamente alla serie UNI 11337, che si pone come norma complementare.

TESTO INGLESE

La presente norma è la versione ufficiale in lingua italiana della norma europea EN ISO 19650-1 (edizione dicembre 2018).

ICS 35.240.67; 91.010.01

ENTE ITALIANO DI NORMAZIONE

ISO
International Organization for Standardization

EN
European Committee for Standardization

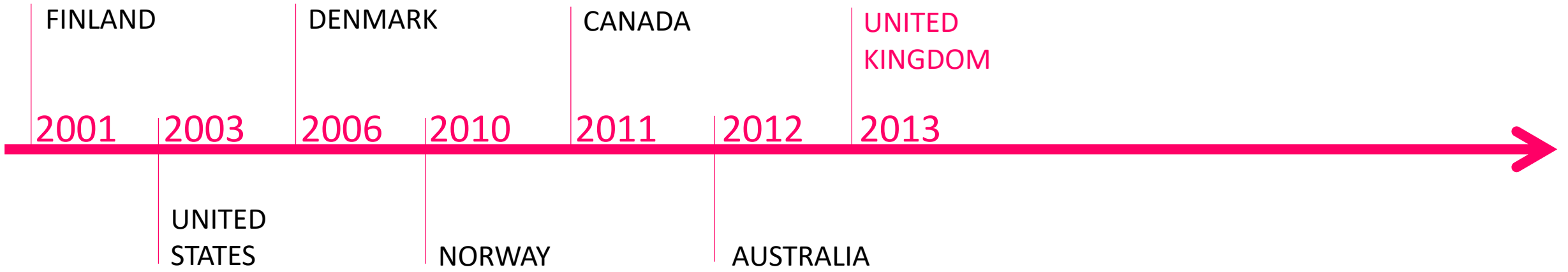
UNI
National Unification Body
[Ente italiano di normazione]

UNI → **UNI 11337**

UNI EN

EN ISO → **UNI EN ISO** → **UNI EN ISO 19650**

UNI ISO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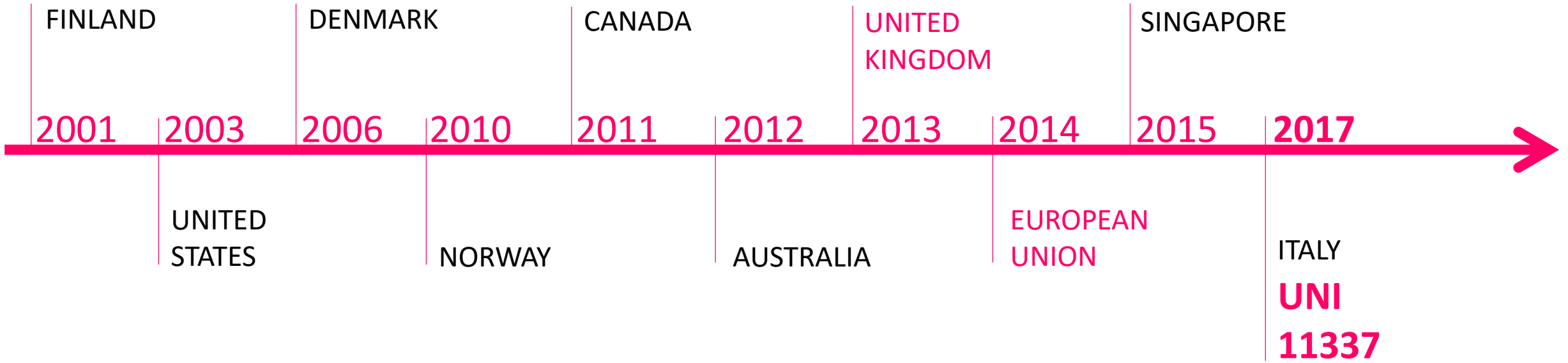
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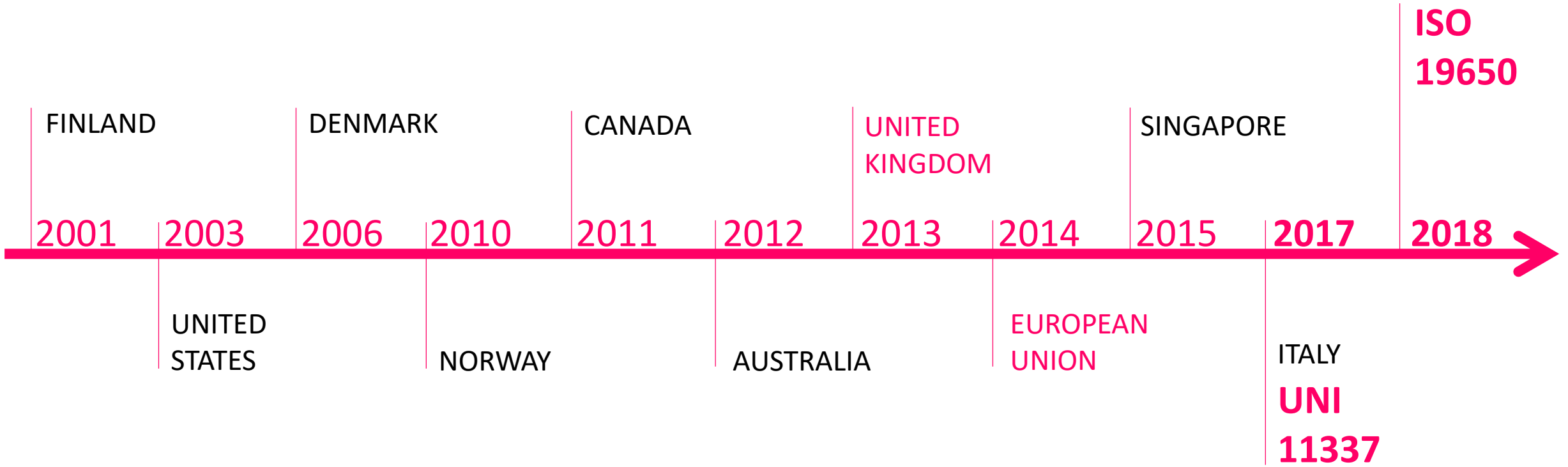
UNI 11337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UNI 11337

DIRETTIVA COMUNITARIA E NUOVO CODICE DEI CONTRATTI PUBBLICI

DIRECTIVE 2014/24/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL - DIRETTIVA 2014/24/UE DEL PARLAMENTO EUROPEO E DEL CONSIGLIO DEL 26 FEBBRAIO 2014 SUGLI APPALTI PUBBLICI E CHE ABROGA LA DIRETTIVA 2004/18/CE:

[...4. PER GLI APPALTI PUBBLICI DI LAVORI E I CONCORSI DI PROGETTAZIONE, GLI STATI MEMBRI POSSONO RICHIEDERE L'USO DI STRUMENTI ELETTRONICI SPECIFICI, QUALI GLI STRUMENTI DI SIMULAZIONE ELETTRONICA PER LE INFORMAZIONI EDILIZIE O STRUMENTI ANALOGHI...].

https://www.mit.gov.it/normativa/direttiva-201424ue

DECRETO DEL MINISTERO INFRASTRUTTURE E TRASPORTI (N. 560 DEL 01.12.2017):

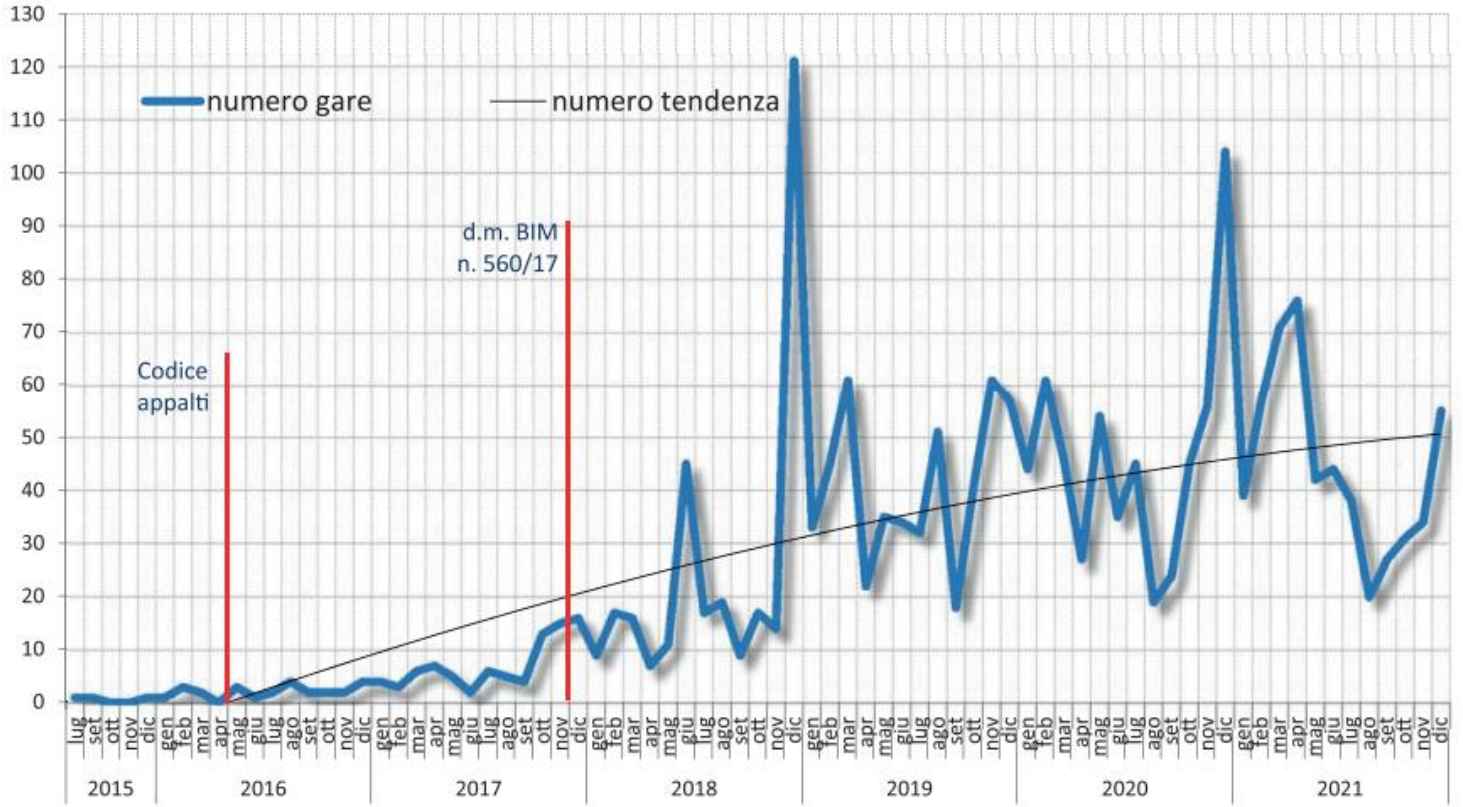
[…DEFINISCE LE MODALITÀ E I TEMPI DI PROGRESSIVA INTRODUZIONE, DA PARTE DELLE STAZIONI APPALTANTI, DELLE AMMINISTRAZIONI CONCEDENTI E DEGLI OPERATORI ECONOMICI, DELL'OBBLIGATORIETÀ DEI METODI E STRUMENTI ELETTRONICI SPECIFICI, QUALI QUELLI DI MODELLAZIONE PER L'EDILIZIA DELLE INFRASTRUTTURE, NELLE FASI DI PROGETTAZIONE, COSTRUZIONE E GESTIONE DELLE OPERE E RELATIVE VERIFICHE […]. 6. LE STAZIONI APPALTANTI RICHIEDONO, IN VIA OBBLIGATORIA, L'USO DEI METODI E DEGLI STRUMENTI ELETTRONICI [...] SECONDO LA SEGUENTE TEMPISTICA:

a) PER I LAVORI COMPLESSI RELATIVI A OPERE DI IMPORTO A BASE DI GARA **PARI O SUPERIORE A 100 MILIONI DI EURO**, A DECORRERE DAL 1°GENNAIO **2019**;
b) PER I LAVORI COMPLESSI RELATIVI A OPERE DI IMPORTO A BASE DI GARA **PARI O SUPERIORE A 50 MILIONI DI EURO**, A DECORRERE DAL 1°GENNAIO **2020**;
c) PER I LAVORI COMPLESSI RELATIVI A OPERE DI IMPORTO A BASE DI GARA **PARI O SUPERIORE A 15 MILIONI DI EURO**, A DECORRERE DAL 1°GENNAIO **2021;**
d) PER LE OPERE DI IMPORTO A BASE DI GARA PARI O SUPERIORE ALLA SOGLIA DI CUI ALL'ARTICOLO 35 DEL CODICE DEI CONTRATTI PUBBLICI (**5.22 MILONI DI EURO**), A DECORRERE DAL 1° GENNAIO **2022**;
e) PER LE OPERE DI IMPORTO A BASE DI GARA **PARI O SUPERIORE A 1 MILIONE DI EURO**, A DECORRERE DAL 1° GENNAIO **2023**;
f) PER LE OPERE DI IMPORTO A BASE DI GARA **INFERIORE A 1 MILIONE DI EURO**, A DECORRERE DAL 1° GENNAIO **2025**...].

https://www.mit.gov.it/normativa/decreto-ministeriale-numero-560-del-01122017

OICE – ASSOCIAZIONE DELLE ORGANIZZAZIONI DI INGEGNERIA, DI ARCHITETTURA E DI CONSULENZA TECNICO-ECONOMICA. **RAPPORTO SULLE GARE BIM 2021 E SULLA DIGITALIZZAZIONE**. ANALISI DELLE GARE PUBBLICHE DEL MERCATO.

ANDAMENTO NUMERO BANDI BIM (2015-2021).



BANDI BIM PER REGIONI IN NUMERO.

Regione	2020		2021		Differenza % 2021/2020
	numero	%	numero	%	
Valle d'Aosta	0	0,0%	1	0,2%	-
Piemonte	13	2,3%	17	3,2%	30,8%
Liguria	7	1,3%	7	1,3%	0,0%
Lombardia	64	11,4%	65	12,2%	1,6%
Trentino AA	2	0,4%	6	1,1%	200,0%
Veneto	35	6,3%	45	8,4%	28,6%
Friuli V. Giulia	14	2,5%	14	2,6%	0,0%
Emilia Romagna	16	2,9%	26	4,9%	62,5%
Toscana	19	3,4%	35	6,6%	84,2%
Umbria	6	1,1%	7	1,3%	16,7%
Marche	17	3,0%	26	4,9%	52,9%
Lazio	158	28,2%	59	11,0%	-62,7%
Abruzzo	10	1,8%	13	2,4%	30,0%
Molise	2	0,4%	7	1,3%	250,0%
Campania	46	8,2%	60	11,2%	30,4%
Basilicata	19	3,4%	12	2,2%	-36,8%
Puglia	47	8,4%	37	6,9%	-21,3%
Calabria	44	7,9%	32	6,0%	-27,3%
Sicilia	9	1,6%	31	5,8%	244,4%
Sardegna	32	5,7%	34	6,4%	6,3%
Totale	560	100,0%	534	100,0%	-4,6%

UNI 11337 - BUILDING AND CIVIL ENGINEERING WORKS - DIGITAL MANAGEMENT OF THE INFORMATIVE PROCESSES.	
UNI 11337-1:2017	Part 1: Models, documents and informative objects for products and processes.
UNI/TR 11337-2:2021	Part 2: Management of information flows and decision making processes by appointing party.
UNI/TS 11337-3:2015	Codification criteria for construction products and works, activities and resources - Part 3: Models of collecting, organizing and recording the technical information for construction products.
UNI 11337-4:2017	Part 4: Evolution and development of information within models, documents and objects.
UNI 11337-5:2017	Part 5: Informative flows in the digital processes.
UNI/TR 11337-6:2017	Part 6: Guidance to redaction the informative specific information.
UNI 11337-7:2018	Part 7: Knowledge, skill and competence requirements of building information modelling profiles.
UNI 11337-8	Parte 8: Processi integrati di gestione delle informazioni e delle decisioni.
UNI 11337-9	Parte 9: Gestione informativa in fase di esercizio (fascicolo del costruito).
UNI 11337-10	Part 10: Gestione informativa delle pratiche amministrative.
UNI 11337-11	Parte 11: Sicurezza dei dati e blockchain.
UNI 11337-12	Parte 12: Qualificazione delle organizzazioni.

UNI 11337-1:2017 DEALS WITH THE FOLLOWING TOPICS:

- **TERMS AND DEFINITIONS**
  (RELATED TO INFORMATION CONTENS,
  TO INFORMATION ENVIRONMENTS,
  TO PRODUCT INFORMATION STRUCTURES,
  TO SPACE INFORMATION STRUCTURES,
  TO PROCESS INFORMATION STRUCTURES);

2D - SECOND DIMENSION: A GRAPHICAL REPRESENTATION OF THE WORK OR ITS ELEMENTS BASED ON THE **PLAN** (TWO-DIMENSIONAL GEOMETRY)

3D - THIRD DIMENSION: A GRAPHICAL SIMULATION OF THE WORK OR ITS ELEMENTS BASED ON **SPACE** (THREE-DIMENSIONAL GEOMETRY)

4D – FOURTH DIMENSION: A SIMULATION OF THE WORK OR ITS ELEMENTS BASED ON **TIME** IN ADDITION TO SPACE.

5D – FIFTH DIMENSION: A SIMULATION OF THE WORK OR ITS ELEMENTS BASED ON **MONEY** IN ADDITION TO SPACE AND TIME.

6D – SIXTH DIMENSION: A SIMULATION OF THE WORK OR ITS ELEMENTS BASED ON USE, **MANAGEMENT**, MAINTENANCE AND POSSIBLE DECOMMISSIONING, IN ADDITION TO SPACE.

7D – SEVENTH DIMENSION: A SIMULATION OF THE WORK OR ITS ELEMENTS BASED ON **SUSTAINABILITY** (ECONOMIC, ENVIRONMENTAL, ENERGY, ETC.) OF THE WORK, IN ADDITION TO SPACE, TIME AND PRODUCTION COSTS.

UNI 11337-1:2017 DEALS WITH THE FOLLOWING TOPICS:

- **TERMS AND DEFINITIONS**
  (RELATED TO INFORMATION CONTENS,
  TO INFORMATION ENVIRONMENTS,
  TO PRODUCT INFORMATION STRUCTURES,
  TO SPACE INFORMATION STRUCTURES,
  TO PROCESS INFORMATION STRUCTURES);

- **DIGITAL MATURITY IN THE BUILDING PROCESS**
  (5 LEVELS OF DIGITAL INFORMATION MATURITY ARE DEFINED: LEVEL 0 NON-DIGITAL –> LEVEL 4 OPTIMAL);

- **INFORMATION STRUCTURE OF THE BUILDING INDUSTRY PRODUCT;**

- **BUILDING INDUSTRY PROCESS INFORMATION STRUCTURE.**

2D - SECOND DIMENSION: A GRAPHICAL REPRESENTATION OF THE WORK OR ITS ELEMENTS BASED ON THE **PLAN** (TWO-DIMENSIONAL GEOMETRY)
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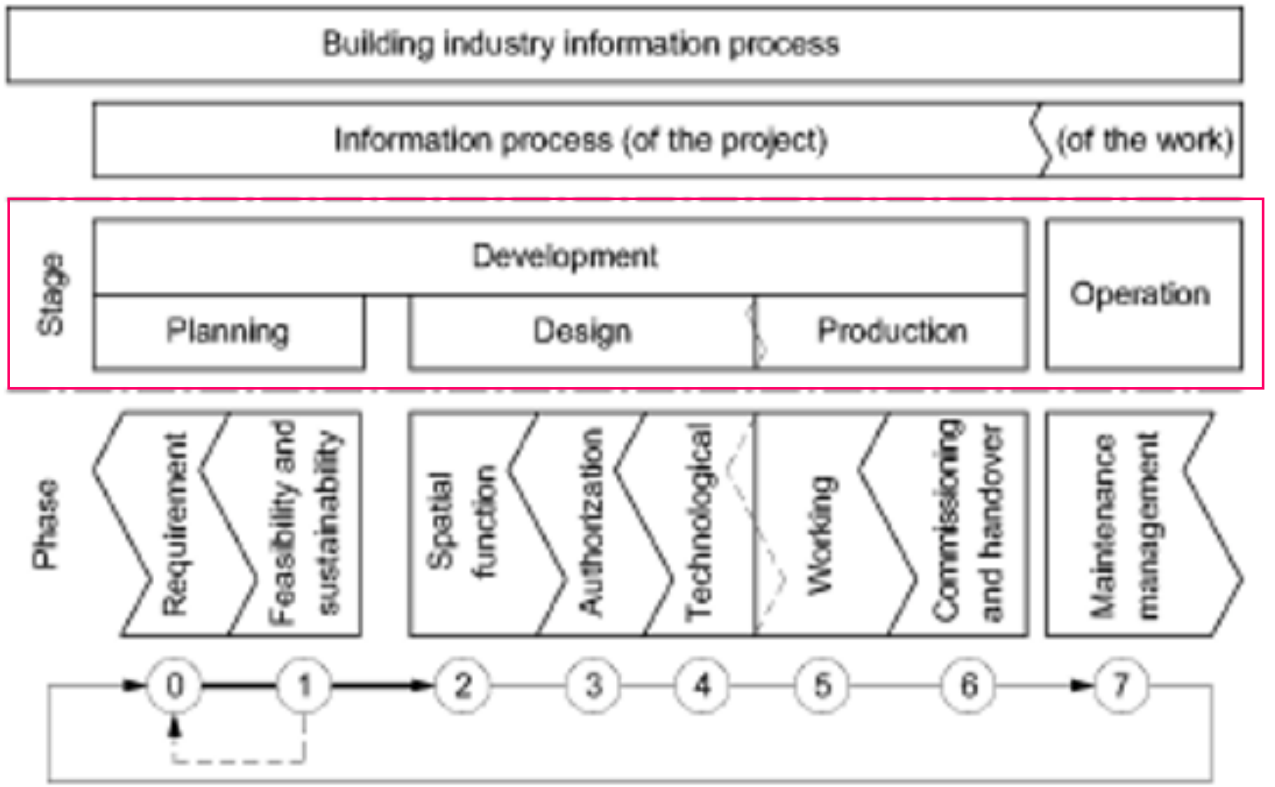
4D – FOURTH DIMENSION: A SIMULATION OF THE WORK OR ITS ELEMENTS BASED ON **TIME** IN ADDITION TO SPACE.
5D – FIFTH DIMENSION: A SIMULATION OF THE WORK OR ITS ELEMENTS BASED ON **MONEY** IN ADDITION TO SPACE AND TIME.
6D – SIXTH DIMENSION: A SIMULATION OF THE WORK OR ITS ELEMENTS BASED ON USE, **MANAGEMENT**, MAINTENANCE AND POSSIBLE DECOMMISSIONING, IN ADDITION TO SPACE.
7D – SEVENTH DIMENSION: A SIMULATION OF THE WORK OR ITS ELEMENTS BASED ON **SUSTAINABILITY** (ECONOMIC, ENVIRONMENTAL, ENERGY, ETC.) OF THE WORK, IN ADDITION TO SPACE, TIME AND PRODUCTION COSTS.

BUILDING INDUSTRY PROCESS INFORMATION STRUCTURE

THE BUILDING INDUSTRY PROCESS INFORMATION STRUCTURE INVOLVES THE INTANGIBLE ASPECTS OF THE WORKS LINKED TO THEIR ACTIVITIES AND PRODUCTION FACTORS IN TERM OF: HUMAN RESOURCES, EQUIPMENT AND PRODUCTS (COMPONENTS).

THE BUILDING INDUSTRY PROCESS IS COMPOSED OF A **STRUCTURED SEQUENCE OF STAGES AND PHASES** FOR THE PRODUCTION AND MANAGEMENT OF INFORMATION CONTENT RELATED TO THE WHOLE LIFE CYCLE OF A WORK.

THE BUILDING INDUSTRY PROCESS CAN BE SCHEMATIZED ACCORDING TO A CONSISTING OF **4 STAGES** OF WHICH IS **HIERARCHICAL STRUCTURE** DIVIDED INTO **8 PHASES**, AS SHOWN IN THE DIAGRAM.
THE STAGES FOLLOW A LOGIC WITH AN END-START LINK, SO THAT EACH STAGE CAN ONLY START AFTER THE PREVIOUS ONE HAS BEEN COMPLETED.

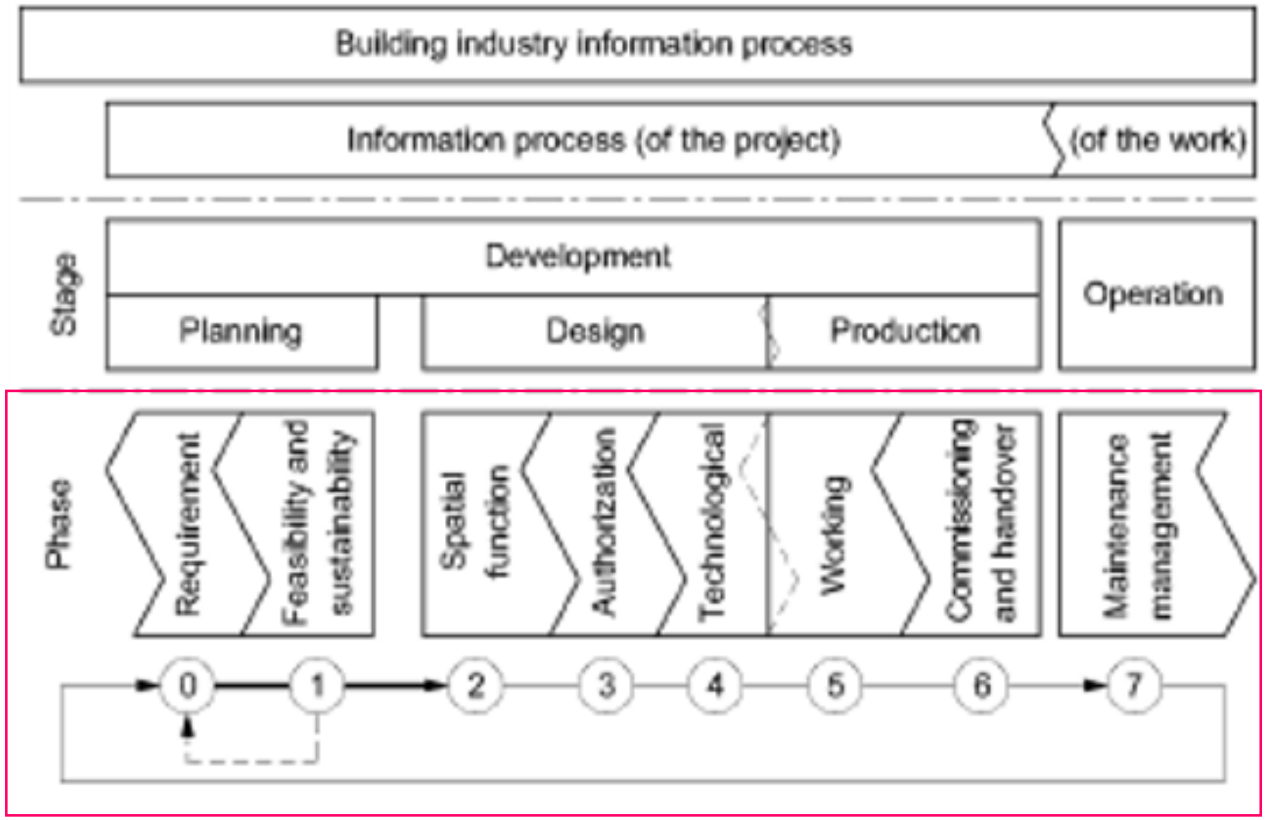


STRATEGIC PLANNING STAGE IS THE STRUCTURED SET OF INFORMATION CONTENT RELATED TO DEFINING THE NEEDS, RESOURCES, CONSTRAINTS, REQUIREMENTS, FEASIBILITY AND SUSTAINABILITY OF THE POSSIBLE ACTIONS PROPOSED IN THEIR RESPONSE.

DESIGN STAGE IS THE STRUCTURED SET OF INFORMATION CONTENT RELATED TO DEFINING THE NATURE AND QUALITY OF THE WORK IDENTIFIED IN THE PLANNING STAGE, WHILE COMPLYING WITH THE ESTABLISHED CONSTRAINTS AND GOALS.

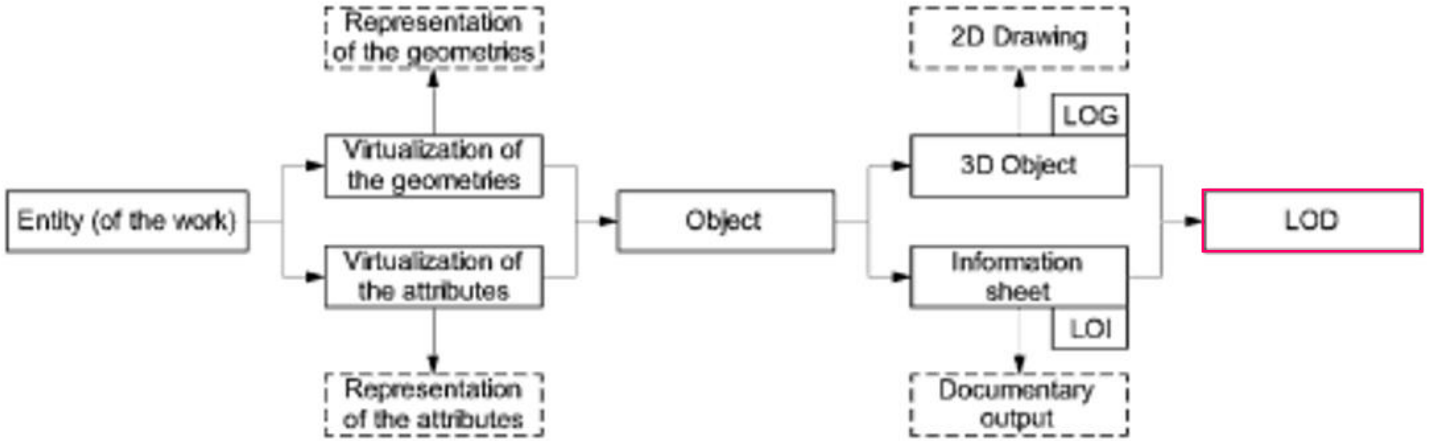
PRODUCTION STAGE IS THE STRUCTURED SET OF INFORMATION CONTENT RELATED TO CARRYING OUT THE WORK BASED ON WHAT WAS DEFINED IN THE STRATEGIC PLANNING AND DESIGN STAGES.

OPERATION STAGE IS THE STRUCTURED SET OF INFORMATION CONTENT RELATED TO USING AND PRESERVING THE WORK.



UNI 11337-4:2017 INTRODUCES AND PROVIDES DEFINITIONS OF THE FOLLOWING TOPICS:

- **LOD LEVEL OF DEVELOPMENT** – THE LEVEL OF DETAIL AND STABILITY OF THE DATA AND INFORMATION OF THE DIGITAL OBJECTS THAT MAKE UP THE MODELS. [livello di sviluppo]

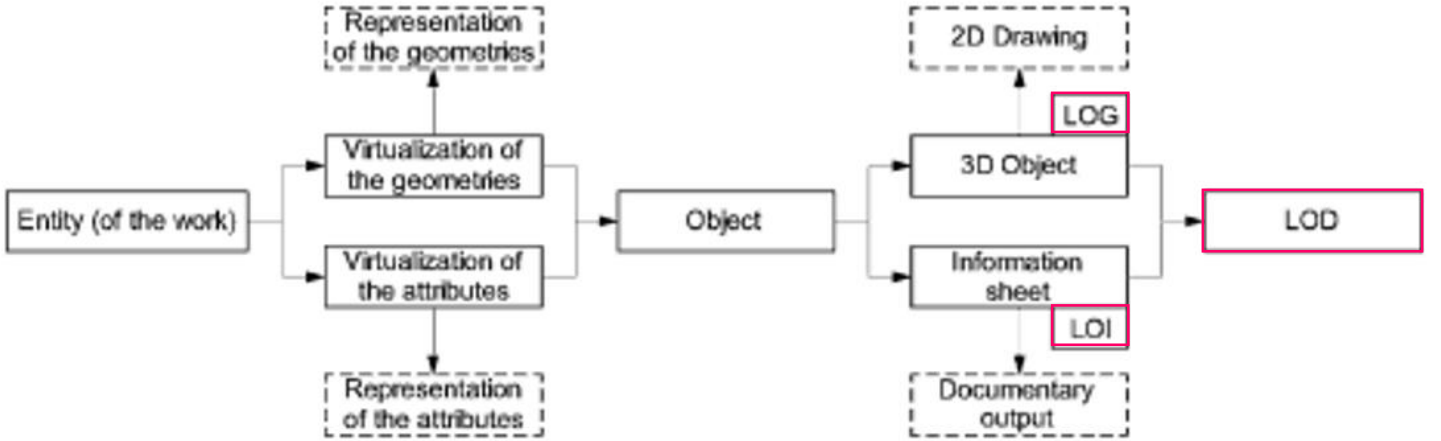


UNI 11337-4:2017 INTRODUCES AND PROVIDES DEFINITIONS OF THE FOLLOWING TOPICS:

- **LOD LEVEL OF DEVELOPMENT** – THE LEVEL OF DETAIL AND STABILITY OF THE DATA AND INFORMATION OF THE DIGITAL OBJECTS THAT MAKE UP THE MODELS. [livello di sviluppo]
- **LOG LEVEL OF DEVELOPMENT GEOMETRIC ATTRIBUTES** - THE LEVEL OF DETAIL AND STABILITY OF THE GEOMETRIC ATTRIBUTES OF THE DIGITAL OBJECTS THAT MAKE UP THE MODELS. TOGETHER WITH THE LOI, IT IS A CONSTITUENT PART OF THE LOD THAT REFERS TO THE GEOMETRIC ATTRIBUTES.
- **LOI LEVEL OF DEVELOPMENT INFORMATION ATTRIBUTES** – THE LEVEL OF DETAIL AND THE STABILITY OF THE INFORMATION ATTRIBUTES OF THE DIGITAL OBJECTS THAT MAKE UP THE MODELS. TOGETHER WITH THE LOG, IT IS A CONSTITUENT PART OF THE LOD THAT REFERS TO THE NON-GEOMETRIC ATTRIBUTES.

THE INFORMATION EVOLUTION OF MODELS AND THEIR INTENDED USE DEFINE THE LEVEL OF DEVELOPMENT NEEDED FOR EACH OF THE OBJECTS THAT MAKE THEM UP (LOD).

THE QUANTITY AND QUALITY OF MODEL INFORMATION CONTENT SHALL BE AT LEAST THAT NECESSARY AND SUFFICIENT TO ENSURE THAT THE PROCESS PHASE (AND STAGE) GOALS TO WHICH THEY REFER ARE MET.



LEVEL OF DEVELOPMENT (LOD)

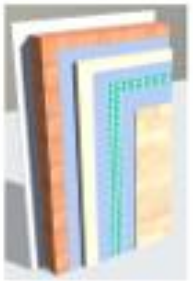
THE LEVEL OF DEVELOPMENT OF DIGITAL OBJECTS THAT MAKE UP THE MODELS (LOD), DEFINES THE **QUANTITY AND QUALITY OF** THEIR **INFORMATION** CONTENT AND SERVES TO ACHIEVE THE GOALS OF THE PROCESS PHASES (AND STAGES) AND THE MODEL USES AND GOAL TO WHICH THER REFER.

THE LEVEL OF INFORMATION DEVELOPMENT OF A DIGITAL OBJECT (LOD) IS EXPRESSED ON A DEFINED **REFERENCE SCALE**. THE DIGITAL OBJECT DEVELOPMENT LEVELS ARE IDENTIFIED THROUGH AN **ALPHABETIC SCALE** STARTING FROM CAPITAL A: **LOD A** – SYMBOLIC OBJECT / **LOD B** – GENERIC OBJECT / **LOD C** – DEFINED OBJECT / **LOD D** – DETAILED OBJECT / **LOD E** – SPECIFIC OBJECT / **LOD F** – IMPLEMENTED OBJECT / **LOD G** – UPDATED OBJECT.

DIFFERENT LOD SCALES ARE DEFINED FOR BUILDINGS AND NEW CONSTRUCTION WORKS, FOR RESTORATION WORK, FOR TERRITORIAL AND INFRASTRUCTURE WORKS, FOR THE SITE (VEHICLES AND EQUIPMENT).

THE LEVEL OF DEVELOPMENT IS EITHER SPECIFIED BY THE EMPLOYER IN THE **EMPLOYER'S INFORMATION REQUIREMENTS** OR AGREED BETWEEN THE EMPLOYER AND THE SUPPLIER THROUGH THE **INFORMATION MANAGEMENT PLAN** FOR THE WORK IN ACCORDANCE WITH THE **INFORMATION MANAGEMENT BID** AND THE EMPLOYER'S INFORMATION REQUIREMENTS (EIR).

EXAMPLE LOD FOR A WALL

LOD A	LOD B	LOD C	LOD D	LOD E	LOD F	LOD G
						
Geometry Vertical or pseudo-vertical architectural element represented by a 2D symbol.	**Geometry** Generic solid to represent a vertical or pseudo-vertical architectural element with approximate shape, thickness and position.	**Geometry** Vertical or pseudo-vertical architectural element (system and sub-system) represented by outlines calculated according to the technical standards.	**Geometry** Vertical or pseudo-vertical architectural element represented by a solid with dimensions equal to the real dimensions. It models all the stratigraphy.	**Geometry** Vertical or pseudo-vertical architectural element represented by a solid with dimensions equal to the real dimensions. It includes all the stratigraphy, material supplier-specific data and the finishes.	**Geometry** Wall object. As in LOD E (as-built survey).	**Geometry** Wall object. New works: as in LOD F (with updates) Maintenance and management on existent elements: as in LOD C or D (starting from).
Object 2D graphic (2D lines and backgrounds)	**Object** 3D solid	**Object** Structured 3D solid	**Object** Complex 3D solids	**Object** Complex 3D solids	**Object** Complete wall solids	**Object** Wall solids
Characteristics - Approximate positioning	**Characteristics** - Simple outline geometries	**Characteristics** - Thickness - Length - Width - Volume - Material definitions - Main stratigraphy definitions - Architectural system definition	**Characteristics** - Detailed stratigraphy definitions - Component thicknesses - Structure - Insulation - Air chamber - Support background - Finish - Constructional details - Component details by group, without reference to individual products	**Characteristics** - Interior finish type - Interior finish surfaces - Exterior finish type - Exterior finish surfaces - Material/Component Composition - Certifications - Structural capacity - Vapor transmission - R value - U value - Absorption value - Sound transmission - Component details by individual product - Mounting information - Substrate material - Individual product datasheets	**Characteristics** - Maintenance manual - Classification (UNI 8290, CSI, etc.) - Product certification - Approval certificate - Finished wall system	**Characteristics** - Maintenance date

LOD A - **SYMBOLIC OBJECT** - THE ENTITIES ARE REPRESENTED GRAPHICALLY BY A SYSTEM OF GEOMETRIC SYMBOLS OR A REPRESENTATION TAKEN AS A REFERENCE WITHOUT GEOMETRIC CONSTRAINTS.
THE QUANTITATIVE AND QUALITATIVE CHARACTERISTICS (PERFORMANCE, SIZE, SHAPE, LOCATION, COST, ETC.) ARE APPORXIMATE. [oggetto simbolico]

LOD B - **GENERIC OBJECT** - THE ENTITIES ARE VIRTUALIZED GRAPHICALLY AS A GENERIC GEOMETRIC SYSTEM OR OUTILNE GEOMETRY.
THE QUANTITATIVE AND QUALITATIVE CHARACTERISTICS (PERFORMANCE, SIZE, SHAPE, LOCATION, COST, ETC.) ARE APPORXIMATE. [oggetto generico]

LOD C - DEFINED OBJECT - THE ENTITIES ARE VIRTUALIZED GRAPHICALLY AS A DEFINED GEOMETRIC SYSTEM.
IT DEFINES THE QUANTITATIVE AND QUALITATIVE CHARACTERISTICS (PERFORMANCE, SIZE, SHAPE, LOCATION, ORIENTATION, COST, ETC.) IN A GENERIC WAY AND IN ACCORDANCE WITH THE LIMITS OF THE LEGISLATION IN FORCE AND THE TECHNICAL REFERENCE STANDARDS APPLICABLE TO A RANGE OF SIMILAR ENTITIES. [oggetto definito]

LOD D - **DETAILED OBJECT** - THE ENTITIES ARE VIRTUALIZED GRAPHICALLY AS A DETAILED GEOMETRIC SYSTEM.
THE QUANTITATIVE AND QUALITATIVE CHARACTERISTICS (PERFORMANCE, SIZE, SHAPE, LOCATION, ORIENTATION, COST, ETC.) ARE SPECIFIC TO A RANGE OF SIMILAR PRODUCTS.
IT DEFINES THE INTERFACE WITH OTHER SPECIFIC CONSTRUCTION SYSTEMS, INCLUDING THE APPROXIMATE SPACES FOR MOVEMENT AND MAINTENANCE. [oggetto dettagliato]

LOD E - **SPECIFIC OBJECT** - THE ENTITIES ARE VIRTUALIZED GRAPHICALLY AS A SPECIFIC GEOMETRIC SYSTEM.
THE QUANTITATIVE AND QUALITATIVE CHARACTERISTICS (PERFORMANCE, SIZE, SHAPE, LOCATION, ORIENTATION, COST, ETC.) ARE SPECIFIC TO A SINGLE PRODUCTION SYSTEM RELATED TO A DEFINED PRODUCT.
IT DEFINES THE DETAILS RELATED TO MANUFACTURE, ASSEMBLY AND INSTALLATION, INCLUDING THE SPECIFIC SPACES FOR MOVEMENT AND MAINTENANCE. [oggetto specifico]

LOD F - **IMPLEMENTED OBJECT** - THE OBJECTS EXPRESS THE VIRTUALIZATION VERIFIED AT THE SPECIFIC SITE OF THE PRODUCTION SYSTEM IMPLEMENTED/BUILT (AS-BUIT).
THE QUANTITATIVE AND QUALITATIVE CHARACTERISTICS (PERFORMANCE, SIZE, SHAPE, LOCATION, ORIENTATION, COST, ETC.) ARE SPECIFIC TO THE SINGLE PRODUCTION SYSTEM OF THE LAID OR INSTALLED PRODUCT.
FOR EACH SINGLE PRODUCT, IT DEFINES THE MANAGEMENT, MAINTENANCE AND/OR REPAIR AND REPLACEMENT WORK TO BE CARRIED OUT THROUGHOUT THE LIFE CYCLE OF THE WORK. [oggetto eseguito]

LOD G - **UPDATED OBJECT** - THE OBJECTS EXPRESS THE UPDATED VIRTUALIZATION OF THE ACTUAL STATE OF AN ENTITY AT A SPECIFIC TIME. IT IS A HISTORICAL REPRESENTATION OF THE PASSAGE FO THE USEFUL LIFE OF A SPECIFIC PRODUCTION SYSTEM UPDATED WITH RESPEC TO THAT WHICH WAS ORIGINALLY IMPLEMENTED/BUILT OR INSTALLED.
THE QUANTITATIVE AND QUALITATIVE CHARACTERISTICS (PERFORMANCE, SIZE, SHAPE, LOCATION, ORIENTATION, COST, ETC.) ARE SPECIFIC TO THE LIFE CYCLE OF A PREVIOUS STATE.
IT ANNOTATES EACH INDIVIDUAL (AND SIGNIFICANT) MANAGEMENT, MAINTENANCE AND/OR REPAIR AND REPLACEMENT WORK CARRIED OUT OVER TIME, AND RECORDS THE LEVEL OF ANY DEGRADATION IN PROGRESS. [oggetto aggiornato]

THE **UNI 11337-4:2017** PROVIDES LOD EXAMPLES FOR:

- **ARCHITECTURE FIELD** (WALL, SUPPORTING BRICK WALL, STRUCTURAL FLOOR, ROOFING, WINDOW, DOOR, HORIZONATAL FINISHES, SPACES, CONTINUOUS FACADES).

- **STRUCTURAL FIELD** (FREESTANING IN SITU CONCRETE PLINTHS, CONTINUOUS IN SITU CONCRETE FOUNDATIONS, IN SITU CONCRETE RAFT FOUNDATIONS, IN SITU CONCRETE COLUMNS, IN SITU CONCRETE BEAMS, IN SITU CONCRETE WALLS, HORIZONATL PLATE STRUCTURES, PREDALLES TYPE FLOORS, CONCRETE AND MASONRY FLOORS, PLINTH FOR PREFABRICATED SOCKED FOUNDATIONS, PREFABRICATED COLUMN, PREFABRICATED BEAMS, PREFABRICATED WALLS, PREFABRICATED HONEYCOMB FLOOR AND SLAB, STEEL COLUMN, STEEL BEAMS, STEEL WIND BRACES, LOAD BEARING SLAB FLOOR)

- **PLANT FIELD** (HEATING, VENTILATION AND AIR CONDITIONING, WATER SUPPLY PIPEWORK, AERAULIC PLANT DUCTING, BOILER, SANITARY PIPEWORK, ELECTRIC PUMP, HYDRAUILC TERMINATION, FIRE PREVENTION PIPEWORK, ELECTRICAL PLANT CABLE DUCTS, LIGHTING DEVICE, UNINTERRUPTIBLE POWER SUPPLY)

- **SITE FIELD** - VEHICLES AND EQUIPMENT (OVERHEAD HANDLING MACHINERY, EARTH MOVING MACHINERY).

THE MOST WIDELY USED CLASSIFICATION IS THAT OF THE **BIM FORUM**.

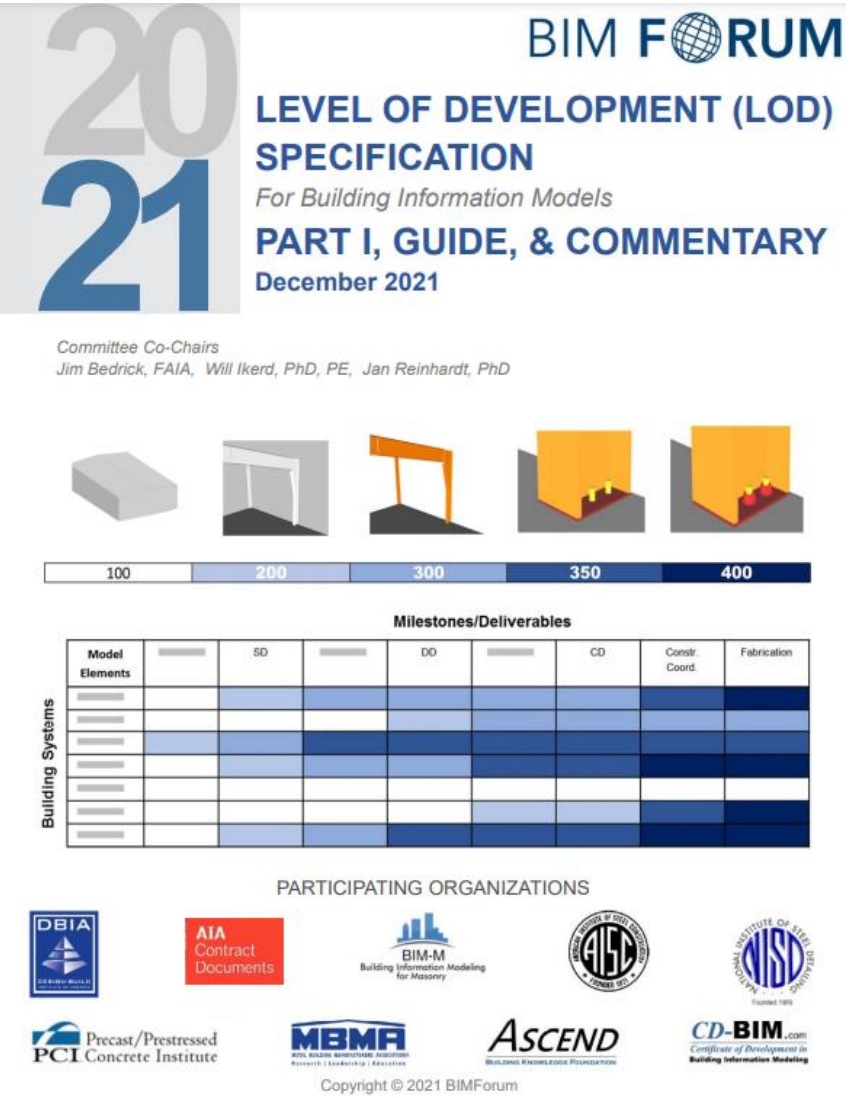
FUNDAMENTAL LOD DEFINITIONS

LOD IS SOMETIMES INTERPRETED AS LEVEL OF DETAIL RATHER THAN LEVEL OF DEVELOPMENT. THIS SPECIFICATION USES THE CONCEPT OF LEVEL OF DEVELOPMENT. THERE ARE IMPORTANT DIFFERENCES.

LEVEL OF DETAIL IS ESSENTIALLY HOW MUCH DETAIL IS INCLUDED IN THE MODEL ELEMENT. **LEVEL OF DEVELOPMENT** IS THE DEGREE TO WHICH THE ELEMENT'S GEOMETRY HAS BEEN THOUGHT THROUGH – THE DEGREE TO WHICH PROJECT TEAM MEMBERS MAY RELY ON THE INFORMATION WHEN USING THE MODEL.

IN ESSENCE, LEVEL OF DETAIL CAN BE THOUGHT OF AS INPUT TO THE ELEMENT, WHILE LEVEL OF DEVELOPMENT IS RELIABLE OUTPUT.

IT IS IMPORTANT TO NOTE THAT THE **INTERNATIONAL TERMINOLOGY** REGARDING LEVEL OF DEVELOPMENT AND LEVEL OF DETAIL **VARIES**. SOME COUNTRIES REFER TO THE LEVEL OF DEVELOPMENT CONCEPT DEFINED WITHIN THIS SPECIFICATION AS THE LEVEL OF DETAIL AND USE **DIFFERENT NUMBERING SYSTEMS**.



LOD 100 [A]

BIMForum Interpretation: LOD 100 elements are not geometric representations. Examples are information attached to other model elements or symbols showing the existence of a component but not its shape, size, or precise location. Any information derived from LOD 100 elements must be considered approximate.

LOD 200 [B]

BIMForum interpretation: At this LOD elements are generic placeholders. They may be recognizable as the components they represent, or they may be volumes for space reservation. Any information derived from LOD 200 elements must be considered approximate.

LOD 300 [C]

BIMForum interpretation: The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs. The project origin is defined and the element is located accurately with respect to the project origin.

LOD 350 [D]

BIMForum interpretation. Parts necessary for coordination of the element with nearby or attached elements are modeled. These parts will include such items as supports and connections. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs.

LOD 400 [E]

BIMForum interpretation. An LOD 400 element is modeled at sufficient detail and accuracy for fabrication of the represented component. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs.

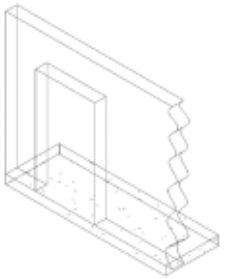
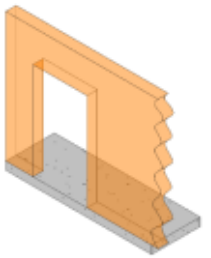
LOD 500 (NOT USED) [F]

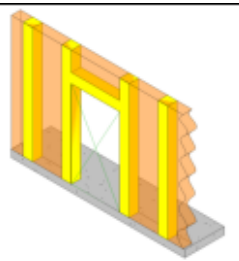
BIMForum interpretation. Since LOD 500 relates to field verification and is not an indication of progression to a higher level of model element geometry or non-graphic information, this Specification does not define or illustrate it.

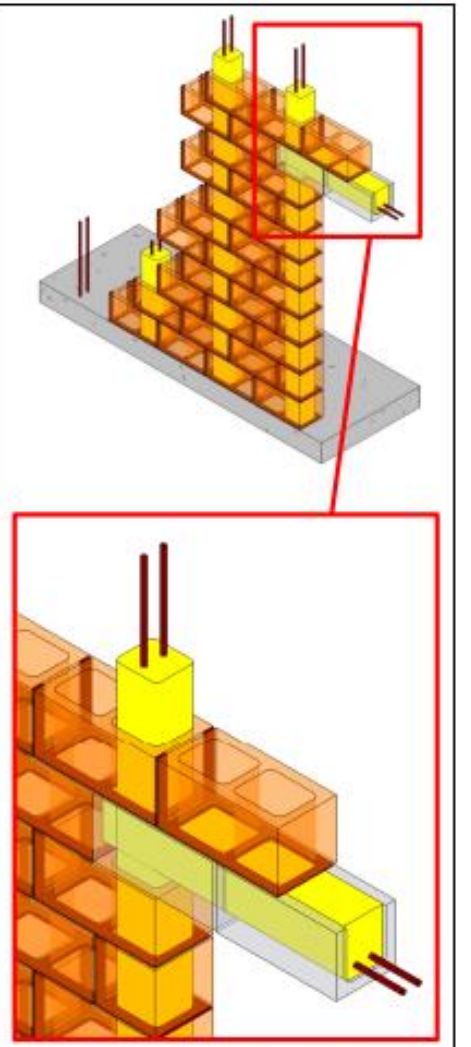
Exterior Wall Construction (Masonry)

Includes: Exterior Wall Supplementary Components as appropriate. Includes Exterior Wall Opening Supplementary Components as appropriate. Includes: Solid wall construction that is composite in nature; in other words, multiple layers of materials to form an overall assembly.

Associated Masterformat Sections: 01 83 16

100	N/A	
200	Generic wall objects separated by type of material (e.g. brick wall vs. terracotta). Approximate thickness of layer represented by a single assembly. Layouts and locations still flexible.	 *75 B2010.04-LOD-200 Exterior Wall (Masonry)* From ikerd.com
300	Specific wall modeled to actual dimensions. Penetrations are modeled to nominal dimensions for major wall openings such as windows, doors, and large mechanical elements. Shear panels	 *76 B2010.04-LOD-300 Exterior Wall (Masonry),* From ikerd.com

350	Element modeling to include:
	• Members modeled at any interface with wall edges (top, bottom, sides) or opening through wall
	• All penetrations are modeled at actual rough-opening dimensions.
	• Openings modeled with support framing around openings
	• Any regions that would impact coordination with other systems such as but not limited to:
	  ○ Bond Beam & Lintel Regions
	  ○ Reinforcing & Embed Regions
	  ○ Jam Regions
	  ○ Any other grouted regions
		
		77 B2010.04-LOD-350 Exterior Wall (Masonry)
		From ikerd.com

400	Element modeling to include: • Reinforcing • Connections • Grouting Material • Jams • Bond Beams • Lintels • Member fabrication part number • Any part required for complete installation	 *78 B2010.04-LOD-400 Exterior Wall (Masonry)* From ikerd.com

UNI 11337-5:2017 INTRODUCES AND PROVIDES DEFINITIONS OF THE FOLLOWING TERMS:

TERMS RELATING TO **ROLES**:

SUPPLIER – ANY PHISICAL OR LEGAL ENTITY THAT, WITH ANY KIND OF CONTRACT COMMISIONED BY AN EMPLOYER, CONTRACTS A WORK, SERVICE OR SUPPLY. [affidatario]

EMPLOYER – ANY PHISICAL OR LEGAL ENTITY THAT, WITH ANY KIND OF CONTRACT, COMMISSIONS A WORK, SERVICE OR SUPPLY. [committente]

SUB-SUPPLIER – ANY PHISICAL OR LEGAL ENTITY THAT, WITH ANY KIND OF CONTRACT, CONTRACTS A SECONDO LEVEL OF WORK, SERVICE OR SUPPLY. [sub-affidatario]

TERMS RELATING TO **CONTRACTS**:

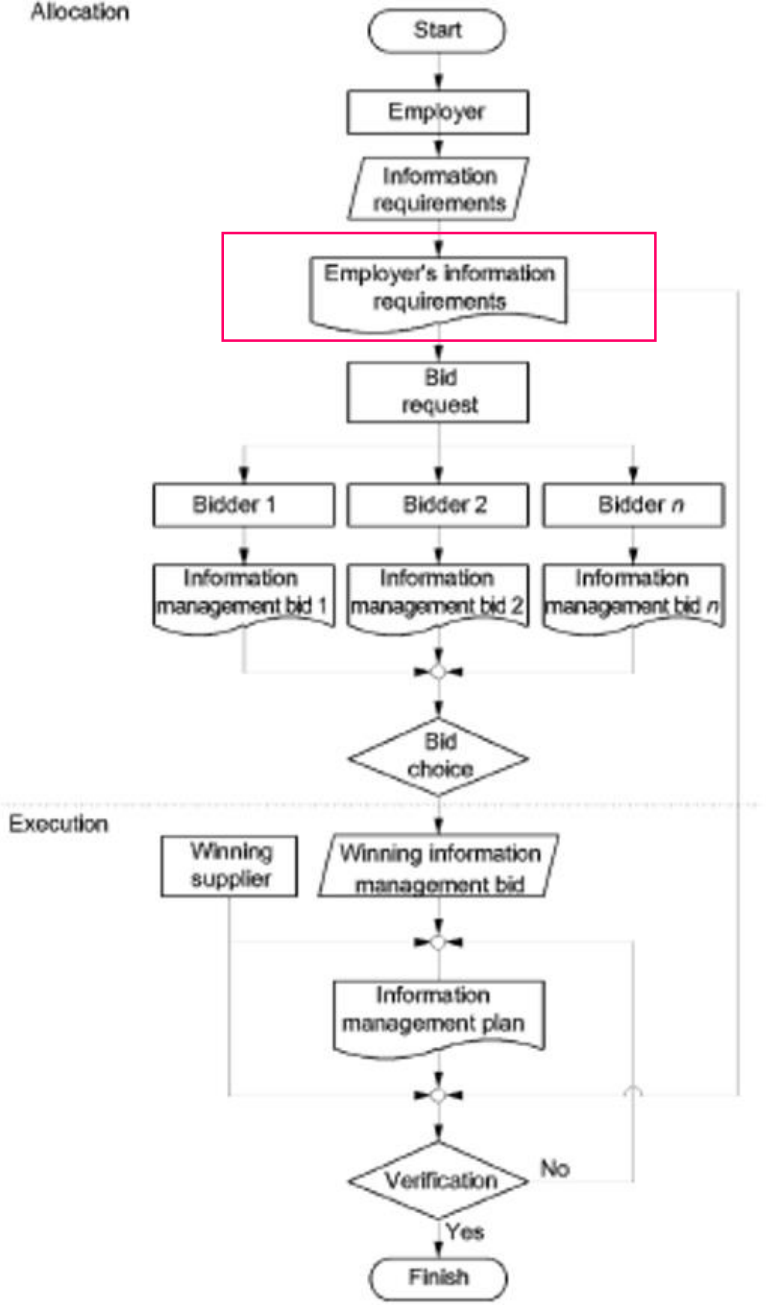
EMPLOYER'S INFORMATION REQUIREMENTS (EIR) - A STATEMENT OF THE INFORMATION NEEDS AND REQUIREMENTS THAT THE EMPLOYER REQUIRES TO THE SUPPLIERS. [capitolato informativo]

INFORMATION MANAGEMENT BID – A STATEMENT AND SPECIFICATION OF THE INFORMATION MANAGEMENT OFFERED BY THE SUPPLIER IN RESPONSE TO THE NEEDS AND REQUISITES REQUIRED BY THE EMPLOYER. [offerta per la gestione informativa]

INFORMATION MANAGEMENT PLAN – AN OPERATIONAL PLAN OF THE INFORMATION MANAGEMENT IMPLEMENTED BY THE SUPPLIER IN RESPONSE TO THE NEEDS AND REQUISITES REQUIRED BY THE EMPLOYER. [piano per la gestione informativa]

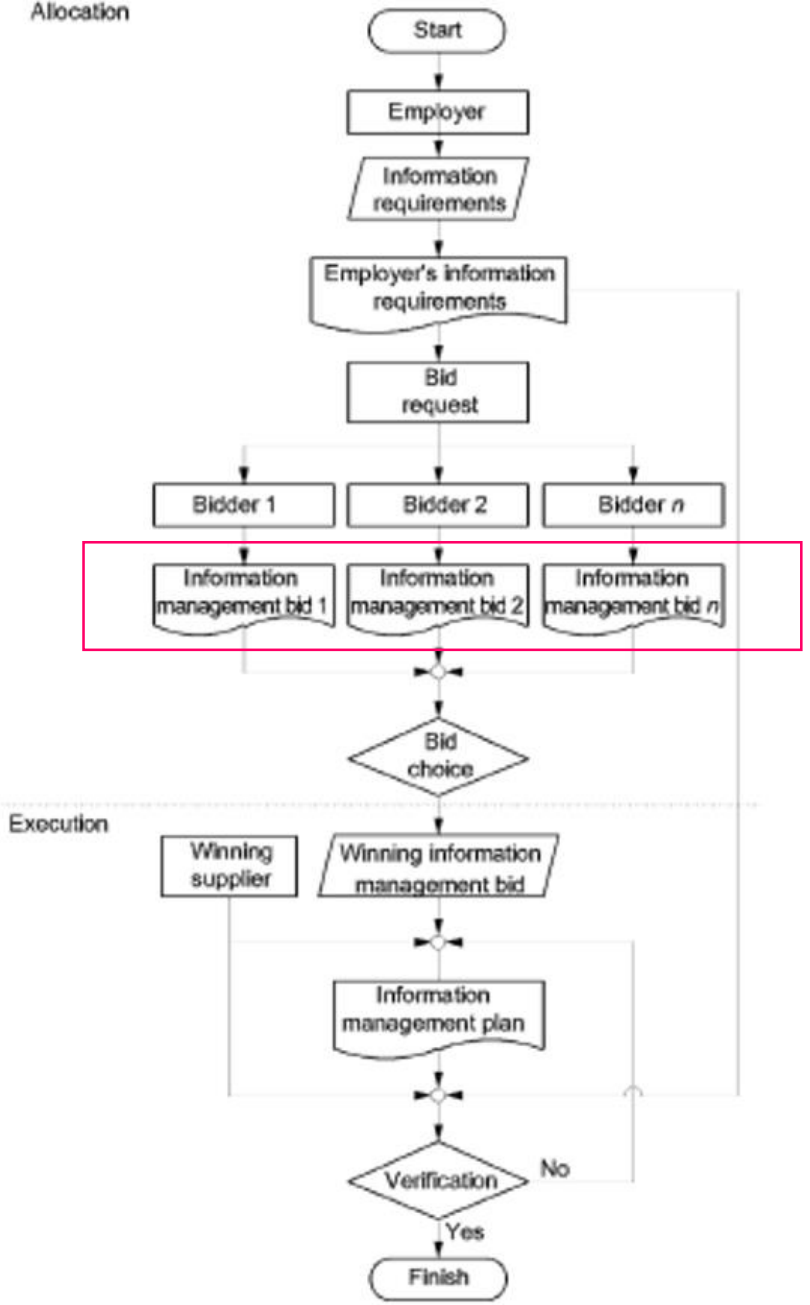
TERMS RELATED TO **CHECKS**:
MODEL AND CODE CHECKING - AN ANALYSIS OF THE POSSIBLE INFORMATION INCONSISTENCIES OF OBJECTS, MODELS AND OUTPUTS WITH RESPECT TO THE RULES AND REGULATIONS. [analisi delle incoerenze]
CLASH DETECTION – AN ANALYSIS OF THE POSSIBLE INTERFERENCE BETWEEN OBJECTS, MODELS AND OUTPUTS WITH RESPECT TO OTHERS. [analisi delle interferenze geometriche]

THREE DIFFERENT DOCUMENTS ARE DRAWN UP TO DEFINE THE REQUIREMENTS FOR THE PRODUCTION, MANAGEMENT (VERIFICATION, VALIDATION, ARCHIVING, ETC.) AND TRANSMISSION OF DATA, INFORMATION AND INFORMATION CONTENT FOR ANY CONSTRUCTION PROCESS WORKS, SERVICES OR SUPPLIES:
- **EMPLOYER'S INFORMATION REQUIREMENTS** [capitolato informativo];
- **INFORMATION MANAGEMENT BID** [offerta per la gestione informativa];
- **INFORMATION MANAGEMENT PLAN** [piano per la gestione informativa]**.**



INFORMATION FLOW

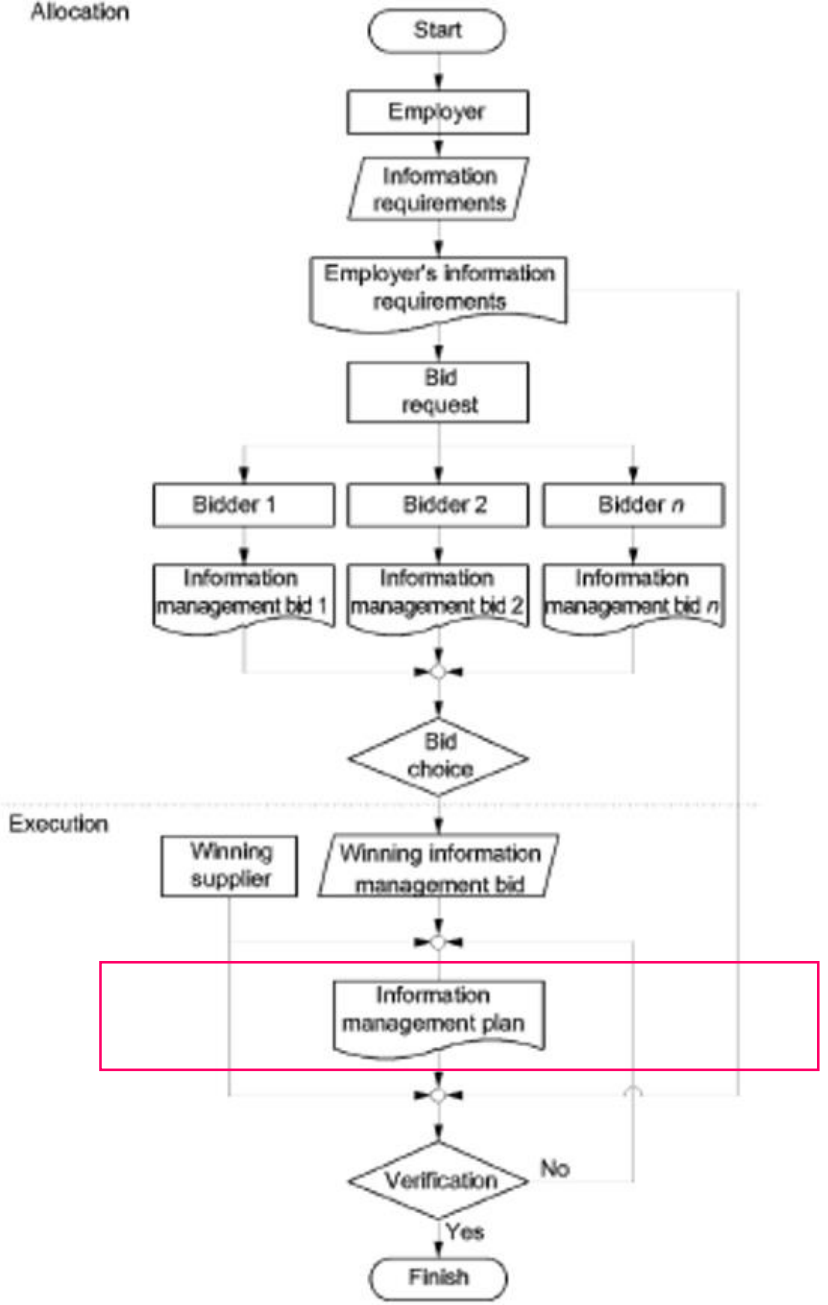
IN THE **CONSTRUCTION PROCESS INFORMATION FLOW**, BEFORE EACH TASK TO BE CONTRACTED, THE EMPLOYER DEFINES ITS INFORMATION NEEDS AND THE RESULTING INFORMATION REQUIREMENTS AND SPECIFIES THEM IN THE **EMPLOYER'S INFORMATION REQUIREMENT** (EIR).



INFORMATION FLOW

IN THE **CONSTRUCTION PROCESS INFORMATION FLOW**, BEFORE EACH TASK TO BE CONTRACTED, THE EMPLOYER DEFINES ITS INFORMATION NEEDS AND THE RESULTING INFORMATION REQUIREMENTS AND SPECIFIES THEM IN THE **EMPLOYER'S INFORMATION REQUIREMENT** (EIR).

IN RESPONSE TO THE EIR FROM THE EMPLOYER INVOLVED PARTIES FORMULATE THEIR **INFORMATION MANAGEMENT BIDS**.



INFORMATION FLOW

IN THE **CONSTRUCTION PROCESS INFORMATION FLOW**, BEFORE EACH TASK TO BE CONTRACTED, THE EMPLOYER DEFINES ITS INFORMATION NEEDS AND THE RESULTING INFORMATION REQUIREMENTS AND SPECIFIES THEM IN THE **EMPLOYER'S INFORMATION REQUIREMENT** (EIR).

IN RESPONSE TO THE EIR FROM THE EMPLOYER INVOLVED PARTIES FORMULATE THEIR **INFORMATION MANAGEMENT BIDS**.

BEFORE CONTRACTING THE TASK, THE CHOSEN SUPPLIER ADDS DETAIL TO AND, IF NECESSARY, REVISES THE ORIGINAL INFORMATION MANAGEMENT BID, CONSOLIDATING IT INTO THE **INFORMATION MANAGEMENT PLAN**.

BY AGREEMENT WITH THE EMPLOYER, THE INFORMATION MANAGEMENT PLAN IS UPDATED BY THE SUPPLIER THAT DREW IT UP WHENEVER NECESSARY AND, IN ANY CASE, WHENEVER EVENTS CHANGE ITS PURPOSE AND GOALS. THE CONTRACT ESTABLISHES THE ALLOWED VARIATION LIMITS IN THE EVENT OF CHANGES.

UNI 11337-5:2017 DEALS ALSO WITH THE FOLLOWING TOPICS:

- PRINCIPAL REQUIREMENTS FOR THE PRODUCTION, MANAGEMENT AND TRANSMISSION OF DATA, INFORMATION AND INFORMATION CONTENT SPECIFIED IN THE EMPLOYER'S INFORMATION REQUIREMENTS (EIR) (TECHNICAL SECTION, MANAGEMENT SECTION);
- INFORMATIONAL CONTENT MANAGEMENT (3 LEVELS OF COORDINATION FLOW);
- DATA, INFORMATION AND INFORMATION CONTENT VERIFICATION (3 LEVELS OF VERIFICATION);
- COMMON DATA ENVIRONMENT (CDE) MANAGEMENT;
- DIGITAL PROCESS FUNCTIONS.

INFORMATION CONTENT MANAGEMENT

THE PROCESS INFORMATION CONTENT MANAGEMENT FOR THE BUILDING INDUSTRY SHOULD GUARANTEE THAT THE DATA AND INFORMATION CONTAINED THERE IS **COMPLETE**, **TRANSMISSIBLE** AND **CONSISTENT**.

THE **EIR** (EMPLOYER'S INFORMATION REQUIREMENTS) DEFINES:
- THE NUMBER AND TYPE OF SINGLE MODELS TO BE DRAWN UP;
- THE NUMBER AND TYPE OF SINGLE MODELS TO BE AGGREGATED;
- THE CLASH DETECTION MANAGEMENT RULES BETWEEN MODELS, BETWEEN OUTPUTS AND BETWEEN MODELS AND OUTPUTS;
- THE RULES FOR STANDARD COMPLIANCE VERIFICATION;
- THE CODE CHECKING MANAGEMENT RULES BETWEEN MODELS, BETWEEN OUTPUTS AND BETWEEN MODELS AND OUTPUTS;
- THE ROLES, RESPONSIBILITIES AND PARTIES DELEGATED TO COORDIANTE, MANAGE AND RESOLVE INFORMATION CONTENT CLASHES AND INCONSISTENCIES.

INFORMATION CONTENT MANAGEMENT

THE DATA AND INFORMATION CONTAINED IN THE VARIOUS GRAPHICAL MODELS THAT BELONG TO A SPECIFIC DIGITAL PROCESS IN THE BUILDING INDUSTRY SHOULD BE COORDINATED WITH EACH OTHER AND WITH THE REFERENCE RULES.
COORDINATION IS DONE THROUGH:
-ANALYSIS AND CONTROL OF PHYSICAL AND INFORMATION INTERFERENCE/CLASHES (CLASH DETECTION);
-ANALYSIS AND CONTROL OF INFORMATION INCONSISTENCIES (MODEL AND CODE CHECKING);
-RESOLUTION OF CLASHES AND INCONSISTENCIES.
GRAPHICAL MODEL COORDINATION IS VERIFIED AUTOMATICALLY USING SPECIFIC SOFTWARE, WHICH GENERATES A REPORT WITH THE OUTCOME OF ITS ANALYSIS AT THE END OF THE VERIFICATION.

3 LEVELS OF COORDINATION FLOW:
- **FIRST COORDINATION LEVEL CL1** – IS DEFINED AS THE COORDINATION OF DATA AND INFORMATION WITHIN A SINGLE GRAPHICAL MODEL.
- **SECOND COORDINATION LEVEL CL2** - IS DEFINED AS THE COORDINATION OF DATA AND INFORMATION BETWEEN SEVERAL SINGLE MODELS.
- **THIRD COORDINATION LEVEL CL3** – IS DEFINED AS THE CONTRO AND RESOLUTION OF CLASHES AND INCONSISTENCIES BETWEEN DATA/INFORMATION/INFORMATION CONTENT GENERATED BY GRAPHICAL MODELS, AND DATA/INFORMATION/INFORMATION CONTENT NOT GENERATED BY GRAPHICAL MODELS.

DATA, INFORMATION AND INFORMATION CONTENT VERIFICATION

THE DATA, INFORMATION AND INFORMATION CONTENT IS VERIFIED ON INFORMATION MODELS OF THE WORK, OVERALL AND/OR ON SINGLE MODELS, OUTPUTS OR OBJECTS, FOR EACH STAGE, IN RELATION TO THE SPECIFIC PROCESS PHASE.

THERE ARE THREE INFORMATION VERIFICATION LEVELS (VL):
VL1 – INTERNAL, FORMAL VERIFICATION;
VL2 – INTERNAL, SUBSTANTIAL VERIFICATION;
VL3 – INDEPENDENT, FORMAL AND SUBSTANTIAL VERIFICATION.

COMMON DATA ENVIRONMENT (CDE) MANAGEMENT

FOR THE PURPOSE OF DIGITAL PROCESS MANAGEMENT ON THE BUILDING INDUSTRY, FOR EACH WORK IT IS NECESSARY TO DEFINE A **COMMON DATA ENVIRONMENT** (CDE) WHERE ALL THE ACCREDITED PARTIES CAN SHARE THE INFORMATION PRODUCED ACCORDING TO PREDETERMINED RULES.
THE COMMON DATA ENVIRONMENT (CDE) IS AN INFORMATION INFRASTRUCTURE FOR ORGANIZED DATA COLLECTION AND MANAGEMENT, INCLUDING ITS PROCEDURES OF USE**.**
THE UNI 11337-5:2017 DEFINES THE CDE REQUIREMENTS. IST MANAGEMENT CAN BE DONE BY THE EMPLOYER OR AN EXTERNAL FIGURE.

UNI 11337-6:2017 DEFINES THE EMPLOYER'S INFORMATION REQUIREMENTS STRUCTURE (EIR).

THE EIR (**EMPLOYER'S INFORMATION REQUIREMENTS)** IS DIVIDED IN FOUR SECTIONS:

- **FOREWORD** (PROJECT IDENTIFICATION, INTRODUCTION, ACRONYMS AND GLOSSARY);
- **LEGISLATION REFERENCES**;
- **TECHNICAL SECTION** (TECHNICAL CHARACTERISTICS AND PERFORMANCE OF THE HARDWARE AND SOFTWARE INFRASTRUCTURE; INFRASTRUCTURE OF THE EMPLOYER AND/OR MADE AVAILABLE; INFRASTRUCTURE REQUIRED BY THE SUPPLIER FOR THE SPECIFIC WORK; DATA SUPPLY FORMATS INITIALLY MADE AVAILABLE BY THE EMPLOYER; DATA SUPPLY AND EXCHANGE; COMMON COORDINATE SYSTEM AND REFERENECE SPECIFICATIONS; OBJECT ENTRY SPECIFICATIONS; OBJECT CLASSIFICATION AND NAMING SYSTEM; REFERENCE SPECIFICATION FOR PROCESS; MODEL AND OUTPUT INFORMATION EVOLUTION; SUPPLIER'S INFORMATION MANAGEMENT SKILLS);
- **MANAGEMENT SECTION** (STRATEGIC INFORMATION GOALS TO THE PROCESS PHASES; LEVELS OF DEVELOPMENT OF THE OBJECTS AND INFORMATION SHEETS; ROLES, RESPONSIBILITIES AND AUTHORITY FOR INFORMATION PURPOSES; INFORMATION CHARACTERISTICS OF THE MODELS, OBJECTS AND/OR OUTPUTS MADE AVAIBLE BY THE EMPLOYER; STRUCTURE AND ORGANIZATION OF THE DIGITAL MODELING; INFORMATION CONTENT SECURITY AND PROTECTION POLICIES; MODEL PROPERTIES; DATA, INFORMATION AND INFORMATION CONTENT SHARING METHODS; MODE, OBJECT AND/OR OUTPUT VERIFICATION AND VALIDATION PROCEDURES; INFORMATION CLASH OR INCONSISTENCY ANALYSIS AND RESOLUTION PROCESS, MANAGEMENT AND PLANNING METHODS (4D, 5D, 6D, 7D); METHODS FOR ARCHIVING AND FINAL DELIVERY OF INFORMATION MODELS, OBJECTS AND/OR OUTPUTS).

UNI 11337-7:2018 INTRODUCES AND PROVIDES DEFINITIONS OF THE FOLLOWING TERMS:

CDE MANAGER – DEALS WITH THE COMMON DATA ENVIRONMENT IMPLEMENTED BY THE ORGANIZATION HE/SHE BELONGS TO A FORESEEN CONTRACTUALLY FOR A SPECIFIC PROJECT BY ANOTHER ACTOR.

BIM MANAGER – RELATES MAINLY AT ORGANIZATIONAL LEVEL, AS CONCERNS THE DIGITAZATION OF PROCESSES IMPLEMENTED BY THE ORGANIZATION, WHERE REQUIRED WITH THE TASK OF SUPERVISION OF GENERAL COORDINATION OF THE PROJECT PORTFOLIO. APPOINTED BY THE HEAD MANAGAMENT OF THE ORGANIZATION, HE/SHE DEFINED THE BIM INSTRUCTIONS AND THE METHODS IN WHICH THE DIGITIZATION PROCESS IMPACTS THE ORGANIZATION AND THE WORK INSTRUMENTS.

BIM COORDINATOR – WORKS AT SINGLE PROJECT LEVEL, LIAISING WITH THE HEAD MANAGEMENT OF THE ORGANIZATION AND AT THE INDICATION OF THE BIM MANAGER.

BIM SPECIALIST – ADVANCED MODELING OPERATOR WHO USUALLY WORKS INTO INDIVIDUAL PROJECTS, COOPERATING CONTINUOUSLY OR OCCASIONALLY WITH A SPECIFIC ORGANIZATION.

UNI 11337-7:2018 DEFINES ALSO SPECIFIC TASKS AND ACTIVITIES OF THESE PROFESSIONALS (TABLES OF KNOWLEDGE, SKILL AND COMPETENCE REQUIREMENTS).

UNI EN ISO 19650 – ORGANIZATION AND DIGITIZATION OF INFORMATION ABOUT BUILDINGS AND CIVIL ENGINEERING WORKS, INCLUDING BUILDING INFORMATION MODELLING (BIM) - INFORMATION MANAGEMENT USING BUILDING INFORMATION MODELLING.	
UNI EN ISO 19650-1:2019	Part 1: Concepts and principles.
UNI EN ISO 19650-2:2018	Part 2: Delivery phase of the assets.
UNI EN ISO 19650-3:2021	Part 3: Operational phase of the assets.
UNI EN ISO 19650-4:2022	Part 4: Information exchange.
UNI EN ISO 19650-5:2020	Part 5: Security-minded approach to information management.

UNI EN ISO 19650-1:2019 INTRODUCES AND PROVIDES DEFINITIONS OF THE FOLLOWING TERMS:

TERMS RELATED TO **ASSETS AND PROJECTS**:

ACTOR - PERSON, ORGANIZATION OR ORGANIZATIONAL UNIT INVOLVED IN A CONSTRUCTION PROCESS. [attore]

APPOINTMENT – AGREED INSTRUCTION FOR THE PROVISION OF INFORMATION CONCERNING WORKS, GOODS OR SERVICES. [incarico]

APPOINTED PARTY – PROVIDER OF INFORMATION CONCERNING WORKS, GOODS OR SERVICES. [soggetto incaricato]

APPOINTING PARTY – RECEIVER OF INFORMATION CONCERNING WORKS, GOODS OR SERVICES FROM A LEAD APPOINTED PARTY. [soggetto proponente]

CLIENT – ACTOR RESPONSIBLE FOR INITIATING A PROJECT AND APPROVING THE BRIEF. [committente]

ASSET – ITEM, THING OR ENTITY THAT HAS POTENTIAL OR ACTUAL VALUE TO AN ORGANIZATION. [cespite immobile]

UNI EN ISO 19650-1:2019 INTRODUCES AND PROVIDES DEFINITIONS OF THE FOLLOWING TERMS:

TERMS RELATED TO **ASSETS AND PROJECTS**:

ACTOR - PERSON, ORGANIZATION OR ORGANIZATIONAL UNIT INVOLVED IN A CONSTRUCTION PROCESS. [attore]

APPOINTMENT – AGREED INSTRUCTION FOR THE PROVISION OF INFORMATION CONCERNING WORKS, GOODS OR SERVICES. [incarico]

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CLIENT – ACTOR RESPONSIBLE FOR INITIATING A PROJECT AND APPROVING THE BRIEF. [committente]

ASSET – ITEM, THING OR ENTITY THAT HAS POTENTIAL OR ACTUAL VALUE TO AN ORGANIZATION. [cespite immobile]

LIFE CYCLE – LIFE OF THE ASSET FROM THE DEFINITION OF ITS REQUIREMENTS TO THE TERMINATION OF ITS USE, COVERING ITS CONCEPTION, DEVELOPMENT, OPERATION, MAINTENANCE SUPPORT AND DISPOSAL. [ciclo di vita]

TRIGGER EVENT – PLANNED OR UNPLANNED EVENT THAT CHANGES AN ASSET OR ITS STATUS DURING ITS LIFE CYCLE, WHICH RESULTS IN INFORMATION EXCHANGE. DURING THE DELIVERY PHASE, TRIGGER EVENTS NORMALLY REFLECT THE ENDS OF PROJECT STAGES. [evento scatenante]

KEY DECISION POINT – POINT IN TIME DURING THE LIFE CYCLE WHEN A DECISION CRUCIAL TO THE DIRECTION OR VIABILITY OF THE ASSET IS MADE. DURING A PROJECT THESE GENERALLY ALIGN WITH PROJECT STAGES. [punto decisionale]

UNI EN ISO 19650-1:2019 IDENTIFIES **TWO PHASES** WITHIN THE LIFE CYCLE OF A BUILDING:

1. **DELIVERY PHASE** – PART OF THE LIFE CYCLE, DURING WHICH AN ASSET IS DESIGNED, CONSTRUCTED AND COMMISSIONED. [fase di consegna]
2. **OPERATIONAL PHASE** - PART OF THE LIFE CYCLE, DURING WHICH AN ASSET IS USED, OPERATED AND MAINTAINED. [fase gestionale]

UNI EN ISO 19650-1:2019 IDENTIFIES **TWO PHASES** WITHIN THE LIFE CYCLE OF A BUILDING:

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2. **OPERATIONAL PHASE** - PART OF THE LIFE CYCLE, DURING WHICH AN ASSET IS USED, OPERATED AND MAINTAINED. [fase gestionale]

TERMS RELATED TO **INFORMATION MANAGEMENT** (OIR, PIR, AIR, EIR, AIM, PIM):
BUILDING INFORMATION MODELLING – USE OF A SHARED DIGITAL REPRESENTATION OF A BUILT ASSET TO FACILITATE DESIGN, CONSTRUCTION AND OPERATION PROCESSES TO FORM A RELIABLE BASIS FOR DECISIONS. [utilizzo di una rappresentazione digitale condivisa di un cespite immobile per facilitare i processi di progettazione, di costruzione e di esercizio, in modo da creare una base decisionale affidabile]
INFORMATION MODEL – SET OF STRUCTURED AND UNSTRUCTURED **INFORMATION CONTAINERS.** [modello informativo]

DELIVERY PHASE -> **PIM - PROJECT INFORMATION MODEL** – INFORMATION MODEL RELATING TO THE DELIVERY PHASE. [modello informativo della commessa]
OPERATIONAL PHASE -> **AIM - ASSET INFORMATION MODEL** – INFORMATION MODEL RELATING TO THE OPERATIONAL. PHASE [modello informativo del cespite immobile]

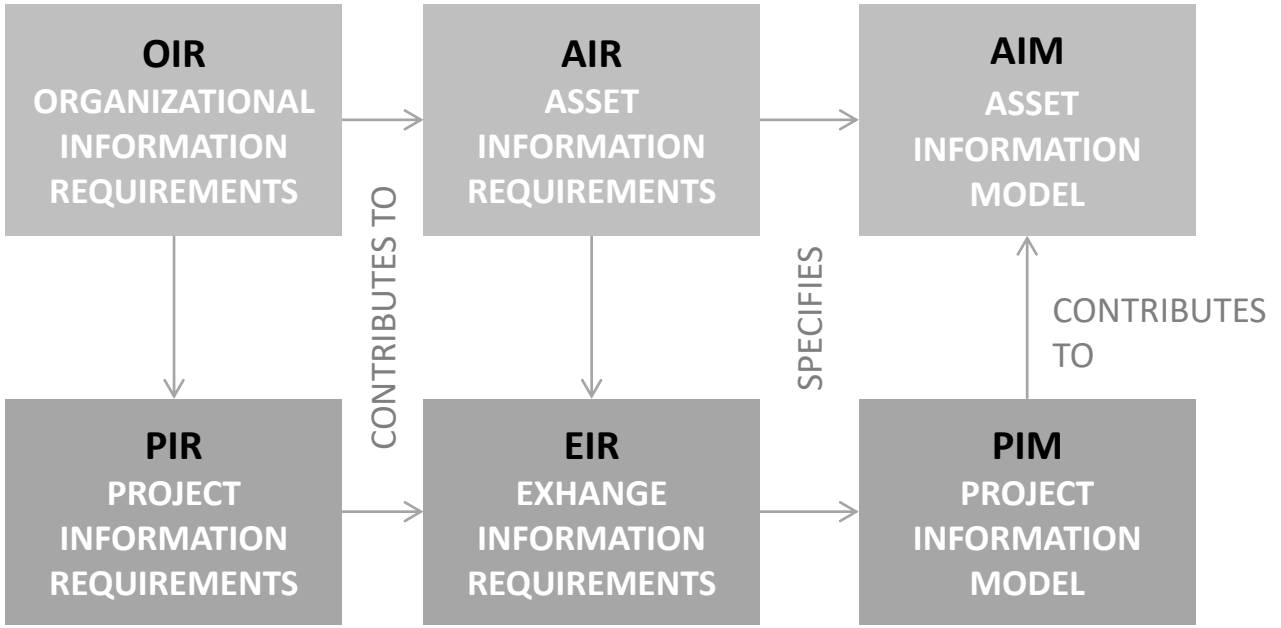
WITHIN THE **TWO PHASES** (DELIVERY AND OPERATIONAL), SPECIFIC **REQUIREMENTS** CAN BE DEFINED (THAT SERVE TO ACHIEVE THE ESTABLISHED GOALS):

OIR - INFORMATION REQUIREMENTS IN RELATION TO ORGANIZATIONAL OBJECTIVES.
[requisiti informativi dell'organizzazione]

AIR - INFORMATION REQUIREMENTS IN RELATION TO THE OPERATION OF AN ASSET.
[requisiti informativi del cespite immobile]

PIR - INFORMATION REQUIREMENTS IN RELATION TO THE DELIVERY OF AN ASSET.
[requisiti informativi della commessa]

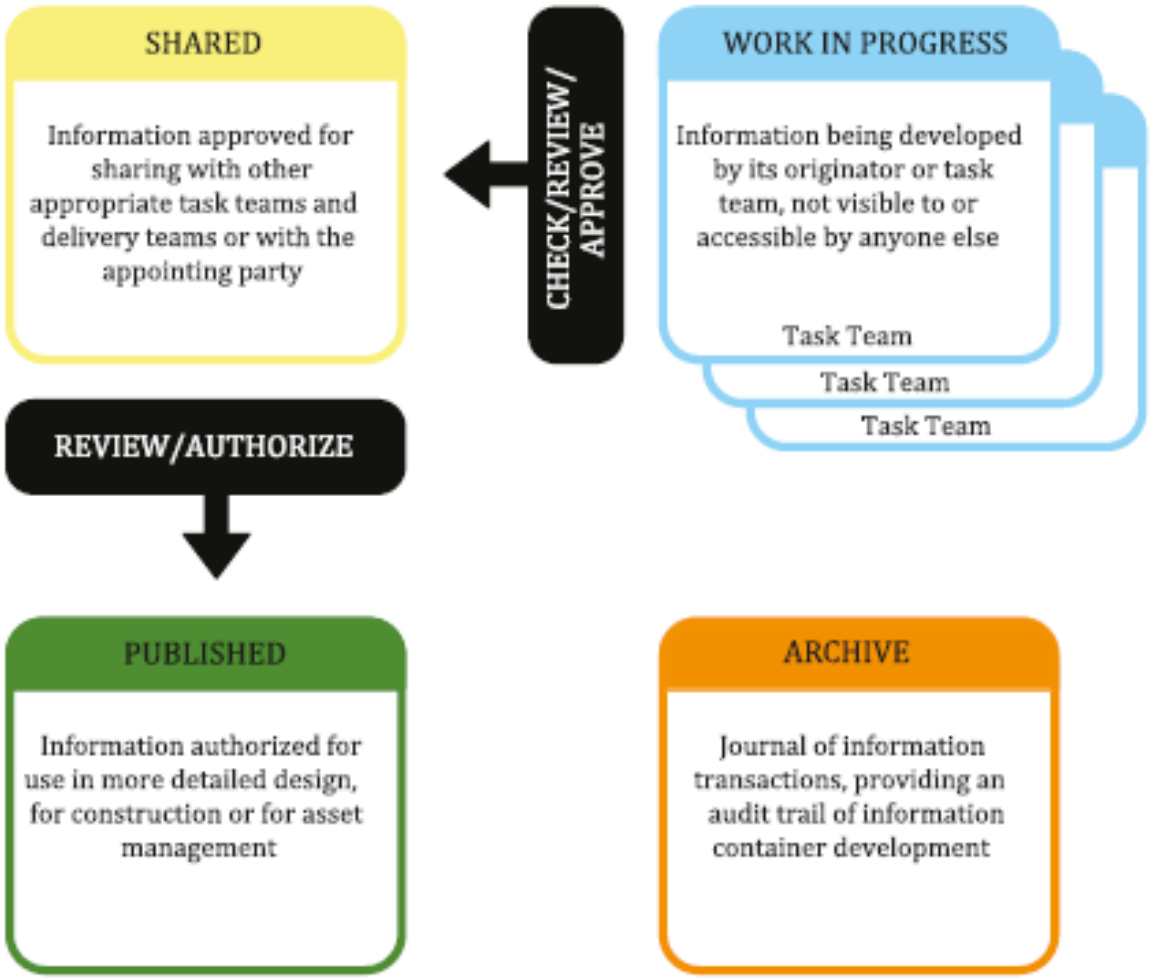
EIR - INFORMATION REQUIREMENTS IN RELATION TO AN APPOINTMENT.
[requisiti di scambio delle informazioni]



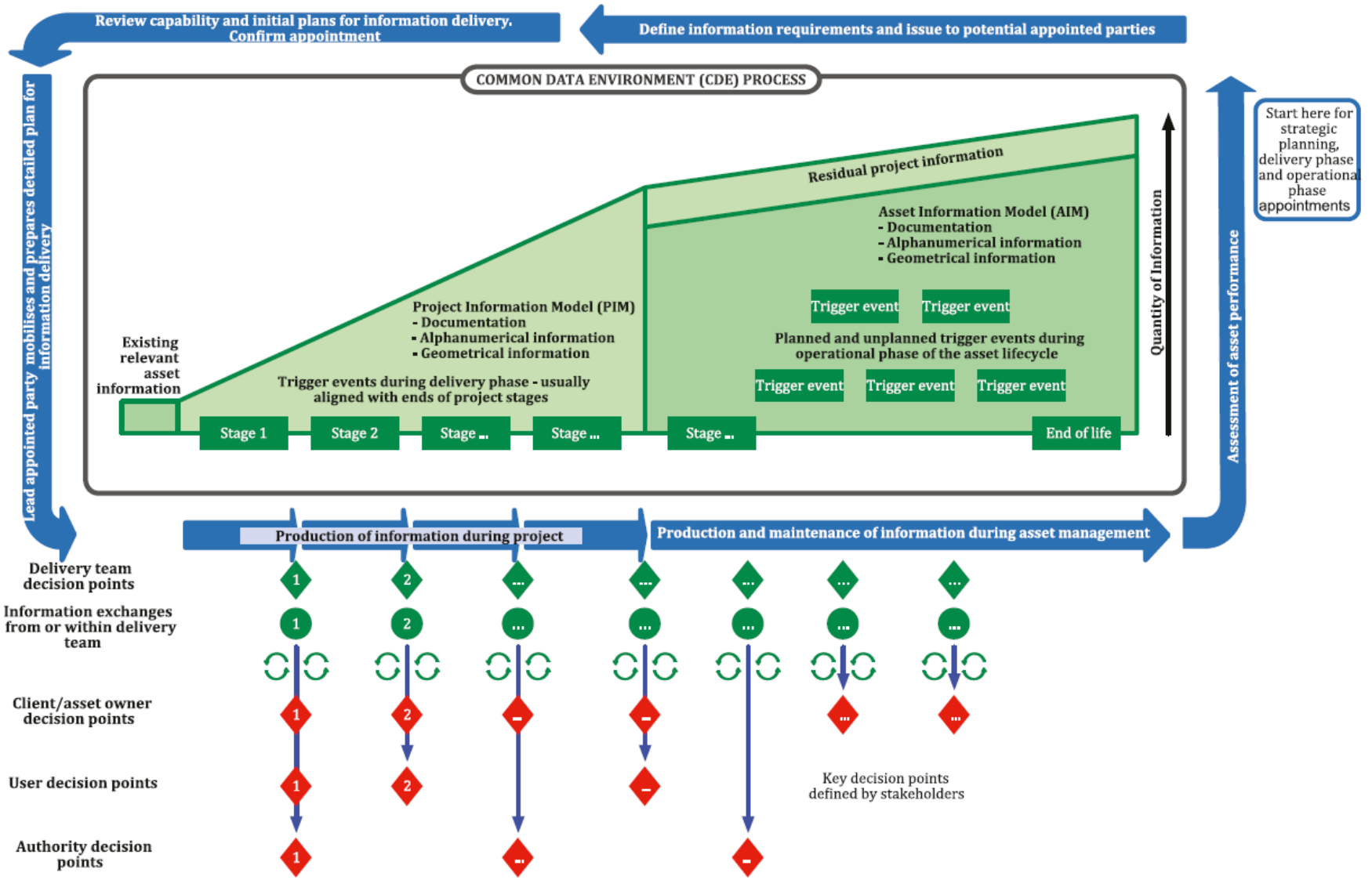
COMMON DATA ENVIRONMENT (CDE).
[ambiente di condivisione dati ACDat]

A **CDE** SOLUTION AND WORKFLOW SHOULD BE USED FOR MANAGING INFORMATION **DURING ASSET MANAGEMENT AND PROJECT DELIVERY**.

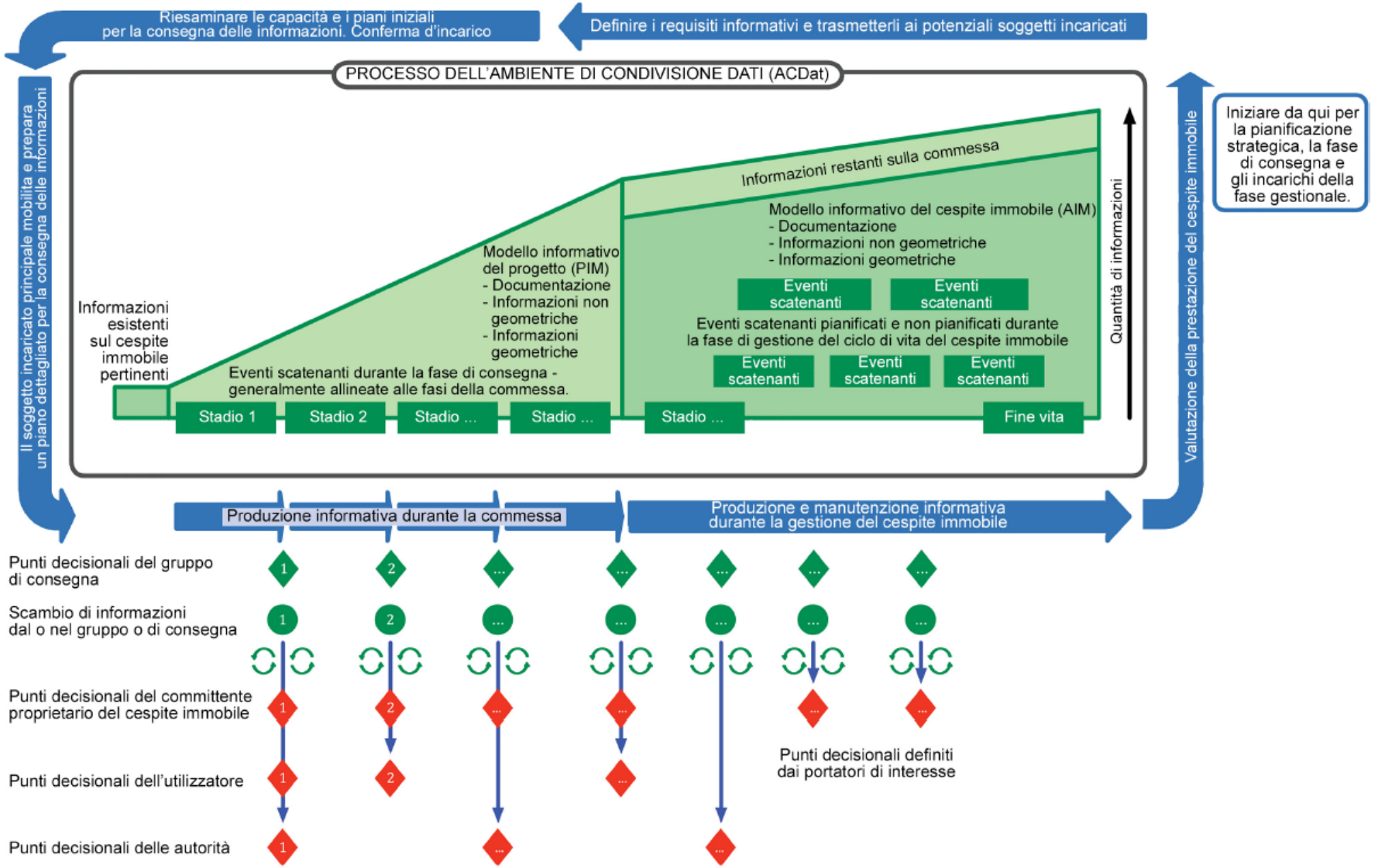
THE **ADVANTAGES** OF ADOPTING A CDE SOLUTION INCLUDE:
-RESPONSIBILITY FOR THE INFORMATION WITHIN EACH INFORMATION CONTAINER REMAINS WITH THE ORGANIZATION THAT PRODUCED IT, AND ALTHOUGH IT IS SHARED AND REUSED ONLY THAT ORGANIZATION IS ALLOWED TO CHANGE THE CONTENTS;
-SHARED INFORMATION CONTAINERS REDUCE THE TIME AND COST IN PRODUCING COORDINATED INFORMATION;
-A FULL AUDIT TRAIL OF INFORMATION PRODUCTION IS AVAILABLE FOR USE DURING AND AFTER EACH PROJECT DELIVERY AND ASSET MANAGEMENT ACTIVITY.



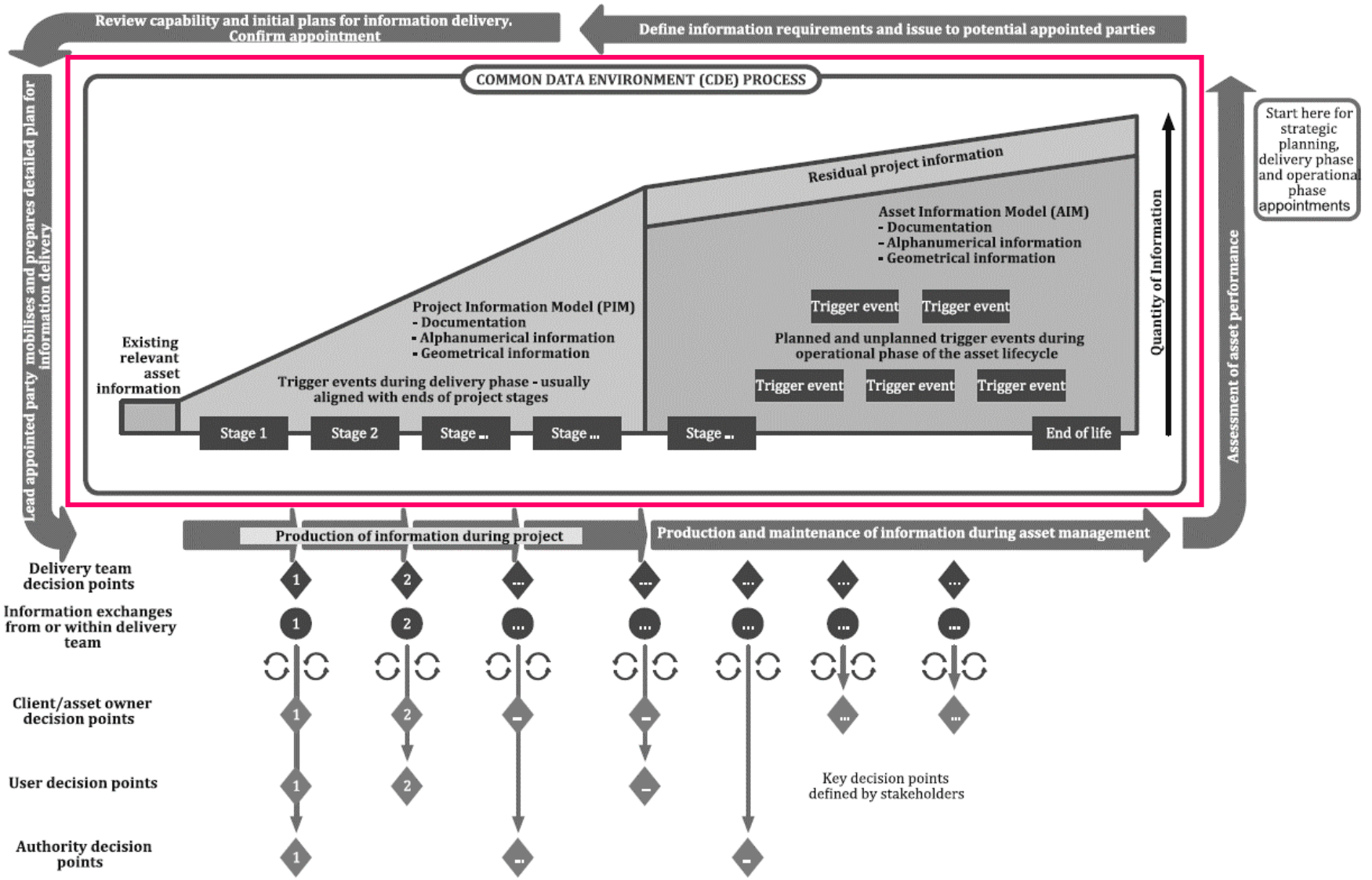
OVERVIEW AND ILLUSTRATION OF THE **INFORMATION MANAGEMENT PROCESS**



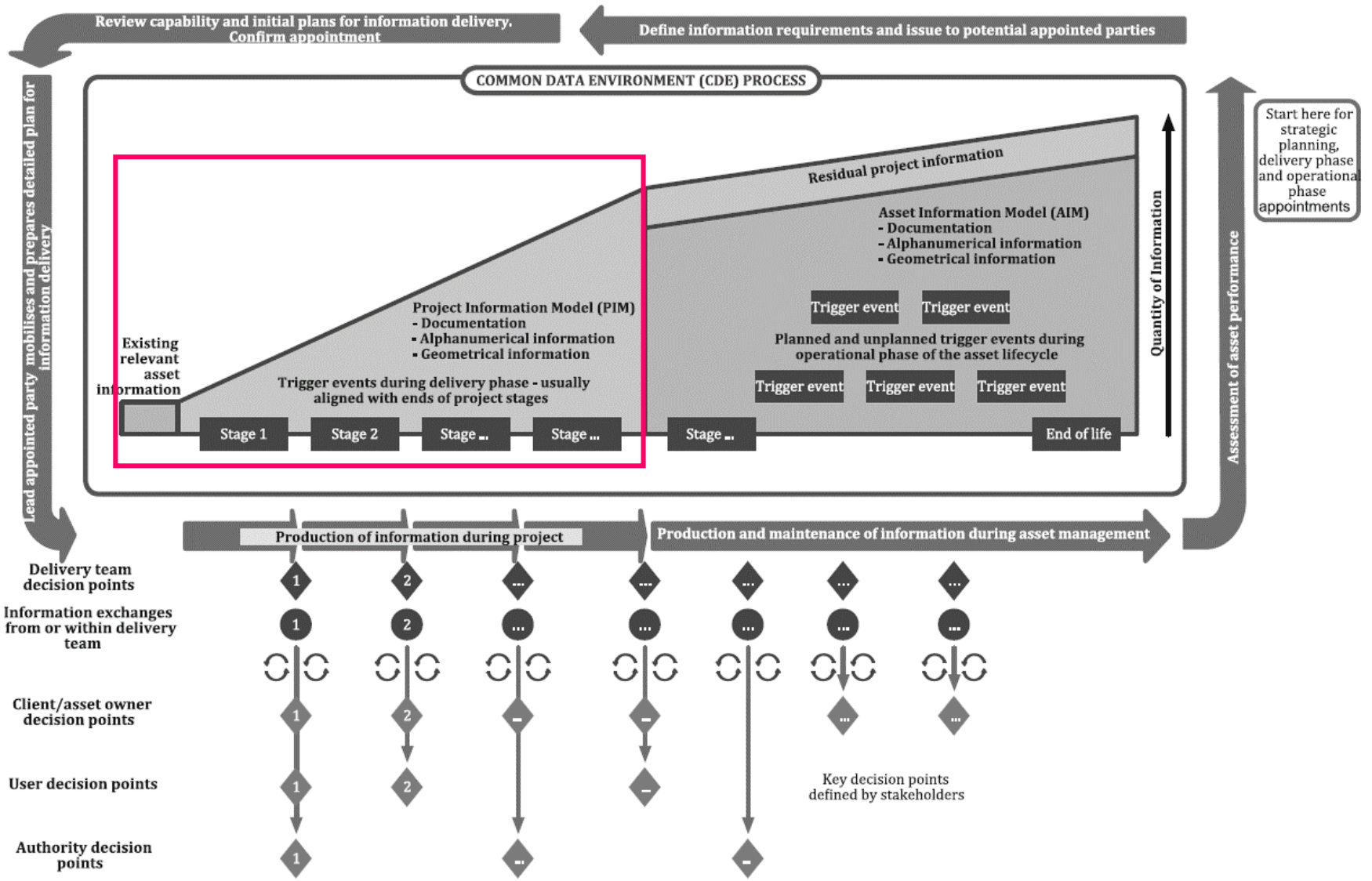
PANORAMICA E RAPPRESENTAZIONE DEL PROCESSO DI GESTIONE DELLE INFORMAZIONI



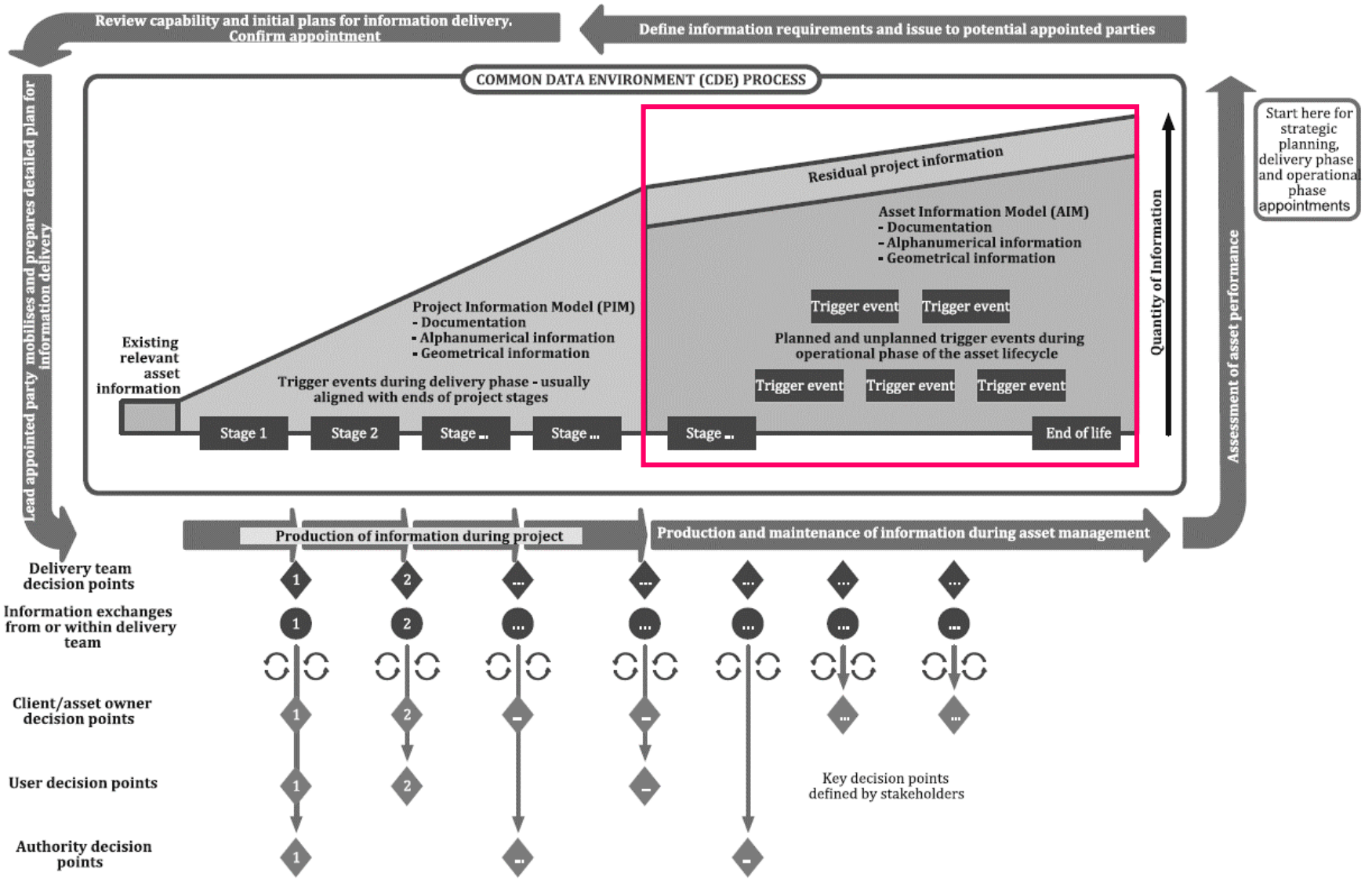
OVERVIEW AND ILLUSTRATION OF THE INFORMATION MANAGEMENT PROCESS



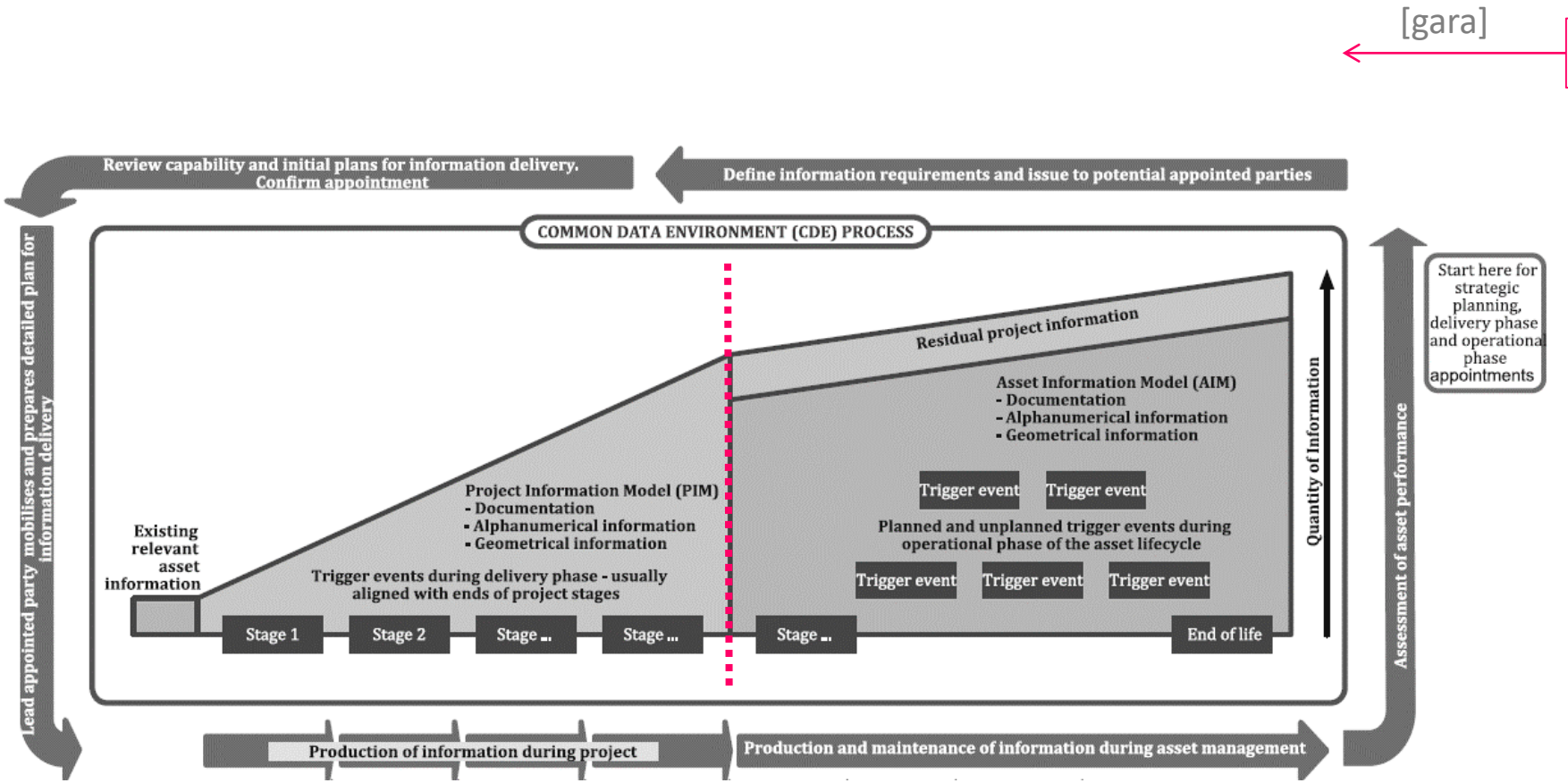
OVERVIEW AND ILLUSTRATION OF THE INFORMATION MANAGEMENT PROCESS



OVERVIEW AND ILLUSTRATION OF THE INFORMATION MANAGEMENT PROCESS

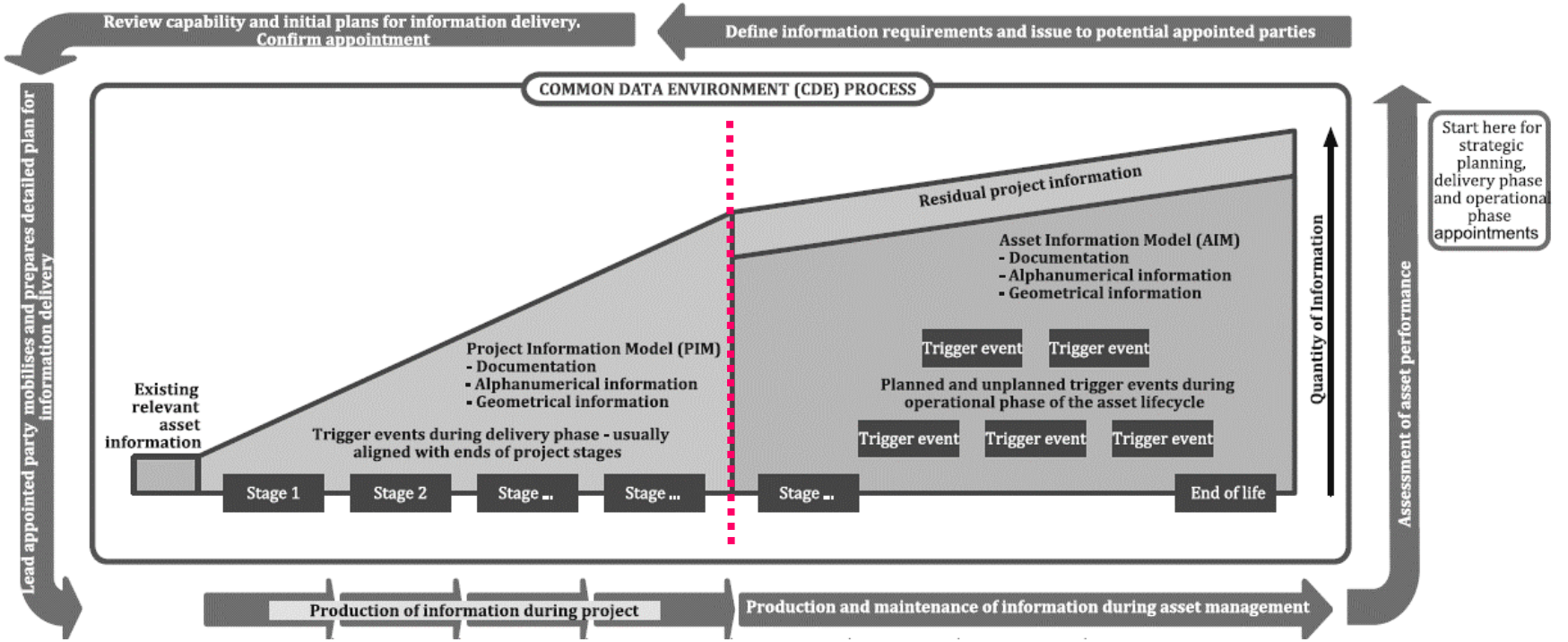


OVERVIEW AND ILLUSTRATION OF THE INFORMATION MANAGEMENT PROCESS



OVERVIEW AND ILLUSTRATION OF THE INFORMATION MANAGEMENT PROCESS

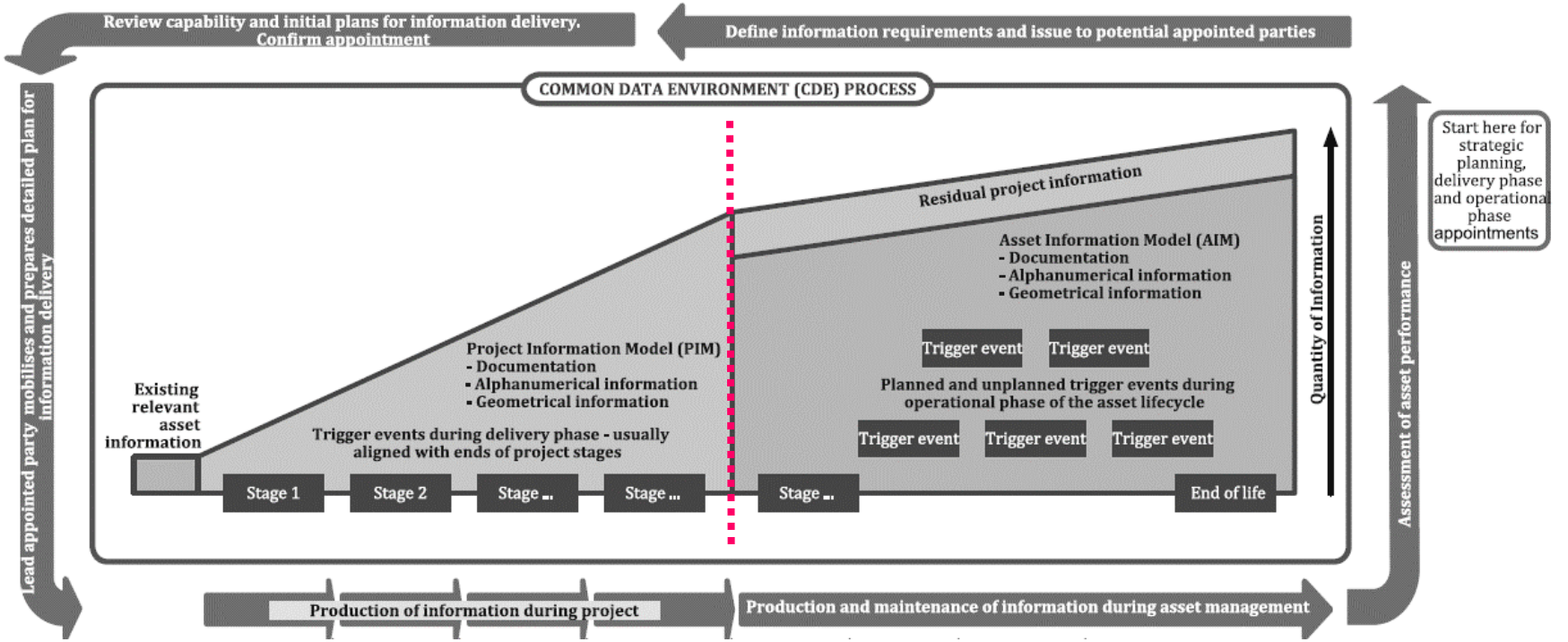
[aggiudicazione] BEP pre-contract / oGI [gara] EIR / CI



[panificazione gara]

OVERVIEW AND ILLUSTRATION OF THE INFORMATION MANAGEMENT PROCESS

MIPD [contratto] BEP post-contract / pGI [aggiudicazione] BEP pre-contract / oGI [gara] EIR / CI



[panificazione gara]

OVERVIEW AND ILLUSTRATION OF THE INFORMATION MANAGEMENT PROCESS

MIPD

[contratto]

BEP post-contract / pGI

[aggiudicazione]

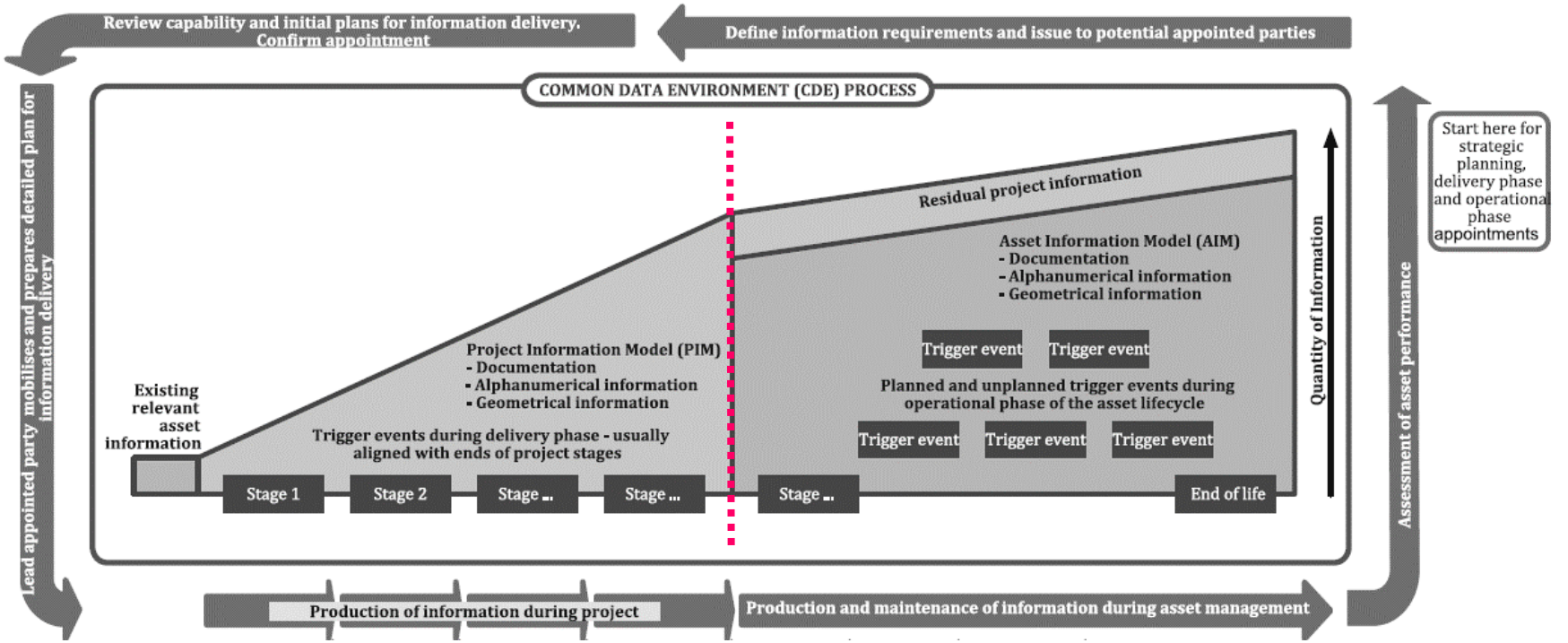
BEP pre-contract / oGI

[gara]

EIR / CI

[mobilization]

[panificazione gara]



[progettazione – esecuzione]

DOCUMENTATION DELIVERY

[manutenzione]

UNI EN ISO 19650-2:2018 INTRODUCES AND PROVIDES DEFINITIONS OF THE FOLLOWING TERMS:

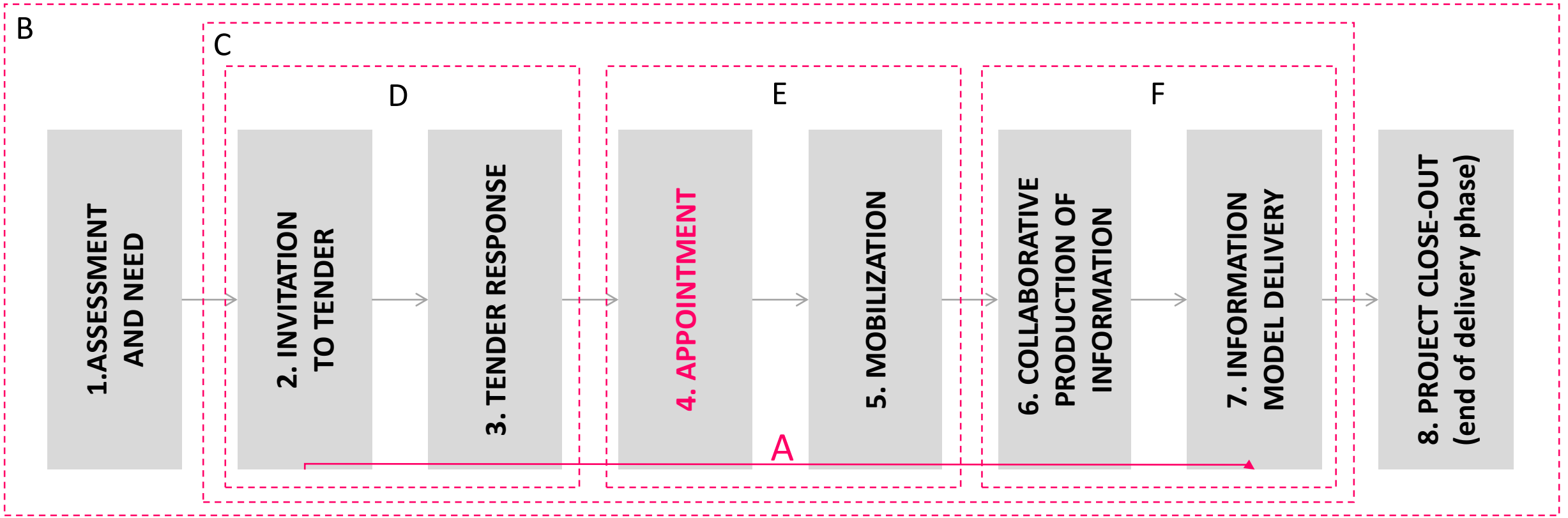
PLAN OF WORK – DOCUMENT THAT DETAILS PRINCIPAL STAGES IN THE DESIGN, CONSTRUCTION WORK AND MAINTENANCE OF A PROJECT AND IDENTIFIES THE MAIN TASKS AND PEOPLE [piano/programma di lavoro]

BIM EXECUTION PLAN – PLAN THAT EXPLAINS HOW THE INFORMATION MANAGEMENT ASPECTS OF THE APPOINTMENT WILL BE CARRIED OUT BY THE DELIVERY TEAM [piano di gestione informativa; pgi (bep)]

MASTER INFORMATION DELIVERY PLAN - MIDP – PLAN INCORPORATING ALL RELEVANT TASK INFORMATION DELIVERY PLANS

TASK INFORMATION DELIVERY PLAN - TIDP – SCHEDULE OF INFORMATION CONTAINERS AND DELIVERY DATES, FOR A SPECIFIC TASK TEAM

INFORMATION MANAGEMENT DURING THE DELIVERY PHASE OF ASSETS



A - INFORMATION MODEL PROGRESSED BY SUBSEQUENT DELIVERY TEAMS FOR EACH APPOINTMENT
B - ACTIVITIES UNDERTAKEN PER PROJECT
C - ACTIVITIES UNDERTAKEN PER APPOINTMENT
D - ACTIVITIES UNDERTAKEN DURING THE PROCUREMENT STAGE (OF EACH APPOINTMENT)
E - ACTIVITIES UNDERTAKEN DURING THE INFORMATION PLANNING STAGE (OF EACH APPOINTMENT)
F - ACTIVITIES UNDERTAKEN DURING THE INFORMATION PRODUCTION STAGE (OF EACH APPOINTMENT)

INFORMATION MANAGEMENT DURING THE DELIVERY PHASE OF ASSETS

1. ASSESSMENT AND NEED [valutazione di fattibilità e formulazione delle esigenze]

- APPOINT INDIVIDUALS TO UNDERTAKE THE INFORMATION MANAGEMENT FUNCTION
- ESTABLISH THE PROJECT'S INFORMATION REQUIREMENTS
- ESTABLISH THE PROJECT'S INFORMATION DELIVERY MILESTONES
- ESTABLISH THE PROJECT'S INFORMATION STANDARD
- ESTABLISH THE PROJECT'S INFORMATION PRODUCTION METHODS AND PROCEDURES
- ESTABLISH THE PROJECT'S REFERENCE INFORMATION AND SHARED RESOURCES
- ESTABLISH THE PROJECT'S COMMON DATA ENVIRONMENT
- ESTABLISH THE PROJECT'S INFORMATION PROTOCOL

2. INVITATION TO TENDER [invito a presentare offerte]

- ESTABLISH THE APPOINTING PARTY'S EXCHANGE INFORMATION REQUIREMENTS
- ASSEMBLE REFERENCE INFORMATION AND SHARED RESOURCES
- ESTABLISH TENDER RESPONSE REQUIREMENTS AND EVALUATION CRITERIA
- COMPILE INVITATION TO TENDER INFORMATION

3. TENDER RESPONSE [offerte]

- NOMINATE INDIVIDUALS TO UNDERTAKE THE INFORMATION MANAGEMENT FUNCTION
- ESTABLISH THE DELIVERY TEAM'S (PRE-APPOINTMENT) BIM EXECUTION PLAN

- ASSESS TASK TEAM CAPABILITY AND CAPACITY
- ESTABLISH THE DELIVERY TEAM'S CAPABILITY AND CAPACITY
- ESTABLISH THE DELIVERY TEAM'S MOBILIZATION PLAN
- ESTABLISH THE DELIVERY TEAM'S RISK REGISTER
- COMPILE THE DELIVERY TEAM'S TENDER RESPONSE

4. APPOINTMENT [incarico]
- CONFIRM THE DELIVERY TEAM'S BIM EXECUTION PLAN
- ESTABLISH THE DELIVERY TEAM'S DETAILED RESPONSIBILITY MATRIX
- ESTABLISH THE LEAD APPOINTED PARTY'S EXCHANGE INFORMATION REQUIREMENTS
- ESTABLISH THE TASK INFORMATION DELIVERY PLAN(S)
- ESTABLISH THE MASTER INFORMATION DELIVERY PLAN
- COMPLETE LEAD APPOINTED PARTY'S APPOINTMENT DOCUMENTS
- COMPLETE APPOINTED PARTY'S APPOINTMENT DOCUMENTS

5. MOBILIZATION [mobilitazione]
- MOBILIZE RESOURCES
- MOBILIZE INFORMATION TECHNOLOGY
- TEST THE PROJECT'S INFORMATION PRODUCTION METHODS AND PROCEDURES

INFORMATION MANAGEMENT DURING THE DELIVERY PHASE OF ASSETS

6. COLLABORATIVE PRODUCTION OF INFORMATION [produzione collaborativa di informazioni]
- CHECK AVAILABILITY OF REFERENCE INFORMATION AND SHARED RESOURCES
- GENERATE INFORMATION
- UNDERTAKE QUALITY ASSURANCE CHECK
- REVIEW INFORMATION AND APPROVE FOR SHARING
- INFORMATION MODEL REVIEW

7. INFORMATION MODEL DELIVERY [consegna del modello informativo]
- SUBMIT INFORMATION MODEL FOR LEAD APPOINTED PARTY AUTHORIZATION
- REVIEW AND AUTHORIZE THE INFORMATION MODEL
- SUBMIT INFORMATION MODEL FOR APPOINTING PARTY ACCEPTANCE
- REVIEW AND ACCEPT THE INFORMATION MODEL

8. PROJECT CLOSE-OUT (end of delivery phase) [chiusura della commessa (fine della fase di consegna)]
- ARCHIVE THE PROJECT INFORMATION MODEL
- CAPTURE LESSONS LEARNED FOR FUTURE PROJECTS

PART 3: OPERATIONAL PHASE OF THE ASSETS.

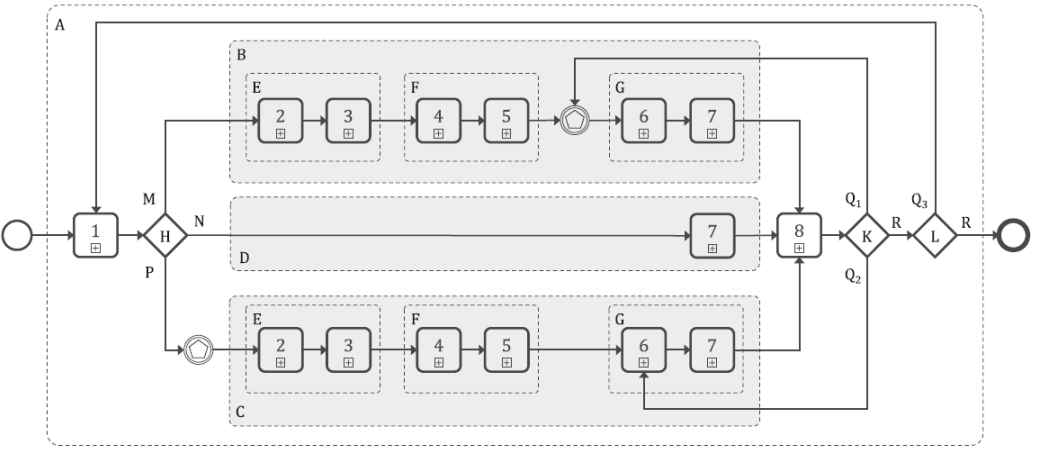
UNI EN ISO 19650-3:2021 INTRODUCES AND PROVIDES DEFINITIONS OF THE FOLLOWING TERMS:

ASSET MANAGEMENT:COORDINATED ACTIVITY OF AN ORGANIZATION TO REALIZE VALUE FROM ASSETS.

FACILITY MANAGEMENT, FACILITIES MANAGEMENT: ORGANIZATIONAL FUNCTION WHICH INTEGRATES PEOPLE, PLACE AND PROCESS WITHIN THE BUILT ENVIRONMENT WITH THE PURPOSE OF IMPROVING THE QUALITY OF LIFE OF PEOPLE AND THE PRODUCTIVITY OF THE CORE BUSINESS.

INFORMATION MANAGEMENT PROCESS TO SUPPORT THE OPERATIONAL PHASE OF ASSETS:
THE INFORMATION MANAGEMENT PROCESS SHALL BE APPLIED THROUGHOUT THE OPERATIONAL PHASE OF EACH ASSET IDENTIFIED THROUGH THE USE OF 5.1.3, AND IN THE CASE OF AN EXISTING ASSET SHALL BE APPLIED TO ALL LEGACY INFORMATION RELATING TO THAT ASSET.

INFORMATION MANAGEMENT ASSOCIATED WITH THE OPERATIONAL PHASE OF ASSETS:



Key

Information management activities		Activity groupings		Decision points, questions and actions	
1	assessment and need	A	activities undertaken during the operational phase of assets	H	type of trigger event providing information
2	invitation to tender/request to provide service	B	activities undertaken for each appointment made before trigger event	K	continuation of the appointment
3	response to invitation to tender/ request to provide service	C	activities undertaken for each appointment made after trigger event or delivery phase using ISO 19650-2	L	continuation of this information management process
4	appointment	D	activities undertaken when acquiring an asset	M	via an appointment made before a trigger event
5	mobilization	E	activities undertaken during the procurement stage (of each appointment)	N	received from another appointing party/asset owner
6	production of information	F	activities undertaken during the information planning stage (of each appointment)	P	via an appointment made after a trigger event or delivery phase using ISO 19650-2
7	information model acceptance by appointing party	G	activities undertaken during the information production stage (of each appointment)	Q_1	yes — lead appointed party waits for next trigger event
8	AIM aggregation			Q_2	yes — lead appointed party progresses to next delivery milestone
				Q_3	yes — appointing party still has responsibility for the asset
				R	no

INFORMATION MANAGEMENT ASSOCIATED WITH THE OPERATIONAL PHASE OF ASSETS

1. ASSESSMENT AND NEED [valutazione di fattibilità e formulazione delle esigenze]

- APPOINT INDIVIDUALS TO UNDERTAKE THE INFORMATION MANAGEMENT FUNCTION
- ESTABLISH ORGANIZATIONAL INFORMATION REQUIREMENTS
- IDENTIFY ASSETS FOR WHICH INFORMATION SHALL BE MANAGED
- IDENTIFY THE ASSET INFORMATION REQUIREMENTS
- IDENTIFY THE FORESEEABLE TRIGGER EVENTS FOR WHICH INFORMATION SHALL BE MANAGED
- ESTABLISH THE ASSET INFORMATION STANDARD
- ESTABLISH THE ASSET INFORMATION PRODUCTION METHODS AND PROCEDURES
- ESTABLISH THE REFERENCE INFORMATION AND SHARED RESOURCES
- ESTABLISH THE COMMON DATA ENVIRONMENT
- ESTABLISH LINKS TO ENTERPRISE SYSTEMS
- ESTABLISH THE ASSET INFORMATION MODEL
- ESTABLISH PROCESSES TO MAINTAIN THE AIM
- ESTABLISH THE ASSET INFORMATION PROTOCOL

INFORMATION MANAGEMENT ASSOCIATED WITH THE OPERATIONAL PHASE OF ASSETS

2. INVITATION TO TENDER/REQUEST TO PROVIDE SERVICE

[invito a presentare offerta/richiesta per la fornitura di un servizio]

- DECIDE THE TYPE OF ACTIVITY PROVIDING INFORMATION
- ESTABLISH THE APPOINTING PARTY'S EIR (ISO 19650-3)
- ASSEMBLE REFERENCE INFORMATION AND SHARED RESOURCES
- ESTABLISH RESPONSE REQUIREMENTS AND EVALUATION CRITERIA
- COMPILE INFORMATION FOR THE INVITATION TO TENDER/REQUEST TO PROVIDE SERVICE

3. RESPONSE TO INVITATION TO TENDER/REQUEST TO PROVIDE SERVICE

[risposta all'invito a presentare]

- NOMINATE INDIVIDUALS TO UNDERTAKE INFORMATION MANAGEMENT FUNCTION
- ESTABLISH THE DELIVERY TEAM'S (PRE-APPOINTMENT) BIM EXECUTION PLAN
- ASSESS TASK TEAM CAPABILITY AND CAPACITY
- ESTABLISH THE DELIVERY TEAM'S CAPABILITY AND CAPACITY
- ESTABLISH THE DELIVERY TEAM'S MOBILIZATION PLAN
- ESTABLISH THE DELIVERY TEAM'S RISK REGISTER
- COMPILE THE DELIVERY TEAM'S RESPONSE

INFORMATION MANAGEMENT ASSOCIATED WITH THE OPERATIONAL PHASE OF ASSETS

4. APPOINTMENT [incarico]
- CONFIRM THE DELIVERY TEAM'S BIM EXECUTION PLAN
- ESTABLISH THE DELIVERY TEAM'S DETAILED RESPONSIBILITY MATRIX
- ESTABLISH THE LEAD APPOINTED PARTY'S EIR (ISO 19650-3)
- ESTABLISH THE TASK INFORMATION DELIVERY PLANS(S)
- ESTABLISH THE MASTER INFORMATION DELIVERY PLAN
- COMPLETE LEAD APPOINTED PARTY'S APPOINTMENT
- COMPLETE APPOINTED PARTY'S APPOINTMENT

5. MOBILIZATION [mobilitazione]
- MOBILIZE RESOURCES
- MOBILIZE INFORMATION TECHNOLOGY
- TEST THE ASSET INFORMATION PRODUCTION METHODS AND PROCEDURES
- MAINTAIN RESOURCES IN READINESS FOR A TRIGGER EVENT

INFORMATION MANAGEMENT ASSOCIATED WITH THE OPERATIONAL PHASE OF ASSETS

6. PRODUCTION OF INFORMATION [produzione di informazioni]
- CHECK AVAILABILITY OF REFERENCE INFORMATION AND SHARED RESOURCES
- GENERATE INFORMATION
- UNDERTAKE QUALITY ASSURANCE CHECK
- REVIEW INFORMATION AND APPROVE FOR SHARING
- REVIEW INFORMATION MODEL
- AUTHORIZE INFORMATION MODEL FOR DELIVERY TO THE APPOINTING PARTY

7. INFORMATION MODEL ACCEPTANCE BY APPOINTING PARTY
[accettazione del modello informativo da parte del soggetto proponente]
- SUBMIT INFORMATION MODEL FOR APPOINTING PARTY ACCEPTANCE
- REVIEW AND ACCEPT THE INFORMATION MODEL

8. AIM AGGREGATION [aggregazione AIM]
- AGGREGATE AN ACCEPTED INFORMATION MODEL INTO THE AIM
- REVIEW AND CONTINUE MAINTENANCE OF THE AIM

PART 5: SECURITY-MINDED APPROACH TO INFORMATION MANAGEMENT.

AS A CONSEQUENCE OF THIS INCREASING USE OF, AND DEPENDENCE ON, INFORMATION AND COMMUNICATIONS TECHNOLOGIES, THERE IS A **NEED TO ADDRESS INHERENT VULNERABILITY ISSUES, AND THEREFORE THE SECURITY IMPLICATIONS THAT ARISE,** WHETHER FOR BUILT ENVIRONMENTS, ASSETS, PRODUCTS, SERVICES, INDIVIDUALS OR COMMUNITIES, AS WELL AS ANY ASSOCIATED INFORMATION.

THIS DOCUMENT PROVIDES A FRAMEWORK TO **ASSIST ORGANIZATIONS IN UNDERSTANDING THE KEY VULNERABILITY ISSUES AND THE NATURE OF THE CONTROLS REQUIRED TO MANAGE THE RESULTANT SECURITY RISKS** TO A LEVEL THAT IS TOLERABLE TO THE RELEVANT PARTIES.

THE SECURITY-MINDED APPROACH CAN BE APPLIED THROUGHOUT THE LIFECYCLE OF AN INITIATIVE, PROJECT, ASSET, PRODUCT OR SERVICE, WHETHER PLANNED OR EXISTING, WHERE SENSITIVE INFORMATION IS OBTAINED, CREATED, PROCESSED AND/OR STORED.

PART 5: SECURITY-MINDED APPROACH TO INFORMATION MANAGEMENT.

UNI EN ISO 19650-2:2018 INTRODUCES AND PROVIDES DEFINITIONS OF THE FOLLOWING TERMS:

METADATA - DATA ABOUT DATA

RISK APPETITE - AMOUNT AND TYPE OF RISK THAT AN ORGANIZATION IS WILLING TO PURSUE OR RETAIN

SECURITY BREACH - INFRACTION OR VIOLATION OF *SECURITY*

SECURITY INCIDENT - SUSPICIOUS ACT OR CIRCUMSTANCE THREATENING *SECURITY*

SECURITY-MINDED - UNDERSTANDING AND ROUTINELY APPLYING APPROPRIATE AND PROPORTIONATE *SECURITY* (3.7) MEASURES IN ANY BUSINESS SITUATION SO AS TO DETER AND/OR DISRUPT HOSTILE, MALICIOUS, FRAUDULENT AND CRIMINAL BEHAVIOURS OR ACTIVITIES

RESIDUAL RISK - RISK THAT REMAINS AFTER CONTROLS HAVE BEEN IMPLEMENTED

THREAT - POTENTIAL CAUSE OF AN INCIDENT WHICH MAY RESULT IN HARM

VULNERABILITY - WEAKNESS THAT CAN BE EXPLOITED TO CAUSE HARM

ESTABLISHING THE NEED FOR A SECURITY-MINDED APPROACH USING A SENSITIVITY ASSESSMENT PROCESS:

- UNDERTAKING A SENSITIVITY ASSESSMENT PROCESS
- UNDERSTANDING THE RANGE OF SECURITY RISKS
- IDENTIFYING ORGANIZATIONAL SENSITIVITIES
- ESTABLISHING ANY THIRD-PARTY SENSITIVITIES
- RECORDING THE OUTCOME OF THE SENSITIVITY ASSESSMENT
-REVIEWING THE SENSITIVITY ASSESSMENT
- DETERMINING WHETHER A SECURITY-MINDED APPROACH IS REQUIRED
- RECORDING THE OUTCOME OF THE APPLICATION OF THE SECURITY TRIAGE PROCESS
- SECURITY-MINDED OR NO SECURITY-MINDED APPROACH REQUIRED

DEVELOPING A SECURITY STRATEGY

- ASSESSING THE SECURITY RISKS
- DEVELOPING SECURITY RISK MITIGATION MEASURES
- DOCUMENTING RESIDUAL AND TOLERATED SECURITY RISKS
- REVIEW OF THE SECURITY STRATEGY

DEVELOPING A SECURITY MANAGEMENT PLAN

- PROVISION OF INFORMATION TO THIRD PARTIES
- LOGISTICAL SECURITY
- MANAGING ACCOUNTABILITY AND RESPONSIBILITY FOR SECURITY
- MONITORING AND AUDITING
- REVIEW OF THE SECURITY MANAGEMENT PLAN

DEVELOPING A SECURITY BREACH/INCIDENT MANAGEMENT PLAN

- DISCOVERY OF A SECURITY BREACH OR INCIDENT
- CONTAINMENT AND RECOVERY
- REVIEW FOLLOWING A SECURITY BREACH OR INCIDENT

Il blog di Archicad Italia

iso 19650

Risultati della ricerca:

Tutto sulla **ISO 19650**, pt. 1: Concetti e Principi

In virtù dell'"Accordo di Vienna" stipulato fra **ISO** (International Standard Organisation) e CEN (Comitato Europeo di Normazione) fra il 1989 – 1990, il 2001 e infine nel 2016, i livelli normativi devono essere coordinati e allineati: sono previste due modalità di adozione, l'una in cui prevale il... livello **ISO** (la normativa **ISO** viene automaticamente recepita a livello CEN e da qui agli Stati membri) e l'altra a favore del livello CEN (le norme locali devono essere poi approvate anche a livello **ISO**). Durante la votazione del 2016 del CEN ha prevalso alla quasi unanimità (tutti meno l'Italia) la...

Tutto sulla **ISO 19650**, pt. 2: Fase di Consegna dei Cespiti Immobili

La "UNI EN **ISO 19650**-2: 2018 – Fase di consegna dei cespiti immobili" è un unico grande diagramma di flusso che illustra ogni punto e ogni passaggio nell'articolazione della commessa.... I contenuti di ogni punto e il modo in cui devono essere sviluppati possono variare per ogni progetto, ma in un quadro astratto quanto basta per poter comprendere la generalità di ogni opera. Questo articolo segue il precedente articolo sulla norma **ISO 19650**-1 (Concetti e Principi) , dove abbiamo già affrontato alcuni temi che riprenderemo qui.

Tutto sulla **ISO 19650**, pt. 3: Fase Gestionale dei Cespiti Immobili

È disponibile, tradotta in italiano, la terza parte della norma **ISO 19650**, relativa alla Fase gestionale dei cespiti immobili. In attesa degli annessi nazionali, abbiamo finalmente un riferimento certo circa il Facility e Asset management .... Riprendendo i principi contenuti nella parte 2 della **ISO 19650** , la gerarchia dei requisiti informativi può essere adattata alle diverse circostanze:...