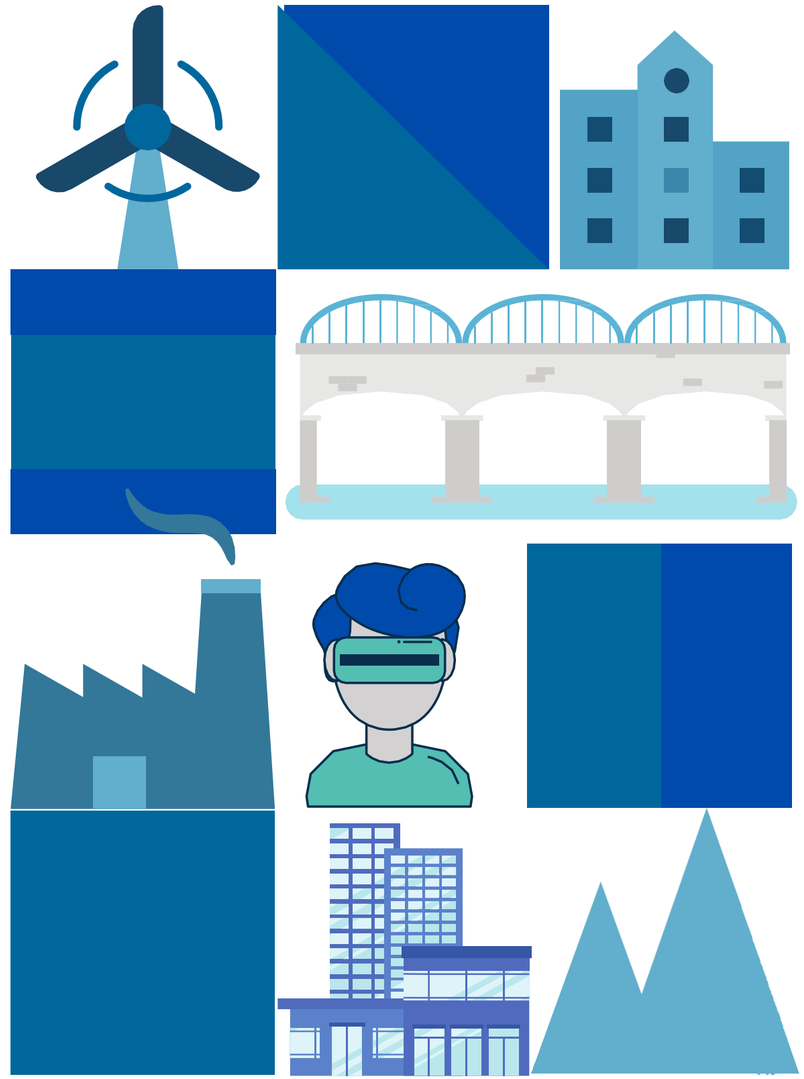
STRUCTURE X
ENGINEERING CONSULTING TRAINING

Report: Simplifying BIM

BIM IMPLEMENTATION IN THE AEC IDUSTRY :

PROBLEMS AND SOLUTIONS



Content

Building Information Modeling

Dimensions

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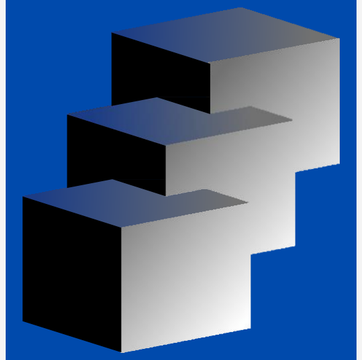
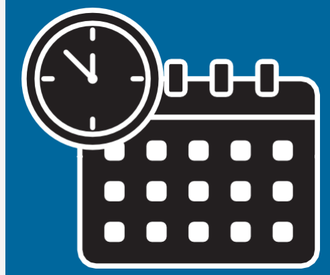
BIM Dimensions



Geomerty

3 D

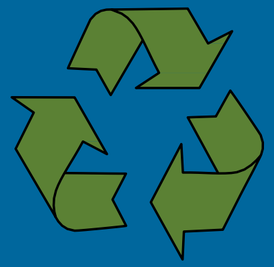


Time

4 D

Cost

5 D



Sustainability

6 D

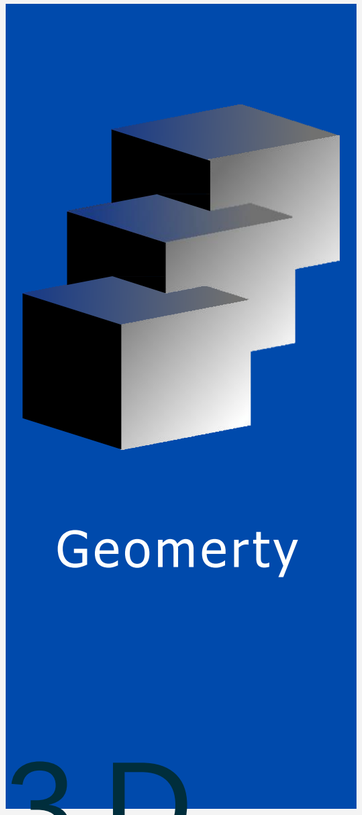
Facility Management

7 D

Safety

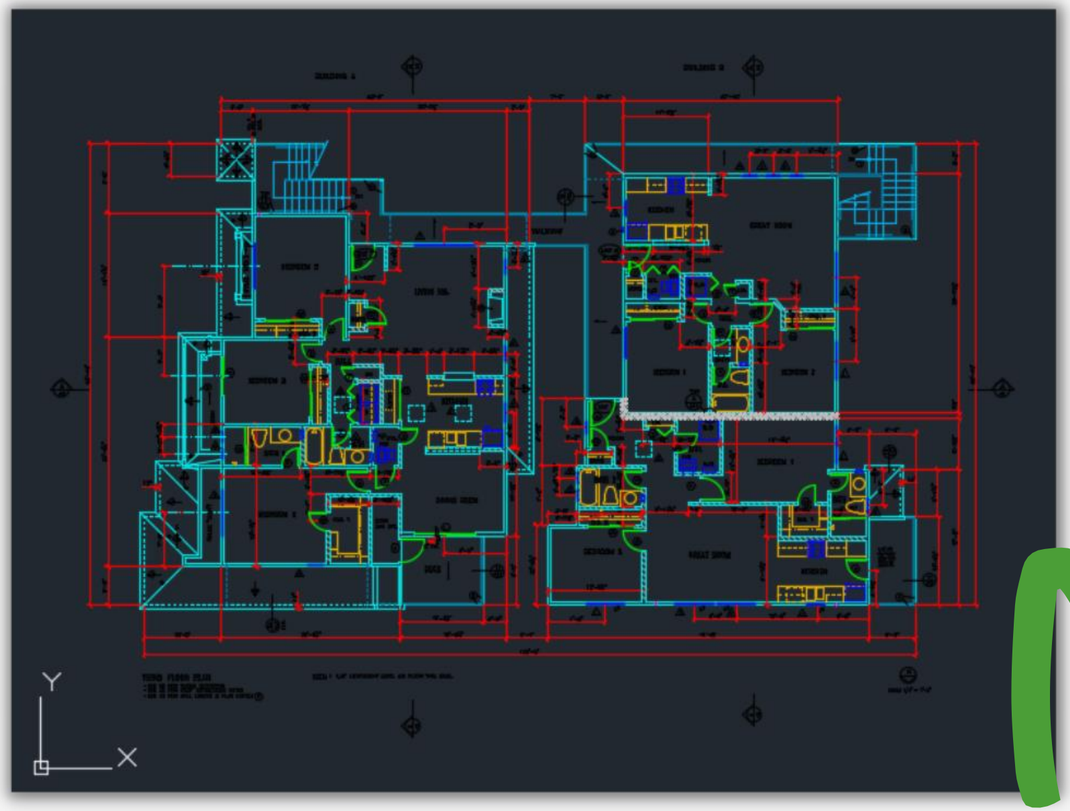
8 D

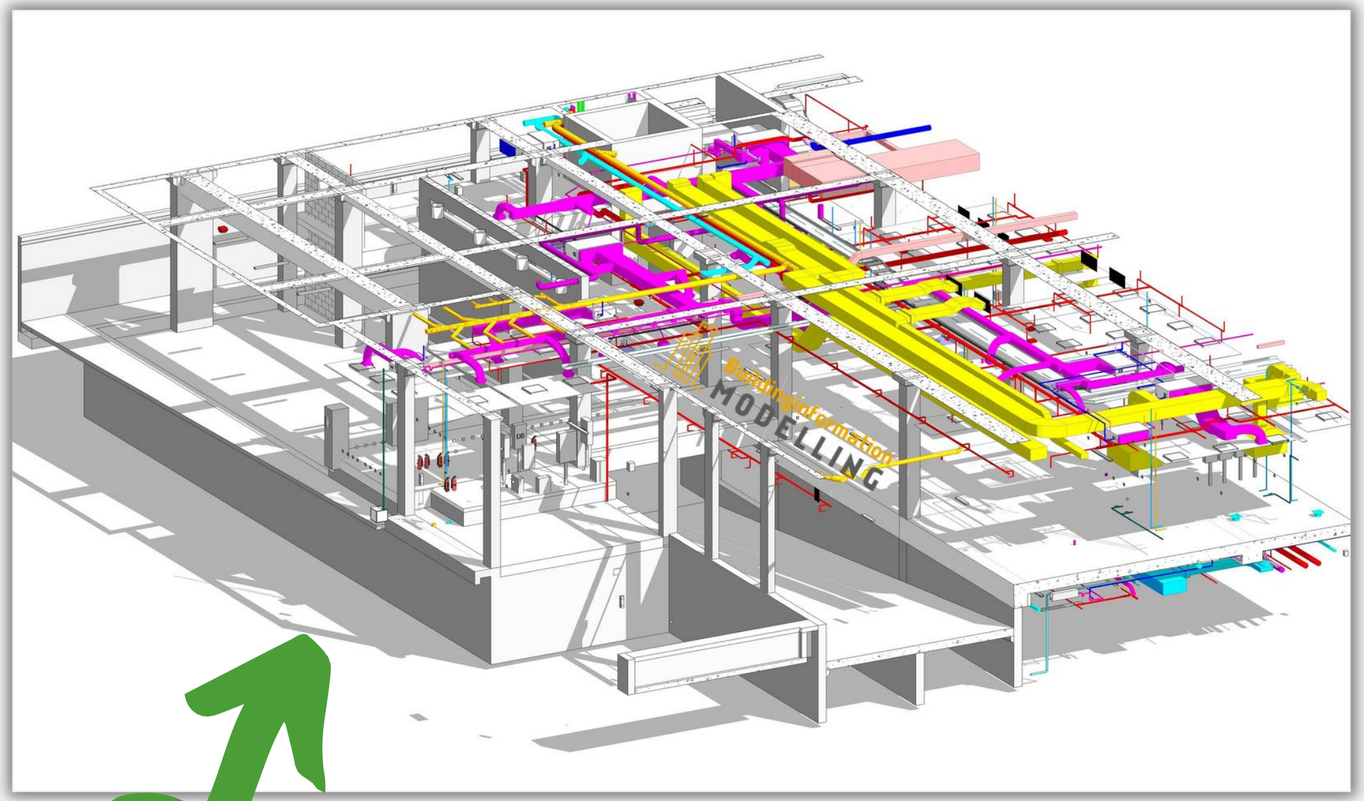
Geometry



A process in which design authoring/Modeling and analysis software are used to develop a building information model (x,y,z) based on criteria important to the building's design and according to contract (BIM Execution plan).

Geometry





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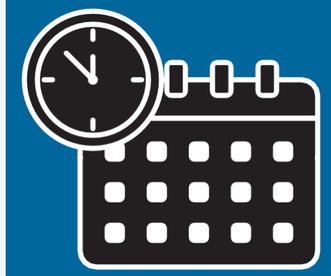
To simplify it 3DBIM = the update from CAD to 3D Model

Time

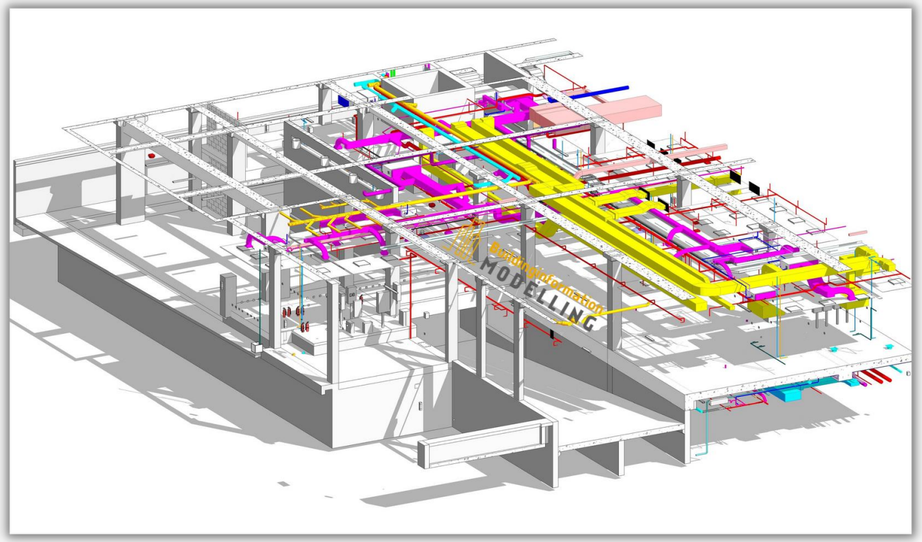


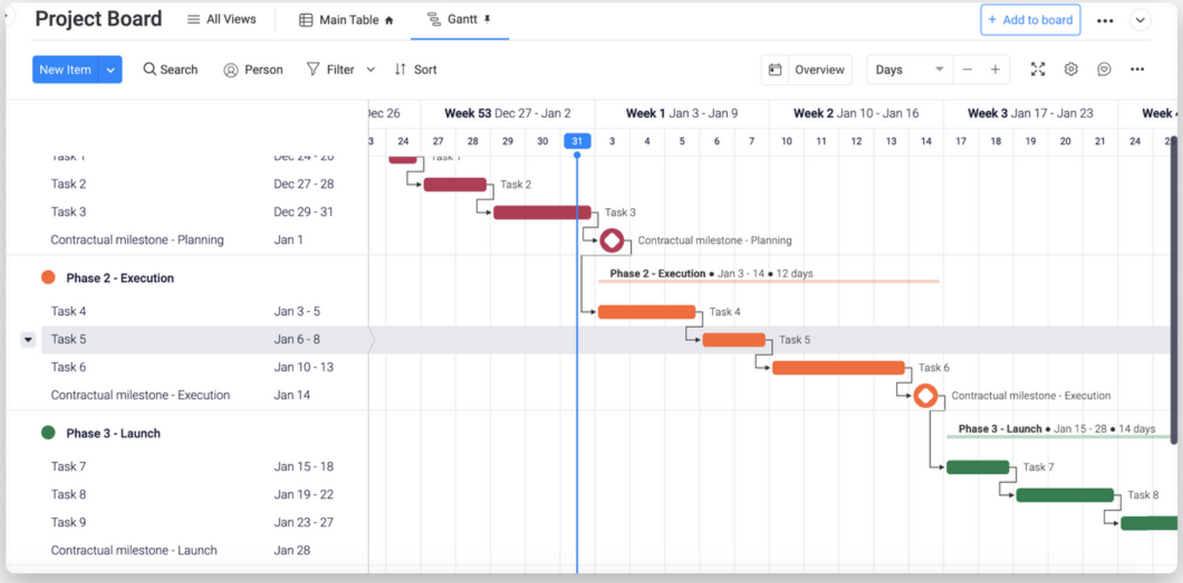
Time

4 D

A process in which a 4D model (3D models with the added dimension of time that we can name it planning) is used to effectively plan the phased tasks and to show the construction sequence and space requirements on a building site

Time





So the 3D Model + Planning = 4DBIM

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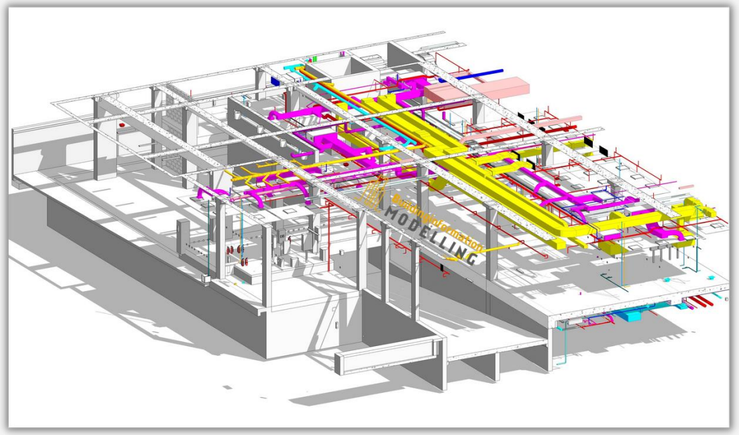
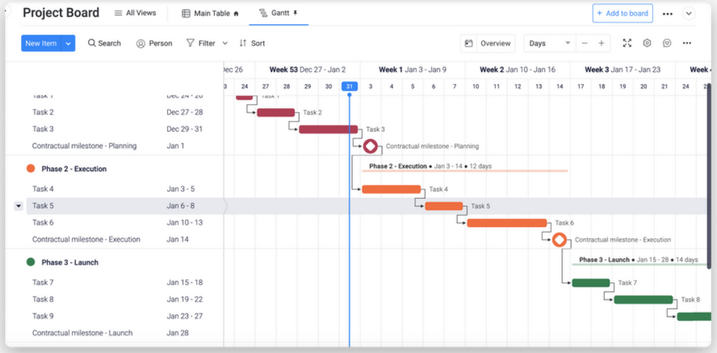
Cost

Is the dimension for which BIM can be used to assist the generation of accurate quantity take-offs and cost estimates throughout the life cycle of a project, typically undertaken by a quantity surveyor or pre-contract estimator.

Cost





+

PROJECT ESTIMATE SHEET

PROJECT NAME:	Mary Green deck
DESCRIPTION:	New 10 x 10 deck with rails and stairs, includes staining
ESTIMATE DATE:	12.01.14
ESTIMATE BY:	John

BURDENED LABOR RATE	$47,50	Per Man/Hr	
MARKUP	45,00%		
Gross Profit Margin	31,03%	Estimated Man Hours	65,50
Sales tax on materials	6,75%	Estimated Admin Hours	8,19
General Production Costs (GPC) factor			
Enter here your materials cost in $	$500 000	General Production Costs factor is	2,50%
Enter here your GPC in $	$12 500		
Permit Fee in $ (fixed cost)	$105,00		
Admin hrs. to add for Lead Carpenter, per 8 man hours inside this estimate	1,00		

Summary Information	
Items Included in Materials Budget	
Permit fee	$105,00
Gen. Prod. Costs	$38,73
Materials plus tax	$1 549,31
Materials Budget	$1 693,04
Labor Budget	$3 111,25
Admin Labor Budget	$388,91
Subs Budget	$1 075,00
Estimated Project Cost	$6 268,19
Estimated Gross Profit	$2 820,69
Estimated Selling Price	$9 088,88
Sold Contract Price	

TASK DESCRIPTION	QUAN.	@	MAT.	HRS.	LABOR	SUB UNITS	UNIT $	SUBS	TOTAL
Plans / Permit Application	1	35,00	35,00	2,00	95,00			0,00	130,00
Structural Engineering			0,00		0,00	1	175,00	175,00	175,00
Travel			0,00		0,00			0,00	0,00
Floor & Dust protection			0,00		0,00			0,00	0,00
Job Set-up			0,00	4,00	190,00			0,00	190,00
Material Delivery Fees			0,00		0,00			0,00	0,00
Disposal of Debris	24	1,20	28,80	1,00	47,50	1	350,00	350,00	426,30
Sanitary (Porta-John or similar)			0,00		0,00			0,00	0,00
Demo Porch			0,00	2,00	95,00			0,00	95,00
footings	2	40,00	80,00	16,00	760,00			0,00	840,00
aluminum flashing	10	1,40	14,00	1,00	47,50			0,00	61,50
2x10 ledger	10	0,85	8,50	2,00	95,00			0,00	103,50
6" lags/washers	16	1,85	29,60	1,25	59,38			0,00	88,98
2x10 joists	200	0,85	170,00	5,00	237,50			0,00	407,50
2x8 joist hangers	8	1,65	13,20	0,50	23,75			0,00	36,95
4x4 support posts	16	1,40	22,40	2,00	95,00			0,00	117,40
2x12 stringers	24	1,66	39,84	4,00	190,00			0,00	229,84
primed pine	240	1,20	288,00	3,00	142,50			0,00	430,50
1x4 se fir	320	0,75	240,00	3,00	142,50			0,00	382,50
36" tall PT colonial rails	30	8,40	252,00	12,00	570,00			0,00	822,00
Decorative post caps	6	11,00	66,00	0,25	11,88			0,00	77,88
paint/stain	4	38,00	152,00		0,00	1	550,00	550,00	702,00
CLEAR JOB SITE			0,00	2,50	118,75			0,00	118,75
TOTALS			$1 451,34	65,50	$3 111,25			$1 075,00	$5 637,59
General Production Costs Allowance									38,73
Permit fee									105,00
Administrative Time		Administration Hrs:		8,19					388,91
Sales tax on materials									97,97
Total job cost									6 268,19
Gross Profit added based on Markup									2 820,69
ESTIMATE PRICE:									$9 088,88

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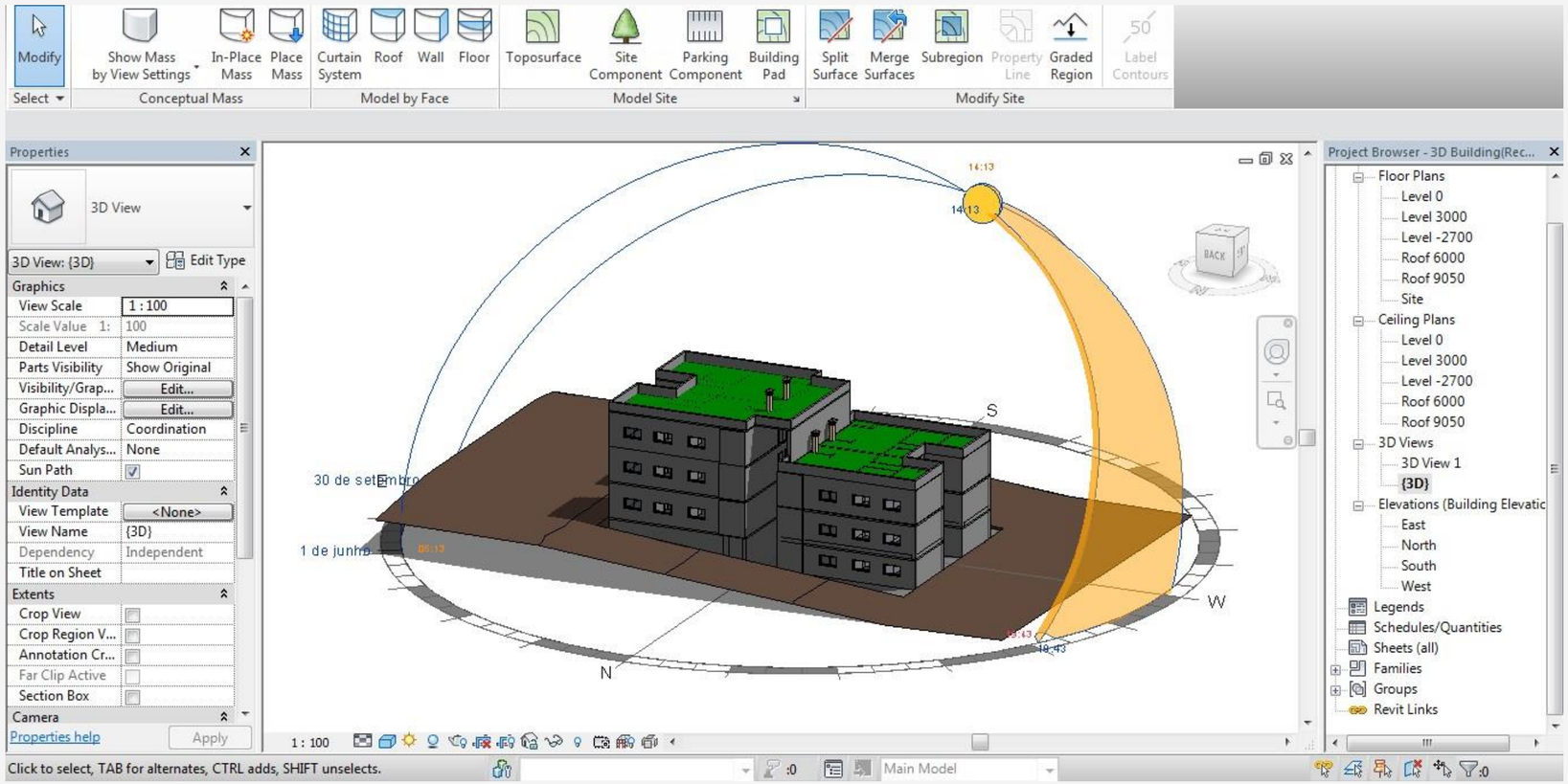
So the 4D Model + Cost Estimation = 5DBIM

Sustainability

A process in which analysis software uses BIM to assess the performance of various system options to determine the most effective engineering solution and to optimize energy consumption based on owner performance requirements.

Sustainability



So the 5D model + Energy Optimization = 6DBIM

Facility Management

is a BIM process that empowers facility management by anticipating various operational requirements, fixtures installations and layouts thank to digital twin that allows the facilities manager to identify different elements of a building, isolate them for their information, and understand the needs of both that specific element and its relationship to peripheral systems.

Sustainability

6D model + Maintenance Optimization = 7DBIM

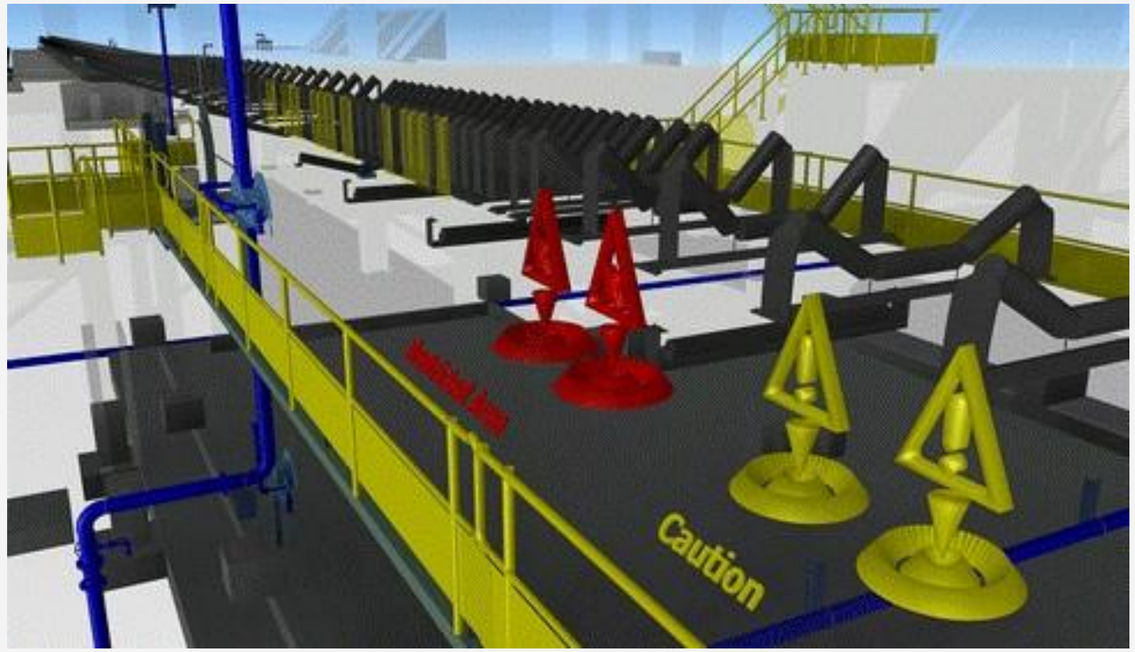
Sustainabilty

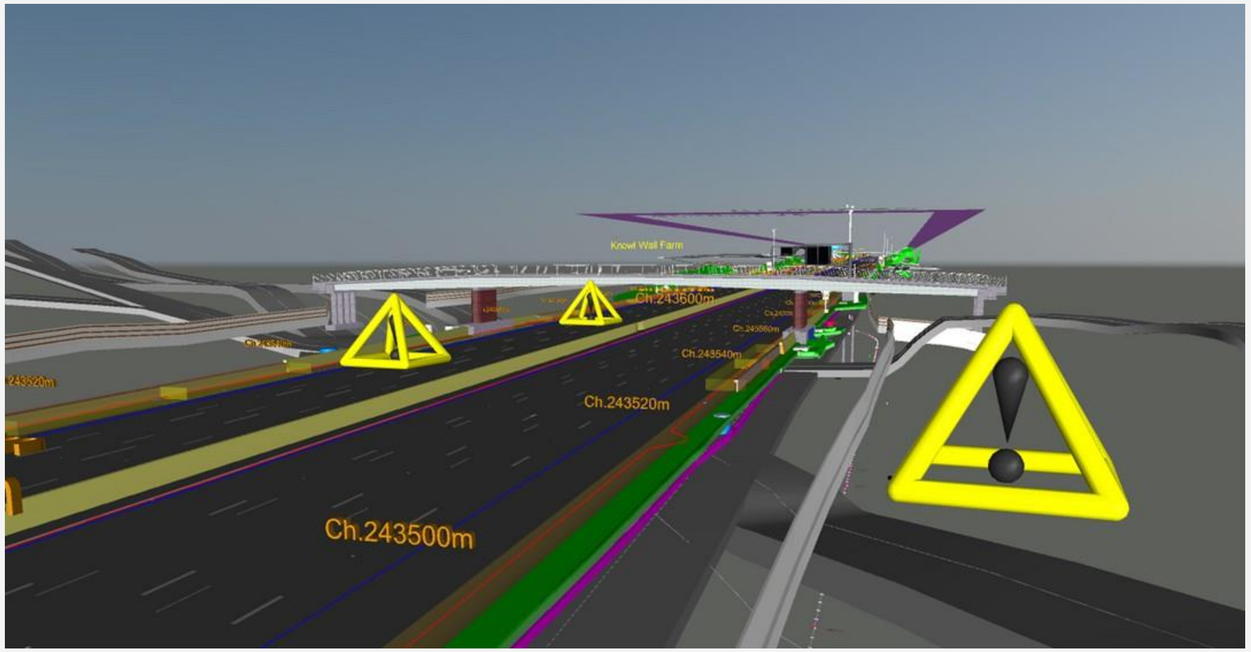
Safety

8 D

8D BIM specifically concerns safety and accident prevention in the construction site. It determines the risk in the model , giving safety suggestions for the high risk profile and proposing risk control and job safety for uncontrollable risk.

Safety





7D model + Accident prevention = 8DBIM

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BIM Difficulties - BIM Solutions

- BIM? Is it really worth it first?
- Which Software Should I use for Modeling?
  BIM use Centralized Model and Data, Should we use the same software then?
- How to manage all data in a single place?
  Models ,Planning ,Spreadsheets, Quantity take-offs , WBS and Charts
- How to control and detect clashes between disciplines when modeling?
  What If get hundreds of clashes, how to fix them?
- How to better Visualize Models?
  2D drawings and even 3D models can't show you the model perfectly!
- Is it easy to maintain good coordination and collaboration?
  When Working on Big Projects , we need to share tasks on several Members and teams!
- Which Standards and Rules should I follow?
  Are there protocols and standards that unify BIM Work Processes?

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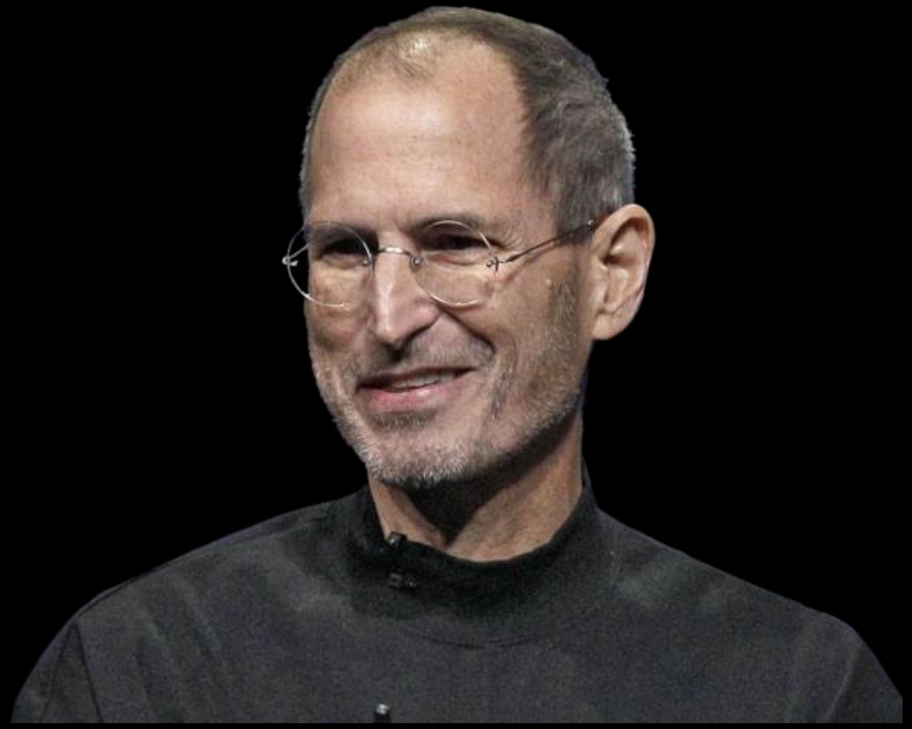
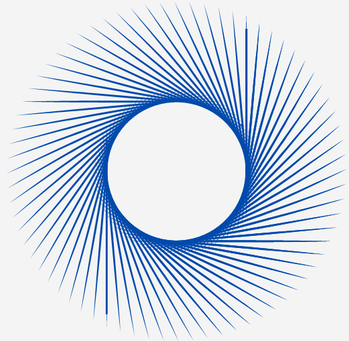


People don't know what they want untill you show it to them

-STEVE JOBS

All Cycle of projects



Centralized Model and Data

BIM? Is it really worth it first?

Better Cost Management and Control

Real-Time Collaboration

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AUTODESK REVIT

ALLPLAN

Which Software Should I use for Modeling?

Tekla® Structures

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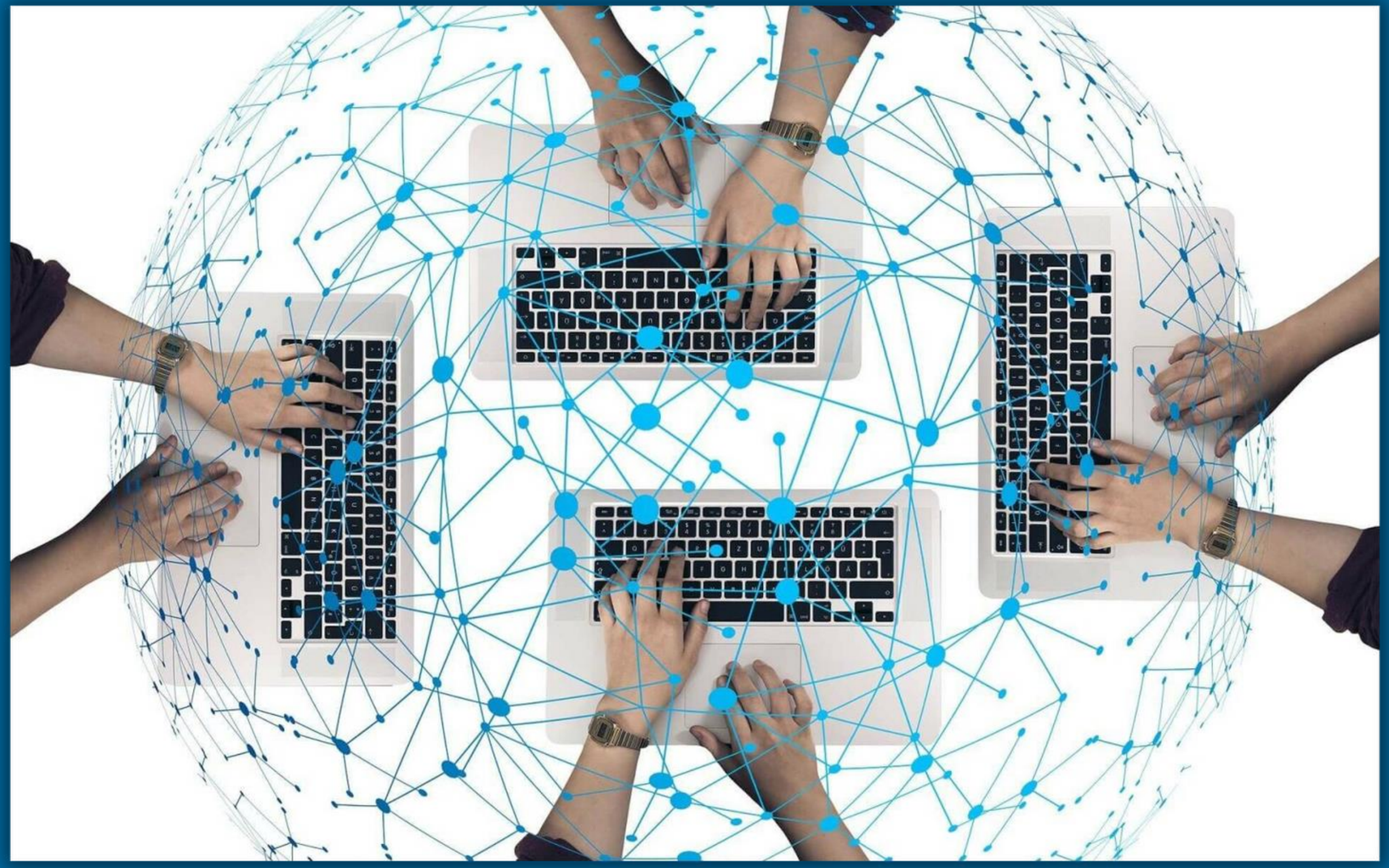
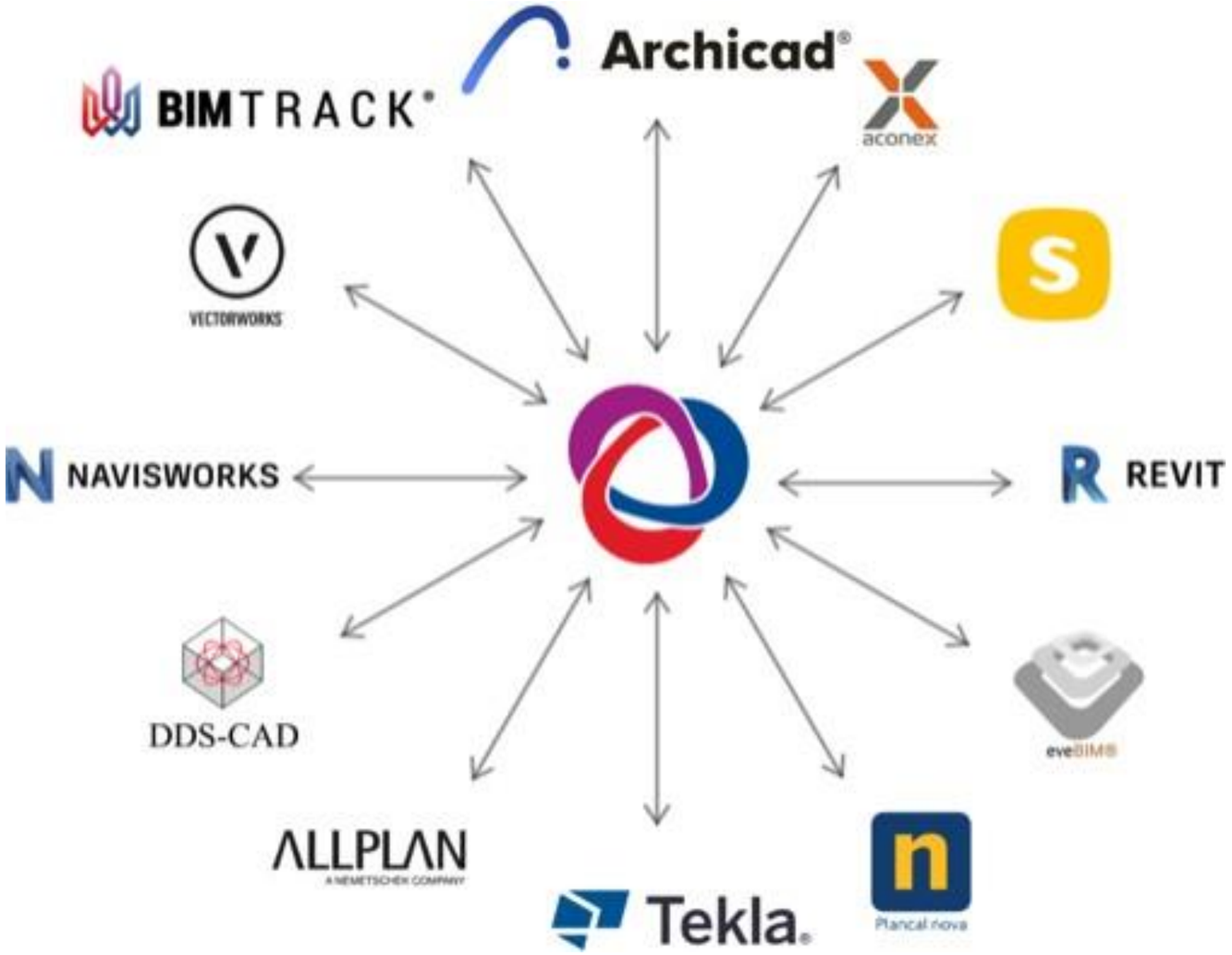


Interoperability



BCF and IFC Exchange

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How to manage all data in a single place?

ORACLE®

PRIMAVERA

PDF

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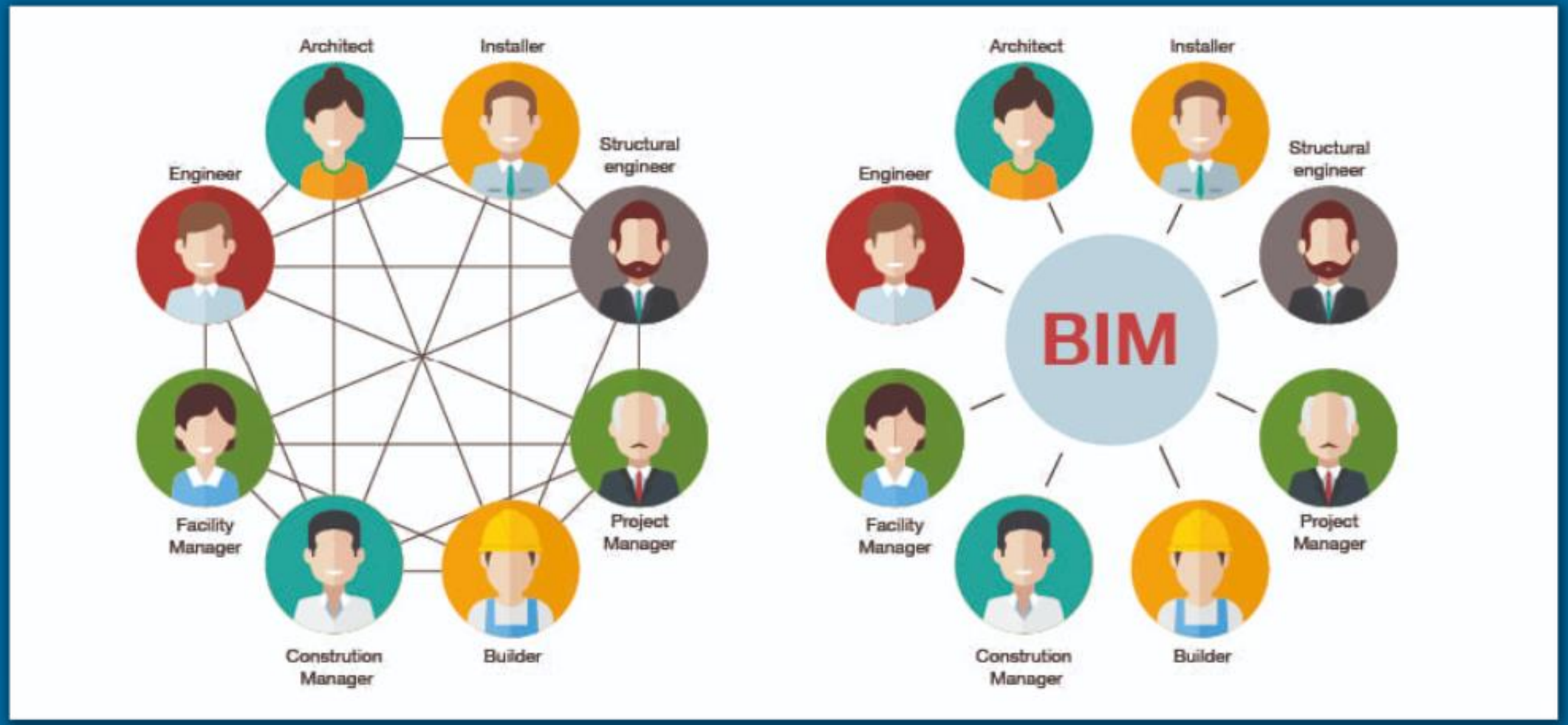
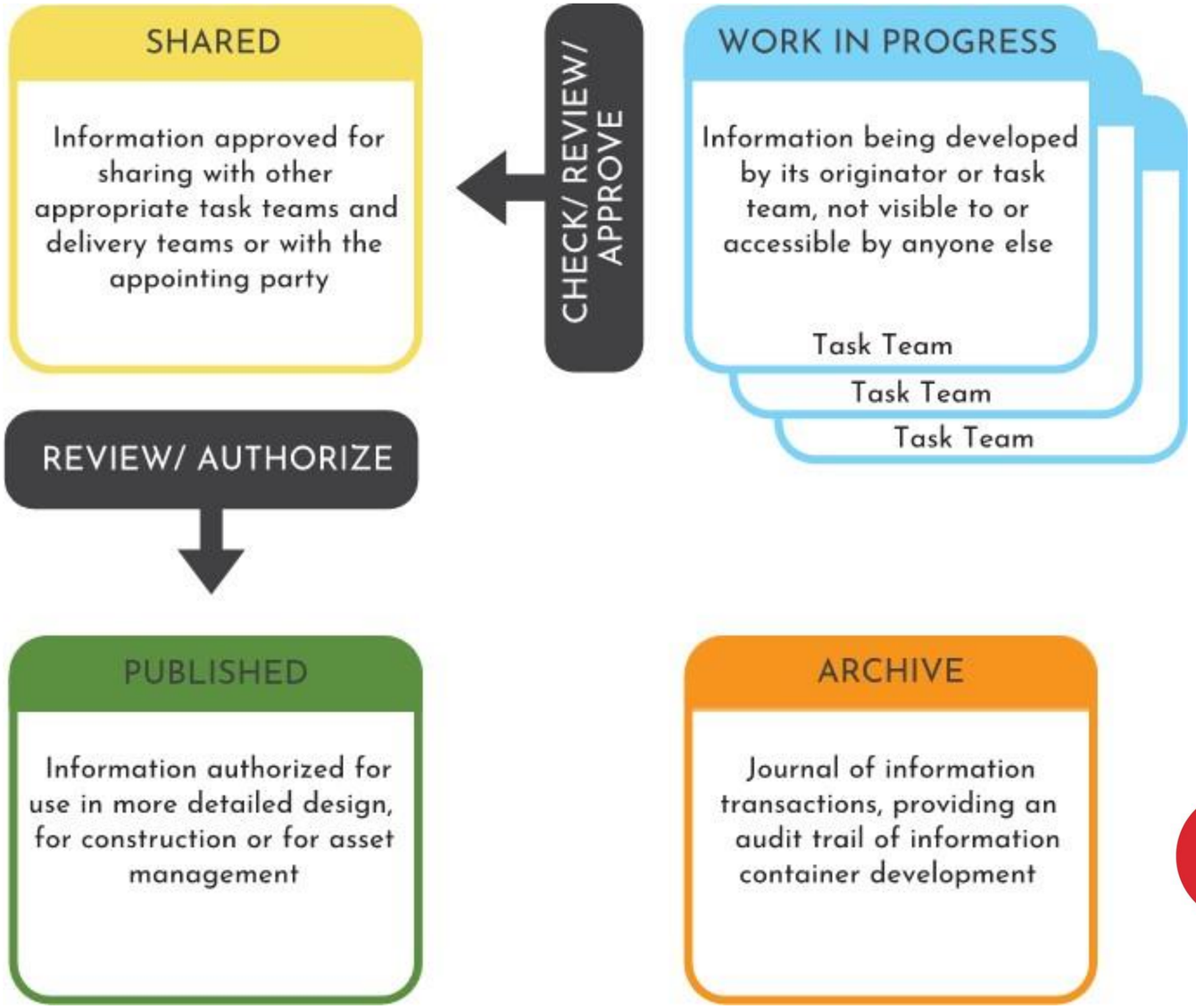


CDE : COMMON DATA ENVIRONMENT

AUTODESK® BIM 360™

ALLPLAN BIMPLUS

ORACLE® Aconex



OneDrive

Google Drive

MEGA

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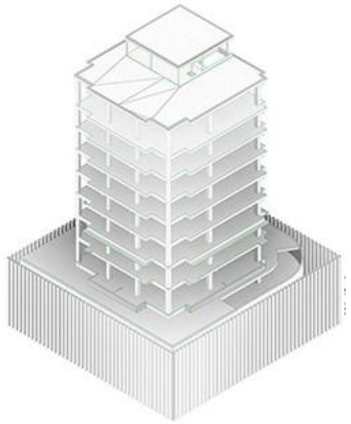
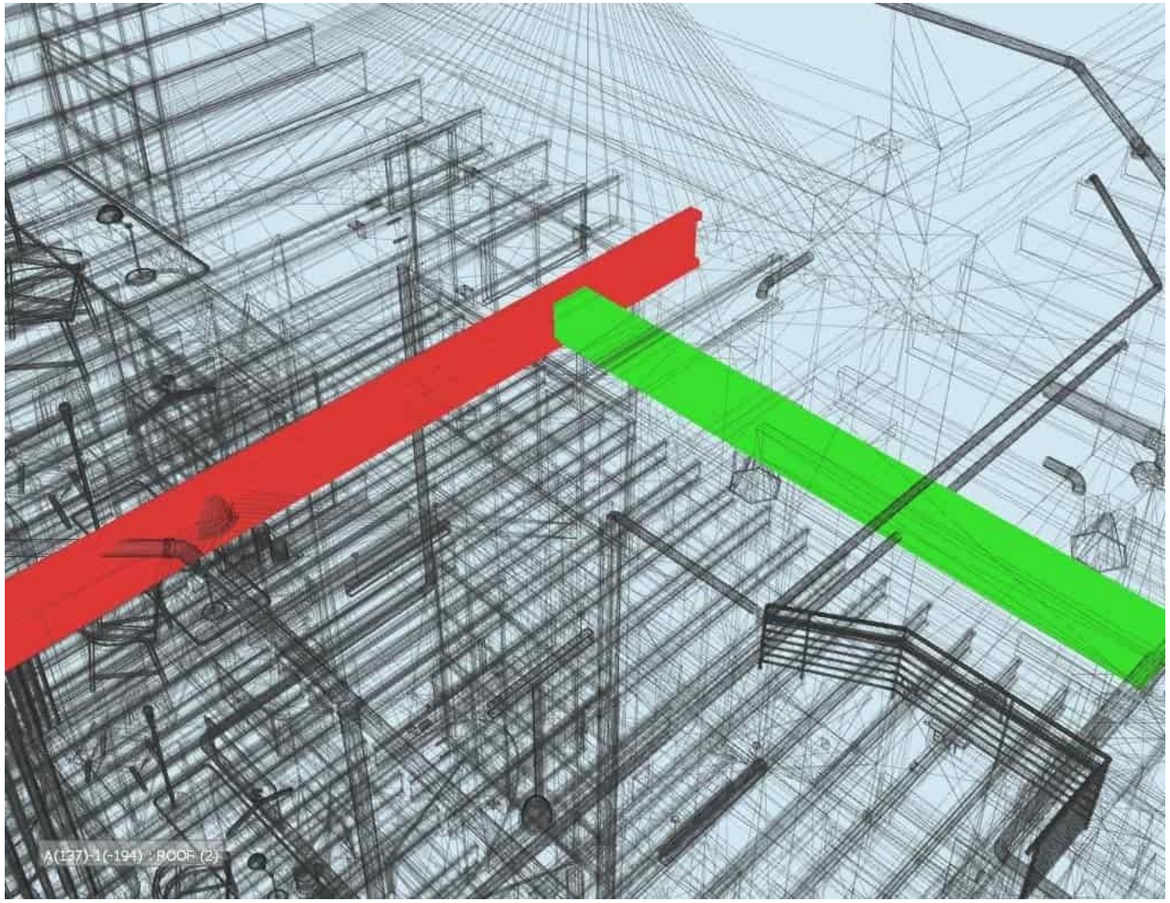
CDE Workflow

How to control and detect clashes between disciplines when modeling?

Clash Detection Workflow

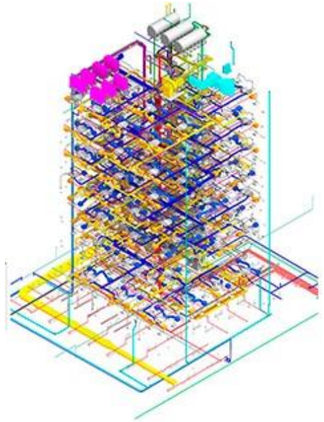


Structural Model



AUTODESK® NAVISWORKS®

Bimsync



MEP Model

SOLIBRI

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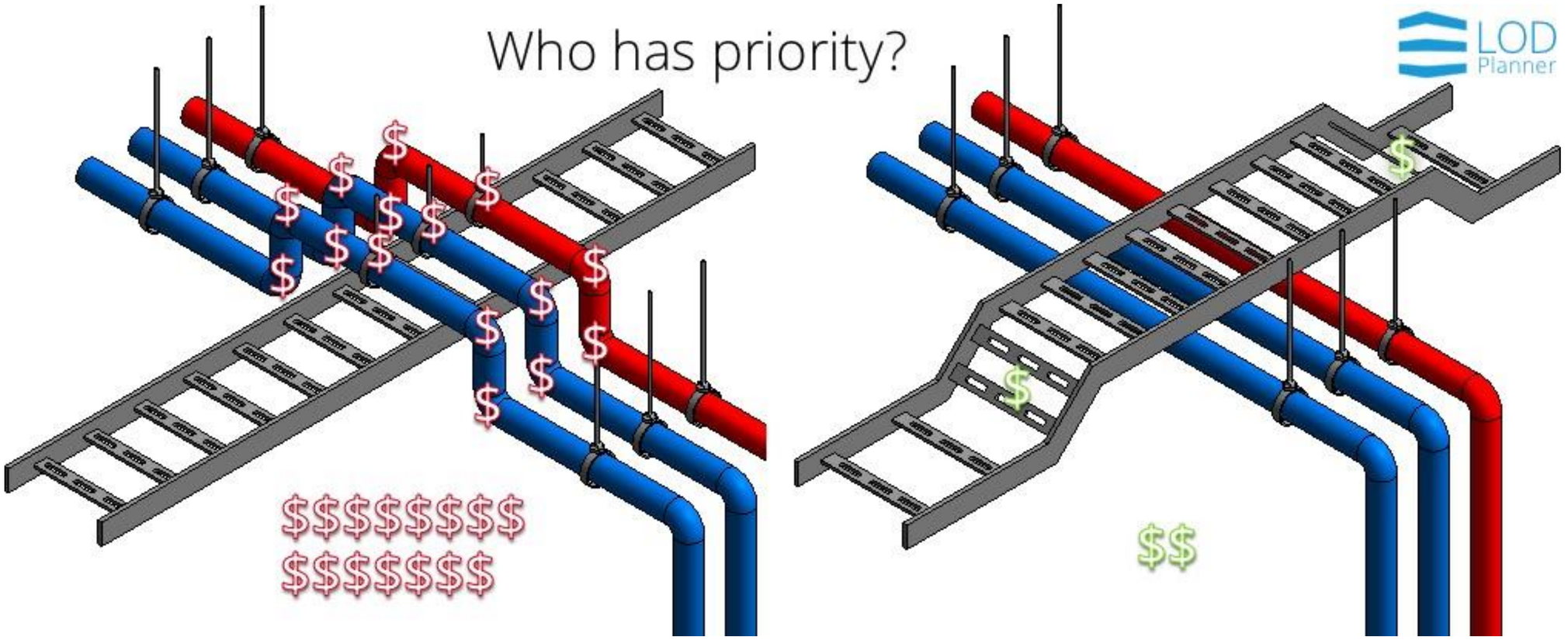

The best Decision is what really matters

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MASLOW HIERARCHY

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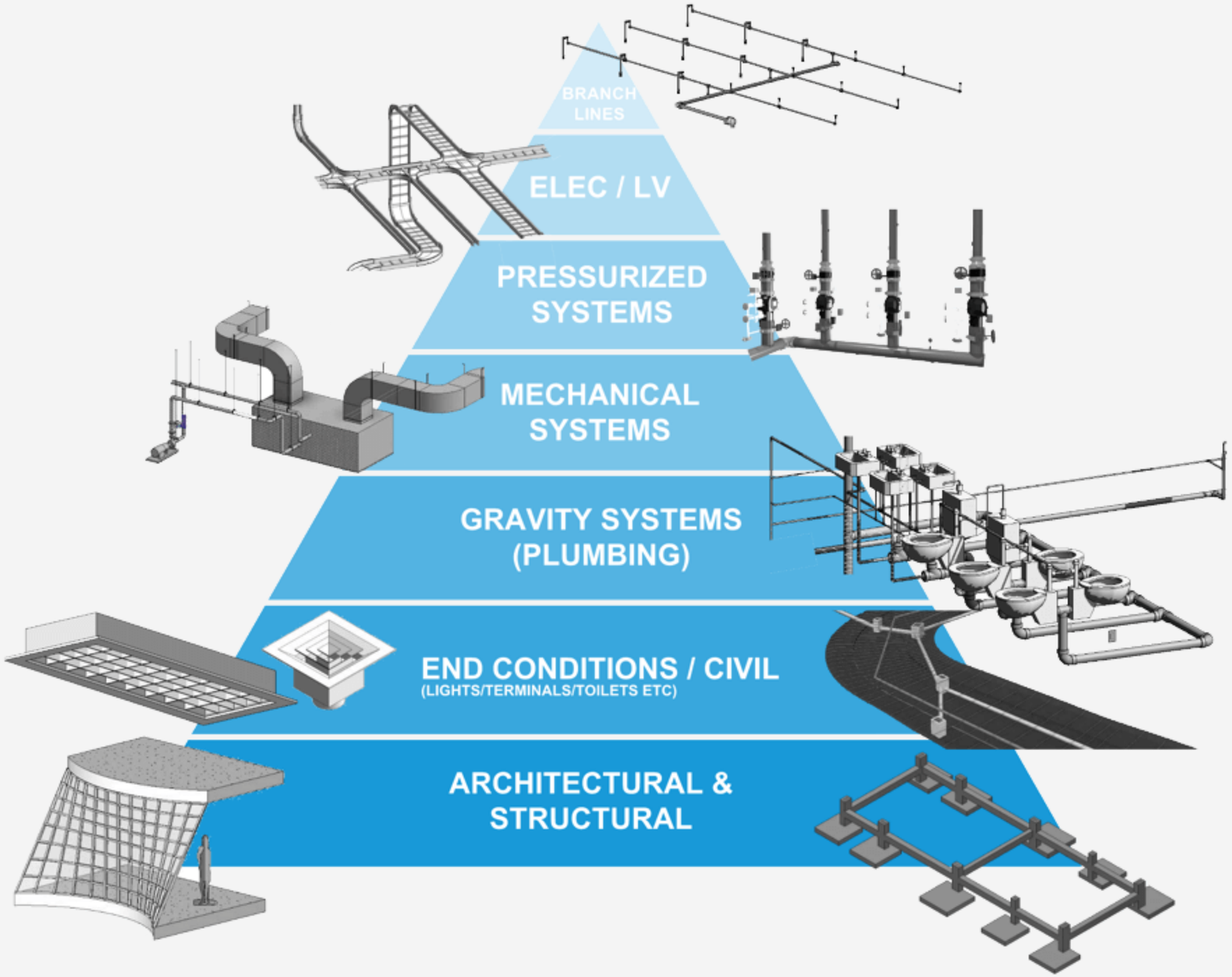

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CLASH AVOIDANCE HIERARCHY

How to better Visualize Models?

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VREX
IRISVR
Virtual Reality - Augmented Reality
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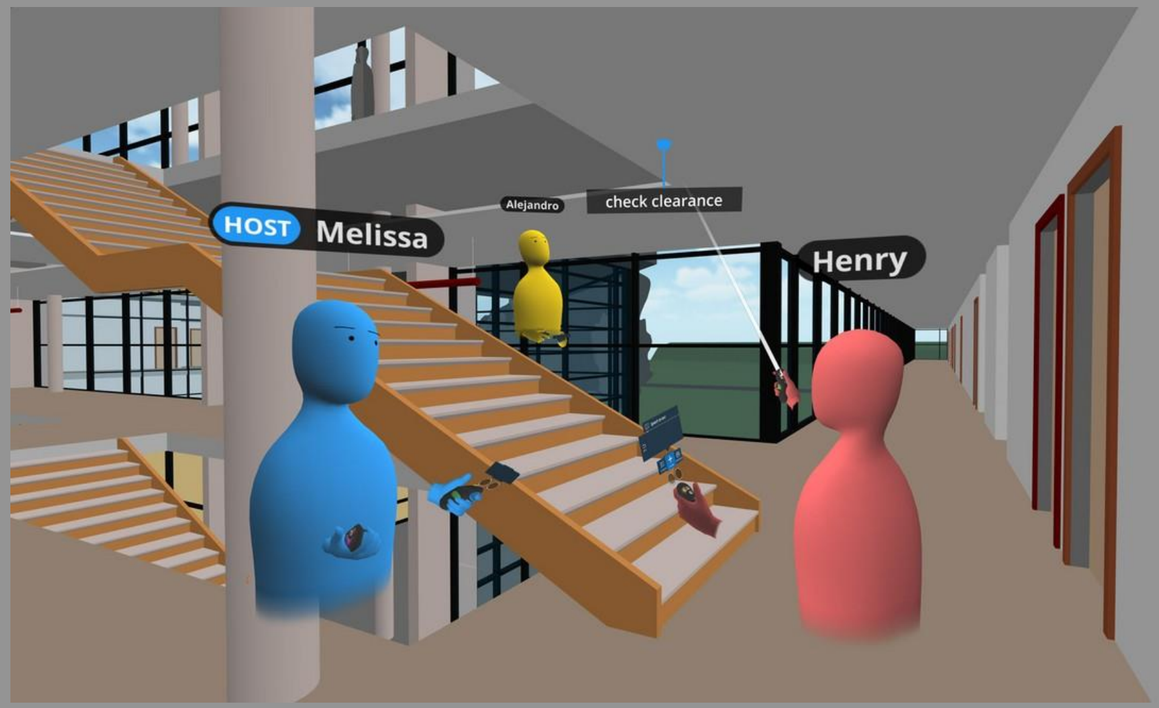
Real Time Model Visualization



Marketing impact toward clients

see the BIM model in a real-like environment

Model Collaboration in VR

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A.M.A
Viewpoints
3D DETAILS
Settings
GRAPHICS
Materials
Outlines
Enhanced Glass

Is it easy to maintain good coordination and collaboration?

Bimsync

AUTODESK®
BIM 360®

Of course we can

BIMTRACK®

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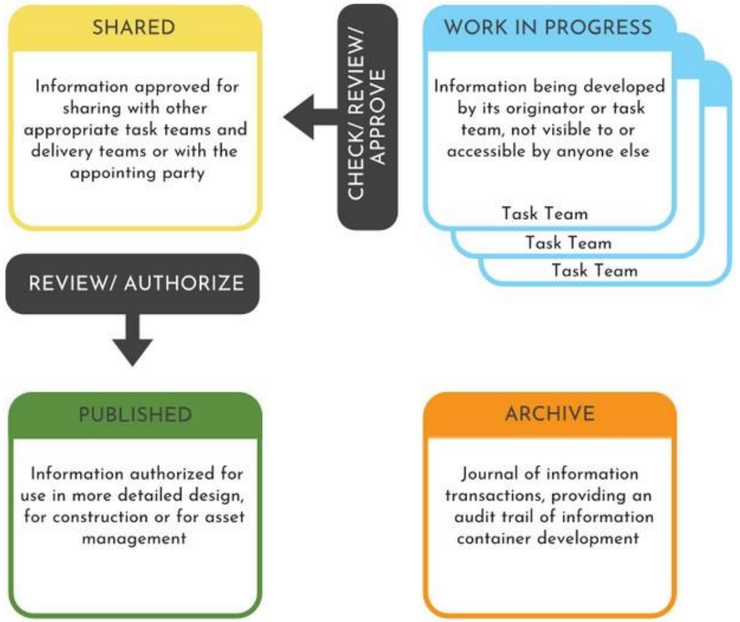
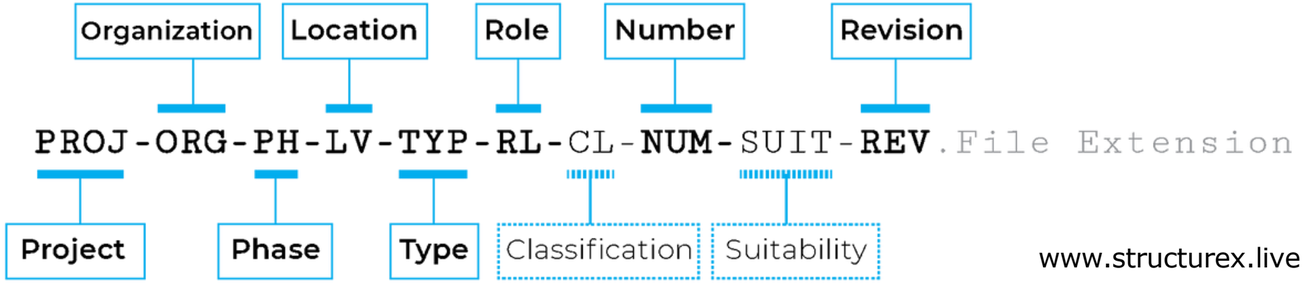
Which Standards and Rules should I follow?

BIM ISO 19650

International Organization for Standardization





bsi.

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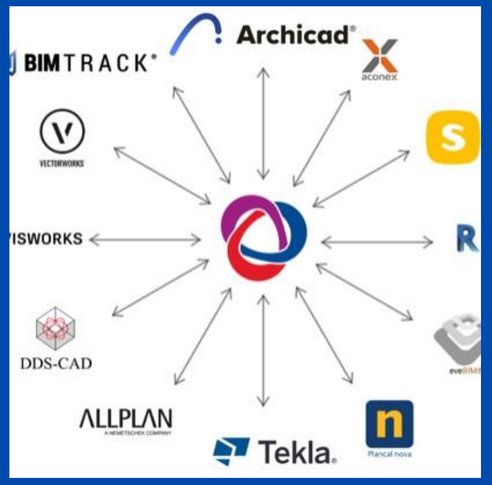
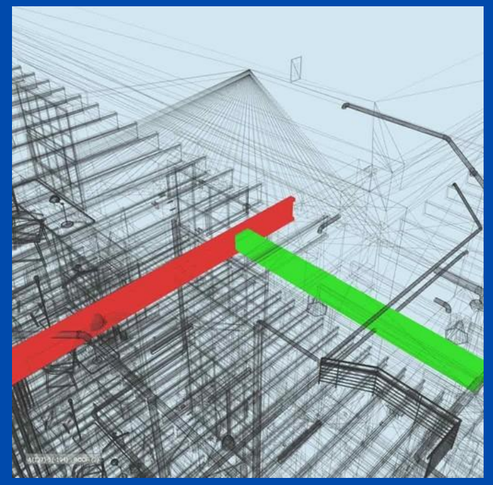
Conclusion





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