



Digital Twins & BIM

Zürcher Hochschule
für Angewandte Wissenschaften

Igor Starkov | VP Digital Twin
Siemens Industry, Inc.



SIEMENS

I Speakers

Dr. Simon Ashworth



Dr. Simon Ashworth

ZHAW School of Life Sciences and Facility Management
Real Estate Management Competency Group
Reidbach
8820 Wädenswil

☎ [+41 \(0\) 58 934 53 25](tel:+41589345325)

✉ simon.ashworth@zhaw.ch



Igor Starkov

VP Digital Twin
Siemens

Mobil: Tel.: +1 571 277 6617

Mail: igor.starkov@siemens.com

Agenda

Section 1

About Ecodomus

Section 2

Digital Twins and BIM CDE and why it is critical for design, construction and facility management

Section 3

Standards for Project Information Model (PIM), QC and Asset Information Model (AIM)

Section 4

Supporting 2D workflows while upgrading to BIM

Section 5

Integrating BIM with PM, CMMS, CAFM, ERP

Section 6

Mobile BIM and AR/MR (inspections, issues, electronic forms)

Section 7

BIM + Internet of Things (IoT) for optimal building performance

Section 8

Laser scanning technology for 3D asset management

Questions
and Answers



Ecodomus

The first global Lifecycle BIM firm, Ecodomus, has been acquired by Siemens in 2022.

- 1 Since 2010, Ecodomus has delivered more BIM for FM projects than all other software companies in the world combined – Unique Experience
- 2 Ecodomus is working with the top clients in the world and is implementing pioneering practices from the leading facility owners – Best Practices
- 3 Ecodomus CDE software has more BIM/FM/COBie features than any other BIM software – Higher Quality of Data at Lower Cost



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Section 8	Laser scanning technology for 3D asset management
Questions and Answers	

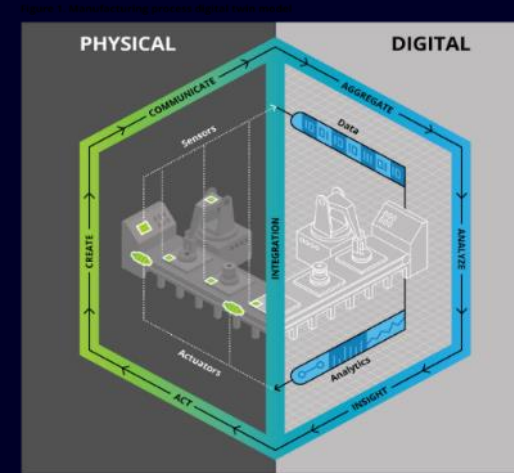


Defining Digital Twin

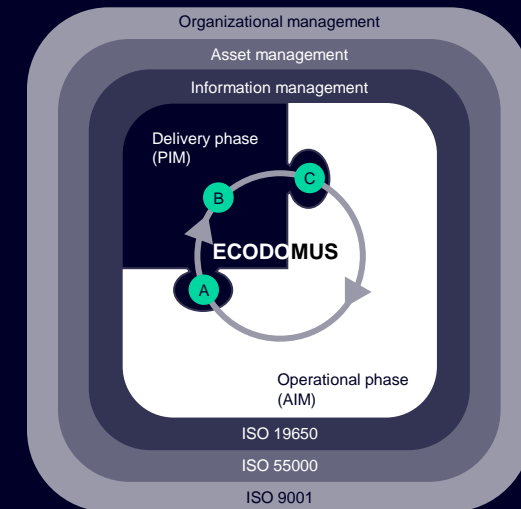
Digital Twin refers to a digital replica of physical assets, processes, people, places, systems and devices that can be used for various purposes. (Wikipedia)

Digital Twin = BIM + IoT + FM + GIS + ...

- How it is *supposed* to work – BIM/CIM design apps (Autodesk Revit, Bentley OpenBuildings, ArchiCAD, etc.)
- How it *actually* works – IoT/SCADA/BAS/BMS (Schneider Electric, Siemens, etc.)
- To build a Digital Twin you need a BIM CDE that works both with PIM (Project Information Model) and AIM (Asset Information Model) and is connected to IoT systems.
- The best solution for that – **Ecodomus**



Source: Deloitte University Press



Digital Twin as a System of Integrated Applications and Databases

BIM as the “lowest common denominator” contains the information relevant to all other facility related systems, thus enabling integrations not available in the past.

Building Geometry Authoring (BIM)

Autodesk Revit, Bentley AECOsim, Graphisoft ArchiCAD, Tekla, IFCs

Space Management (CAFM/IWMS)

Oracle Unifier, TRIRIGA, ARCHIBUS, Planon, Manhattan, etc.

Maintenance Management (CMMS)

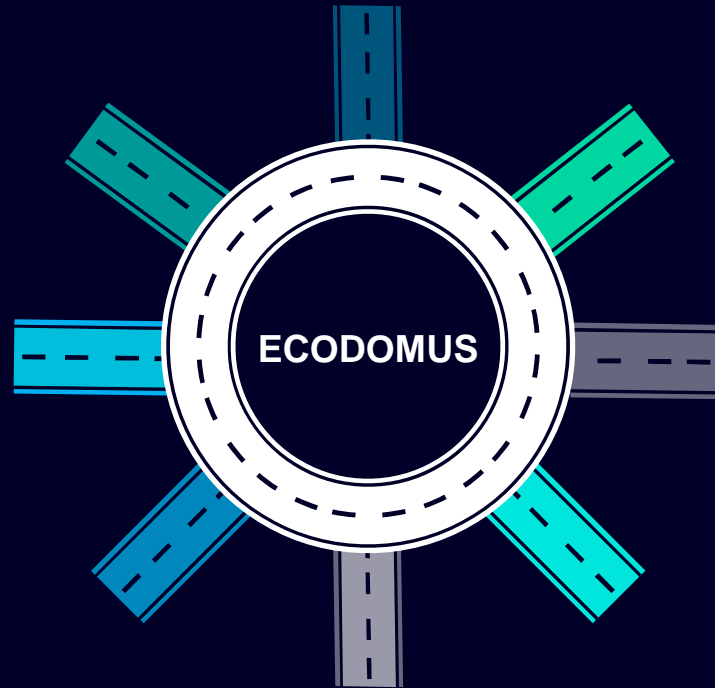
IBM Maximo, Brightly, Accruent, eMaint, FSI, TMA, AssetWorks, Corrigo, etc



Augmented Reality, AI/ML, Predictive maintenance, Process simulation, energy analysis, etc.

Enterprise Resource Planning (ERP)

SAP, Oracle Financials, IFS, Infor, etc.



Electronic Document Management Systems (EDMS)

ProjectWise, Autodesk 360 Docs, Aconex, Alfresco, BlueCielo, etc.



Drones for indoor/outdoor navigation: Space mapping, deliveries, video streaming, inspections, etc.

Geographical Information System (GIS)

CityGML, IndoorGML, ESRI ArcGIS, Mapbox, Oracle Spatial

Project Management (PM)

Procore, Primavera P6, Oracle Unifier, PMWeb, Prolog, e-Builder, etc.

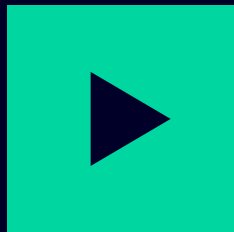
Building Automation System (BAS/IOT)

Siemens Desigo CC, Microsoft Azure IoT, JCI, Schneider Electric, OPC, BACnet, etc.



QR/Barcodes, RFID, CCTV, vibration sensors, concrete sensors, etc.

Ecodomus Digital Twin Example



Lifecycle CDE for Digital Twin Management

Definition > CDE (Common Data Environment) is a central repository where facility information is housed. The contents of the CDE are not limited to assets created in a 'BIM environment' and it will therefore include documentation, graphical model and non-graphical assets. In using a single source of information collaboration between project members should be enhanced, mistakes reduced, and duplication avoided.

Design

- BIM is created for visualization, coordination and as a reference for construction
- Design-intent attributes are entered

Ecodomus' Role

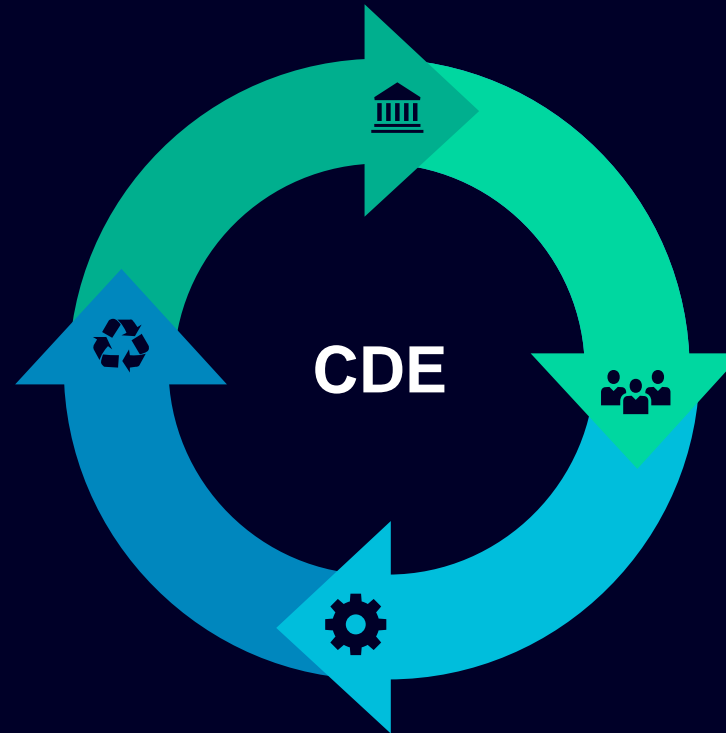
1. Check model data for program compliance and handover to construction
2. Visualize design intent in a browser-based 3D viewer for contractors and FM
3. Collect information outside of BIM authoring tools

Renovation & Upgrades

- Planning renovations in 3D BIM
- Enhanced condition assessment

Ecodomus' Role

1. Provide accurate as-built information for redesign
2. Synchronize as-built updates with the other apps: CMMS, Energy, etc.



Construction

- BIM is updated to 3D as-built
- Installation and Cx attributes are provided
- Linking asset and project documents to BIM

Ecodomus' Role

1. Check model data for handover to O&M
2. Visualize models in a browser-based 3D viewer for project collaboration (GC/subs)
3. Collect information outside of BIM authoring tools, link documents to BIM objects

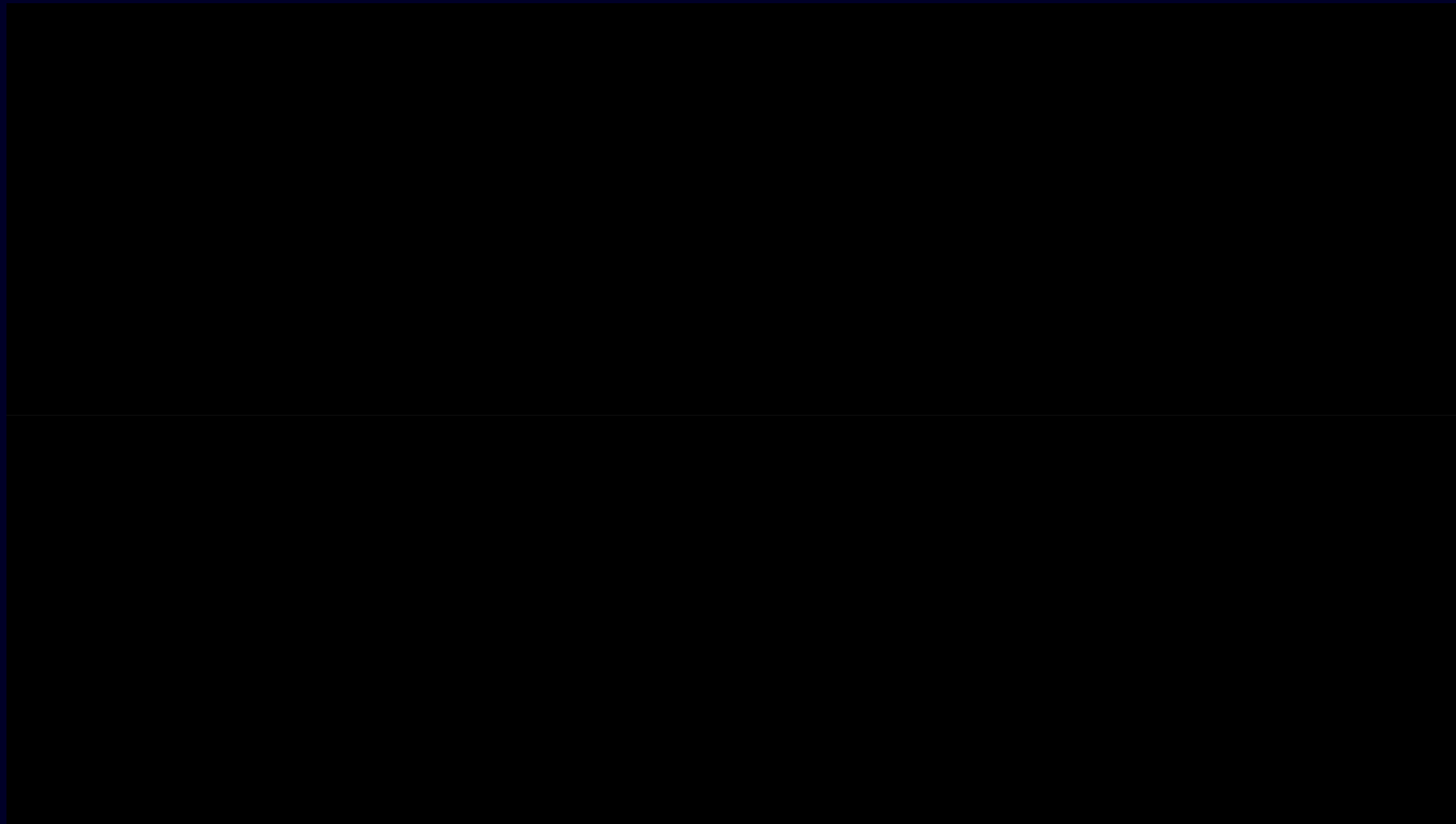
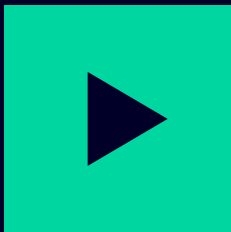
Operation & Maintenance

- 3D visualization for work orders
- Shutdown planning
- Disaster response
- BIM for energy analysis

Ecodomus' Role

1. Visualize models in a 3D viewer for O&M/property management, including integrated data from BAS/CMMS
2. Generate reports (regulatory, procurement, energy analysis, etc.)

Ecodomus CDE Case Study



Digital Twin Benefits Time Savings and Impact

- Use Case analysis from Ecodomus' project with the leading healthcare organization
- Benefits are related not just to time/cost savings but more importantly to the impact on operations
- Digital Twins are created based on the use cases selected by the client

Comparison – Shutdown

Major Plumbing Leak

BASELINE PROCESS	Time Spent	BIM MODEL PROCESS	Time Spent
<ol style="list-style-type: none"> 1. Work Order Submittal 2. Staff Investigation and research 3. Determining ladder and equipment access 	2.5 hours	<ol style="list-style-type: none"> 1. User access the BIM model and locates the room. Looks at systems above ceiling and finds optimal isolation valves. 2. En route, staff discuss system with systems engineer and gets a link to access the BIM files in the room. The systems and valves are highlighted. 	0.75 hours

BIM Process Key Distinctions

- Time Savings = 1.75hours per instance (70% less time)
- SCALE IMPACT
 - Number of Annual Events: 24
- Time Savings: 35 Hours per instance (62% less time)
- SCALE IMPACT
 - Number of Annual Events: 96
- Average savings/year = 3,402hrs

Planned Utility Shutdown

BASELINE PROCESS	Time Spent	BIM MODEL PROCESS	Time Spent
<ol style="list-style-type: none"> 1. Utility shutdown request for an electrical panel. 2. Contractor requests as-builts from facilities 3. Contractor traces the system in the field 4. Facilities receives shutdown request 5. Utility Shutdown request review 6. Utility shutdown request approved and 7. Building occupants are notified of any impacts. Mitigation measures (back-up power, generator, etc.) are in place during shutdown. 	56 Hours	<ol style="list-style-type: none"> 1. Contractor submits utility shutdown request and reviews BIM model. 2. Contractor traces system in the field and uses BIM model to verify the systems and view electrical panel data 3. Facilities AND management reviews BIM Model. 4. Utility shutdown request approved. 5. Building occupants are notified of any impacts. Mitigation measures (back-up power, generator, etc.) are in place during shutdown. 	21 Hours

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Data Management Issues and Consequences

Wrong Processes

Most modelers disregard BIM authoring tools' capabilities and produce good looking 3D models that are **not information models**, and do not provide much value to facility owners.

No Requirements

When facility owners do not specify asset types, attributes, documents, etc. as contractual requirements, their providers do not know how to price the job, and most of the time provide very little **useful** information.

Lack of Responsibility

Without Information Managers the quality of data is not guaranteed. Data providers are not held accountable for their quality of work which often results in missing data.

Wrong Tools

Inexperienced providers, or those not incentivized by owners, try to use free tools and manual labor, resulting in higher total costs, poor data quality, and issues with data updates.

Schedule Delays

When data validation milestones are not defined, all activities are pushed to the final stages of the contract, and often it is too late to find missing information, and the handover is delayed by months.



Information Model Requirements

How

How is the data prepared and collected:
 is BIM geometry adequate for data export?
 Are MEP systems connected? How to
 establish relationships between objects?

What

What data is required: asset types,
 attributes, document categories,
 system levels, zone types?
 What are the nomenclature rules
 for assets, spaces, systems, etc.?

When

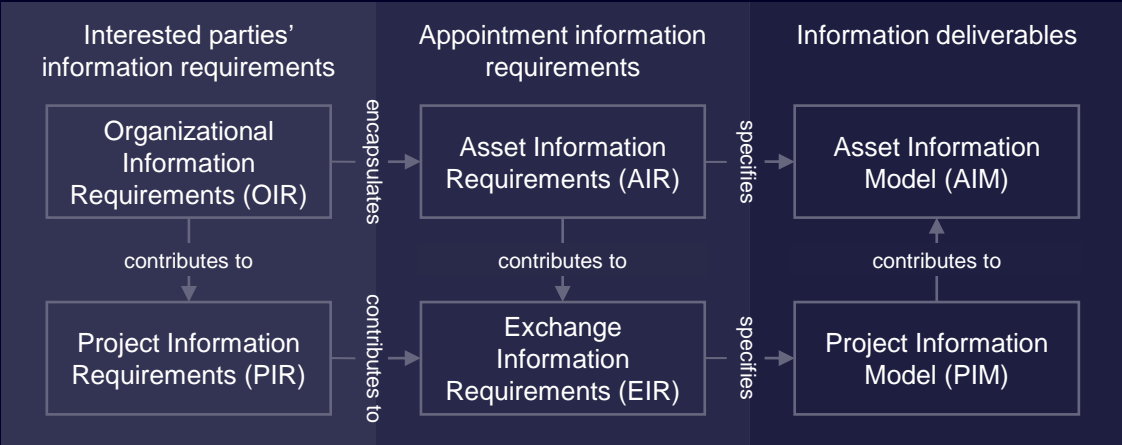
What are the milestones,
 incentives and penalties
 for data checking?

Who

Who provides the data and who checks
 and validates it (Responsibility Matrix)?
 Who updates the 3D model?
 Who collects field data?

Where

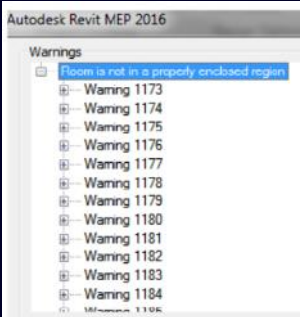
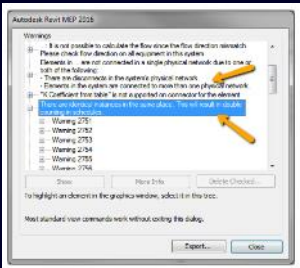
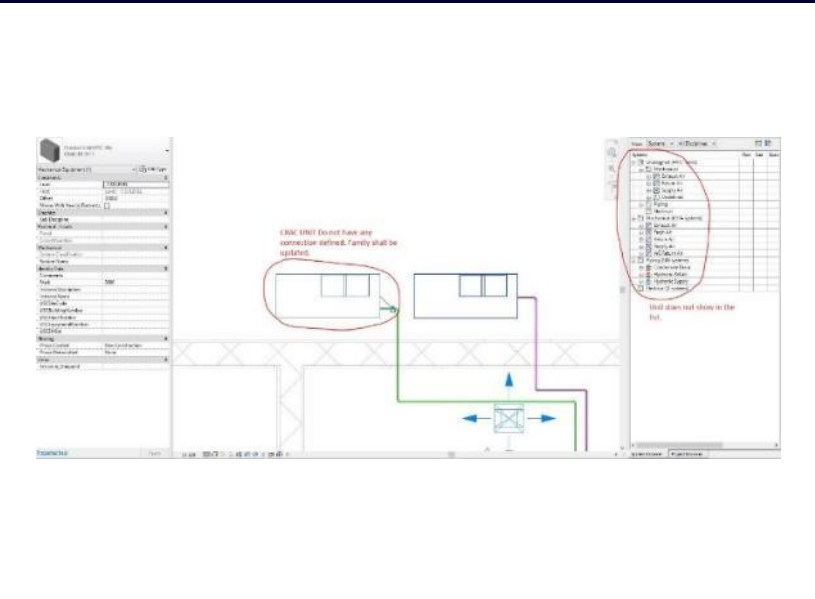
Where is the data managed:
 in Ecodomus? Excel? Revit?



Average BIM vs. Useful BIM

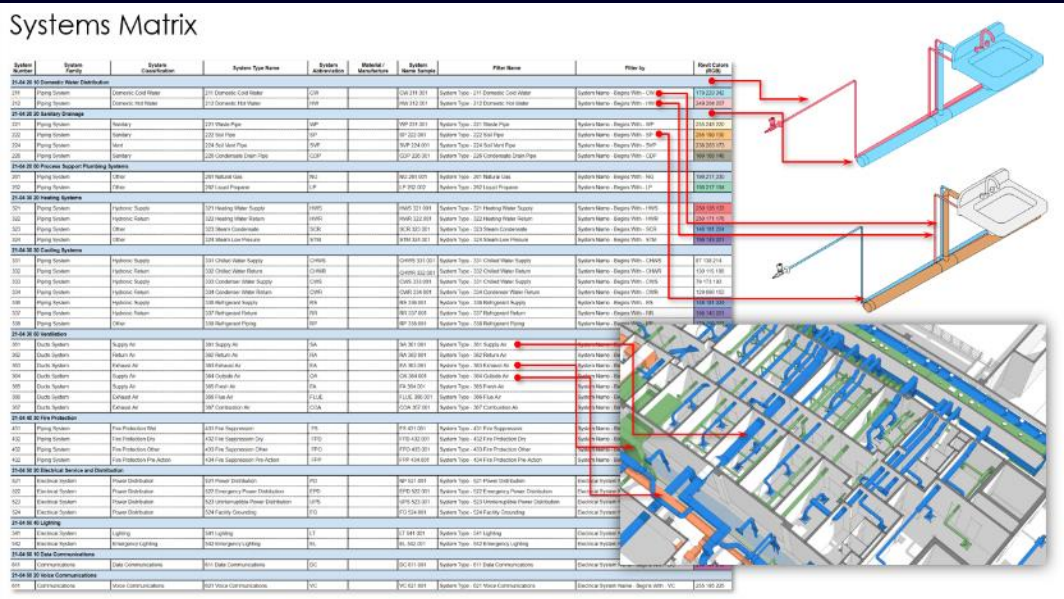
Average “BIM” Project

- Focuses on 2D Deliverables
- Asset names are cryptic
- Properties are missing or wrong
- Building Systems (MEP) are not defined or connected
- Geometry issues (duplicate assets, surface overlaps etc.)



Useful BIM Project

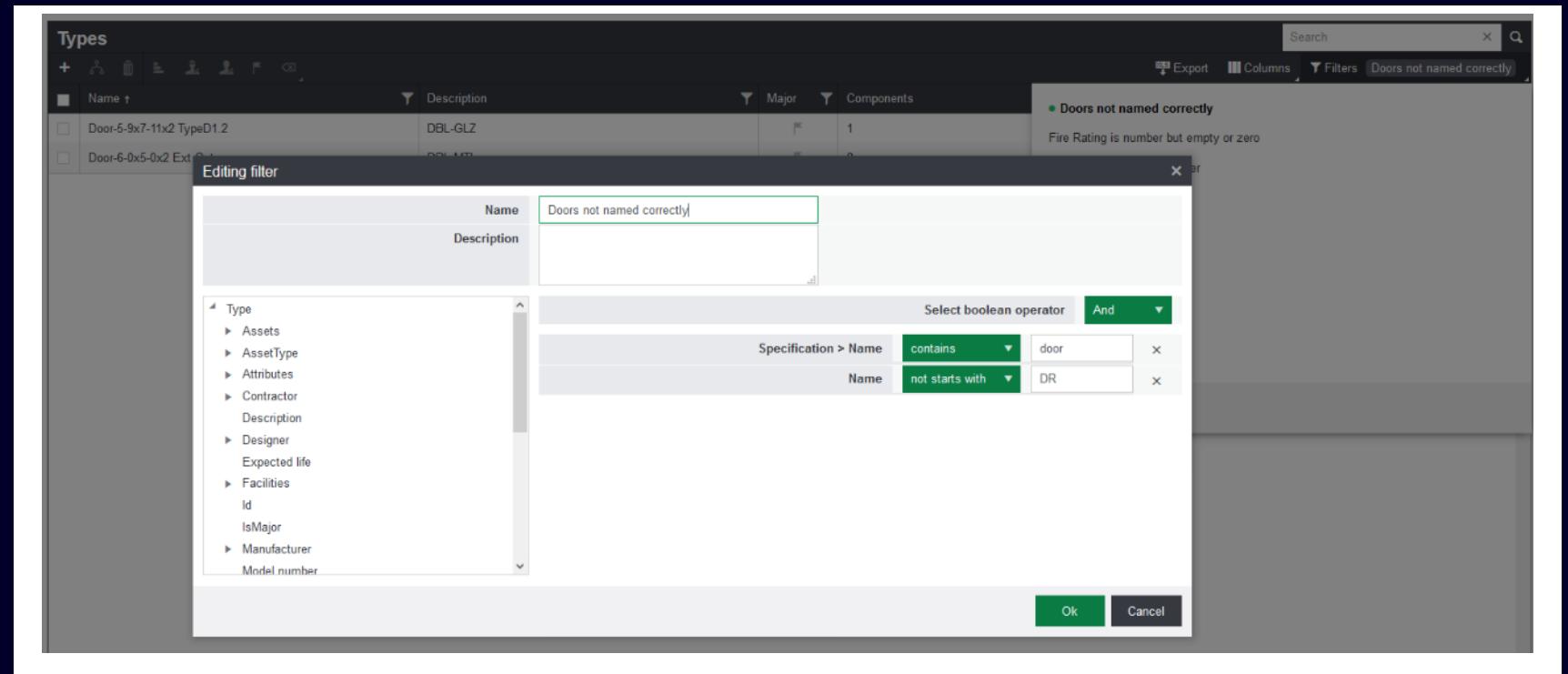
- Focuses on 3D + Data
- Asset names meet owner requirements
- Properties are verified
- Building systems (MEPF) show actual connections
- Geometry issues are resolved – easy to navigate and get data



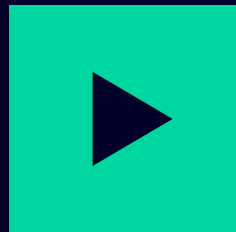
Rule-based Filters/Custom Saved Queries

Create rules and use them as saved queries to monitor quality throughout the project.

- Example on the left shows doors (OmniClass contains the word “door”) that do not start with “DR” as requested by the owner’s requirements



Rule-based Filters/Custom Saved Queries



ecodomus AECOM > Projects > AECOM Demo Project > Components Igor Starkov AECOM Demo Project Help

Assets Components + Add Rename Remove Edit Get barcode in PDF Export Display Columns Custom Filters Hide ducts

Types Components Spaces Systems Zones Floors Facilities Import/Export Reports Quality Control Diagrams Files Viewer Documents Activities Issues Forms Surveys Inspections

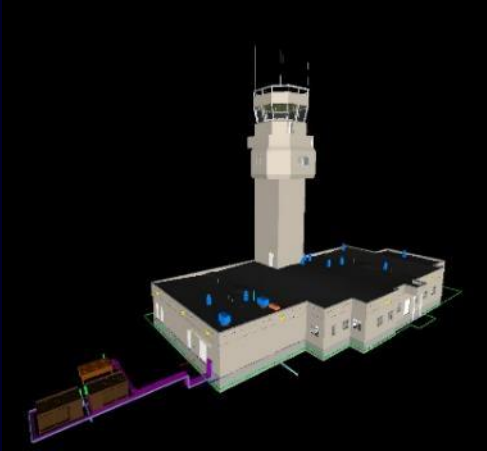
Components <Unknown category> Architecture Civil Electrical Mechanical Piping Structural

DISCIPLINE	Name	Description	Location	Type	Category	Purchased Cost	Installed Cost	Maintenance Cost
	1/2" (1)			Pressure Regulating Valve - ...	Pipe Accessories			
	2 1/2" (4)			Butterfly Valve - 2-12 Inch: 2 ...	Pipe Accessories	50	10	35
	2 1/2" (5)			Butterfly Valve - 2-12 Inch: 2 ...	Pipe Accessories	50	10	35
	2 1/2" (6)			Butterfly Valve - 2-12 Inch: 2 ...	Pipe Accessories	50	10	35
	2 1/2" (7)			Butterfly Valve - 2-12 Inch: 2 ...	Pipe Accessories	50	10	35
	2 Inch (2)			Valve-Mixing-Apollo-Lead_Fr...	Pipe Accessories			
	2 Inch (3)			Valve-Mixing-Apollo-Lead_Fr...	Pipe Accessories			
	4 - 20 mA / Metal Housing (2)			Sensor-Temperature_Pipe-Si...	Pipe Accessories			
	4 - 20 mA / Metal Housing (3)			Sensor-Temperature_Pipe-Si...	Pipe Accessories			
	5" Drain Pipe (10)		120 - A S R	Roof Drain Pipe: 5" Drain Pipe	Plumbing Fixtures	100		
	5" Drain Pipe (11)		1C5 - Electrical	Roof Drain Pipe: 5" Drain Pipe	Plumbing Fixtures	100		
	5" Drain Pipe (12)			Roof Drain Pipe: 5" Drain Pipe	Plumbing Fixtures	100		
	5" Drain Pipe (13)		1VA8 - Void Area	Roof Drain Pipe: 5" Drain Pipe	Plumbing Fixtures	100		
	5" Drain Pipe (14)			Roof Drain Pipe: 5" Drain Pipe	Plumbing Fixtures	100		
	5" Drain Pipe (15)		1VA5 - Void Area	Roof Drain Pipe: 5" Drain Pipe	Plumbing Fixtures	100		
	5" Drain Pipe (8)			Roof Drain Pipe: 5" Drain Pipe	Plumbing Fixtures	100		
	5" Drain Pipe (9)		1VA2 - Void Area	Roof Drain Pipe: 5" Drain Pipe	Plumbing Fixtures	100		
	85 gal Wessel		2XS1 - Roof	Boiler Expansion Tank	Mechanical Equipment	1000	50	
	AC Motor 1		2XS1 - Roof	AC Motor	Electrical Equipment			
	AC-1		2XS1 - Roof	AC Rooftop Unit 75 ton	Air Handling Units	100	20	30
	AC-2	AC-2	2XS1 - Roof	AC Rooftop Unit 70 ton	Air Handling Units	45000		
	AC-3	AC-3	2XS1 - Roof	AC Rooftop Unit 3 ton	Air Handling Units	1000		
	Air_Vent-Metraflex--Metraven...	Test edit1		Air Vent Automatic (1)	Pipe Accessories			

1 - 50 of 3418 items

Send feedback Copyright: EcoDomus, Inc.

Ecodomus BIM Data Management Benefits



1

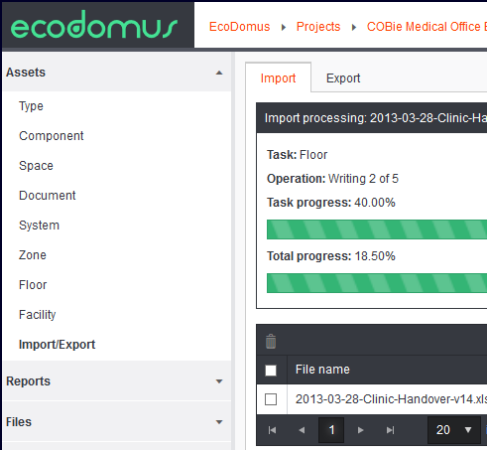
Create Useful BIM

Ecodomus BIM and Data experts have unmatched experience in preparing models and datasets for the successful handover. BIM for FM modeling has unique requirements that most modelers do not know, and as a result, most so-called BIMs have limited value for FM.

3

Many Ways of Data Entry

Ecodomus PM allows entering data via a web browser interface, mobile devices, or export COBie Excel files, update them, and re-import into Ecodomus to update values.



2

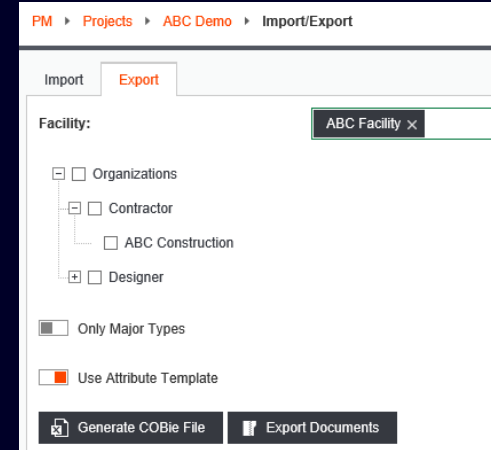
Quality Control

Ecodomus PM's automated quality control features allow for checking attributes and documents for compliance with facility owner's requirements.

4

Optimization

Ecodomus PM and BIM Connector help filter data to reduce unnecessary data collection, focusing attention on the required data.



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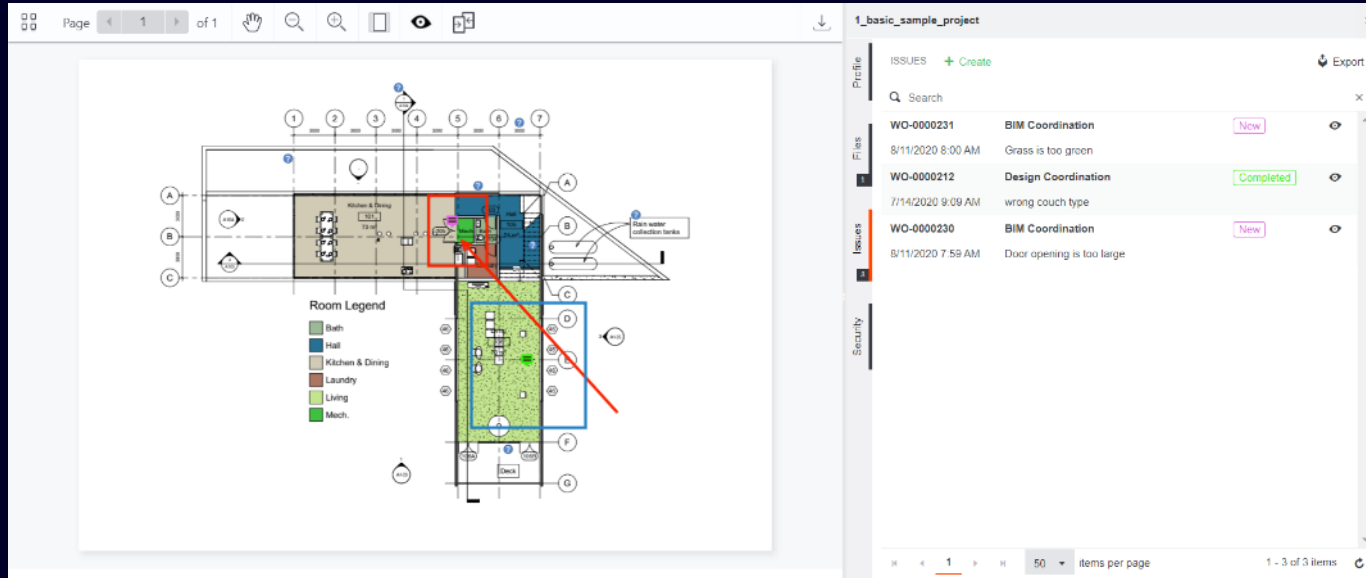
Ecodomus Document Management System

- Each file has metadata associated with it: Category, custom tags, version (revision), date updated, size, etc.
- Metadata fields are editable. Documents can be filtered by metadata fields
- Custom queries can be saved for reuse
- Docs are linked to BIM objects (i.e., component, type, space, system, etc)

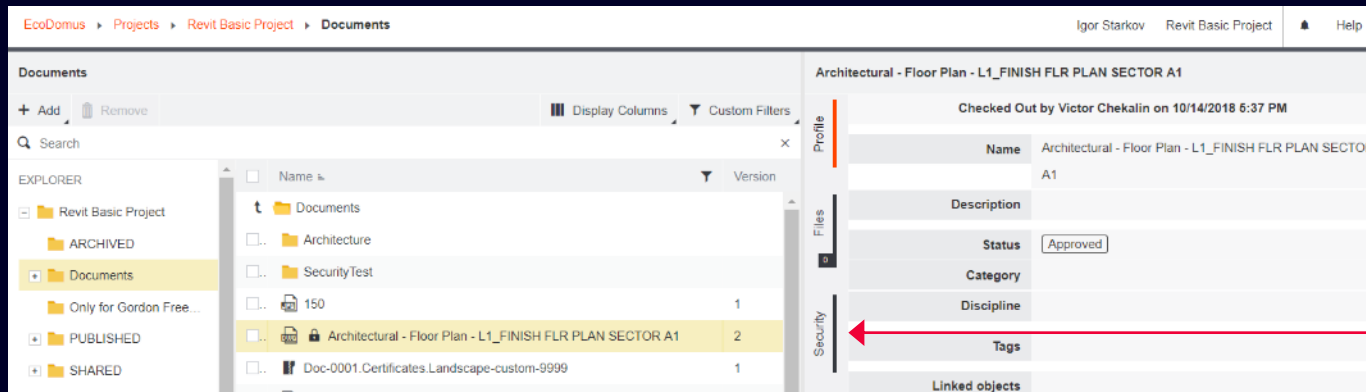
The screenshot displays the Ecodomus Document Management System interface, which is integrated with the Spotless Power BI tool. The interface is divided into several key sections:

- Documents List:** A table showing a list of documents with columns for Name, Version, Category, Linked Objects, Top, File Size, and other metadata. Examples include '9-1-09R' (Client Requirements), '9-2-02R' (Client Requirements), and '9-4-1 Mechanical Single Line Diagram' (Operation and Maintenance).
- Documents Filter:** A panel on the left allows users to filter documents by categories such as 'Client Requirements', 'Closeout Submittals', 'Design Data', 'Operation and Maintenance', 'Product Data', 'Record photograph', 'Samples', and 'Shop Drawings'.
- AC-3 Filter:** A dialog box for creating or editing filters, with fields for Name (e.g., 'AC-3 Filter'), Status, Category (e.g., 'Closeout Submittals'), Discipline, and Tags. It also shows linked objects like 'AC Rooftop Unit 3 ton'.
- Analytics Dashboards:**
 - Count by Status:** A horizontal bar chart showing document counts across various statuses like 'As-Built', 'Approved for Construct...', and 'Final'.
 - Count by Organisation:** A treemap chart showing document counts across different organizations like 'Advanced Precast', 'SFG Global Facades', and 'Aurtech Fac...'.
 - Modified Documents by Year and Month:** A line chart showing the number of documents modified over time, with a significant peak in May 2021.
- Table View:** A detailed table at the bottom listing document folders, status names, names, and IDs. For example, '25057 Facade CLT' (As-Built) has ID 'JZ-5-D401A - G Floor East Typical Mullion Plan Detail'.

Ecodomus Document Management System



- Ability to redline and comment PDFs, DWGs, DGNs, and link to issues
- Multi-layering of markups with turn on/off function
- Support for multiple formatted files per document record

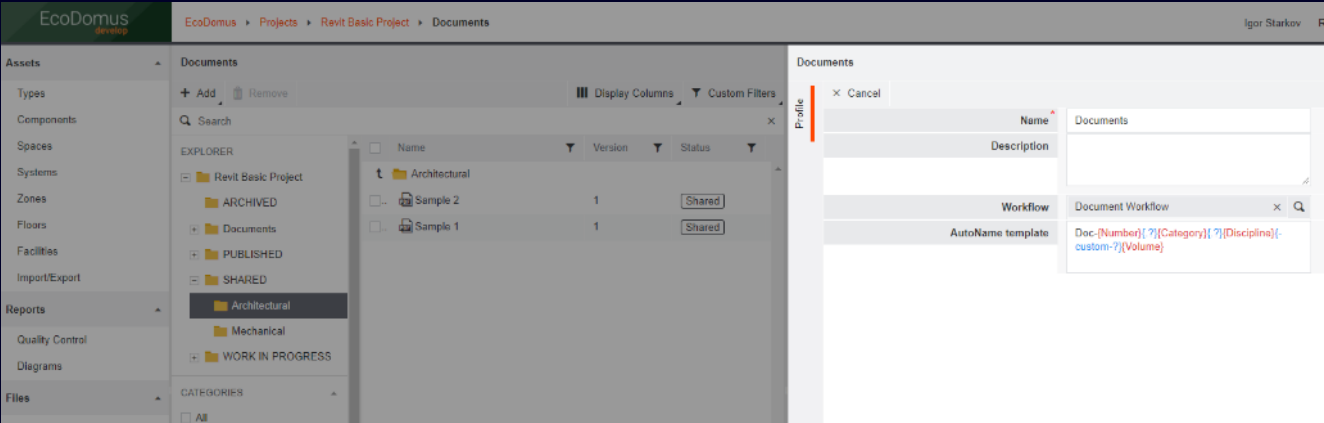


Check-in/Check-out locking of files for editing

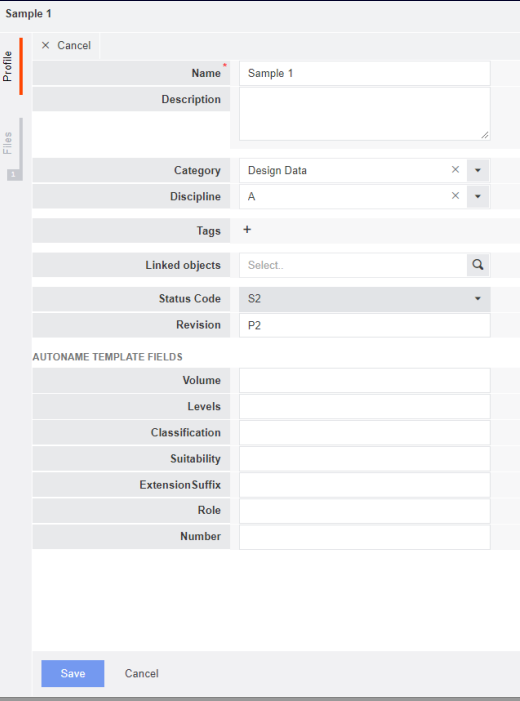
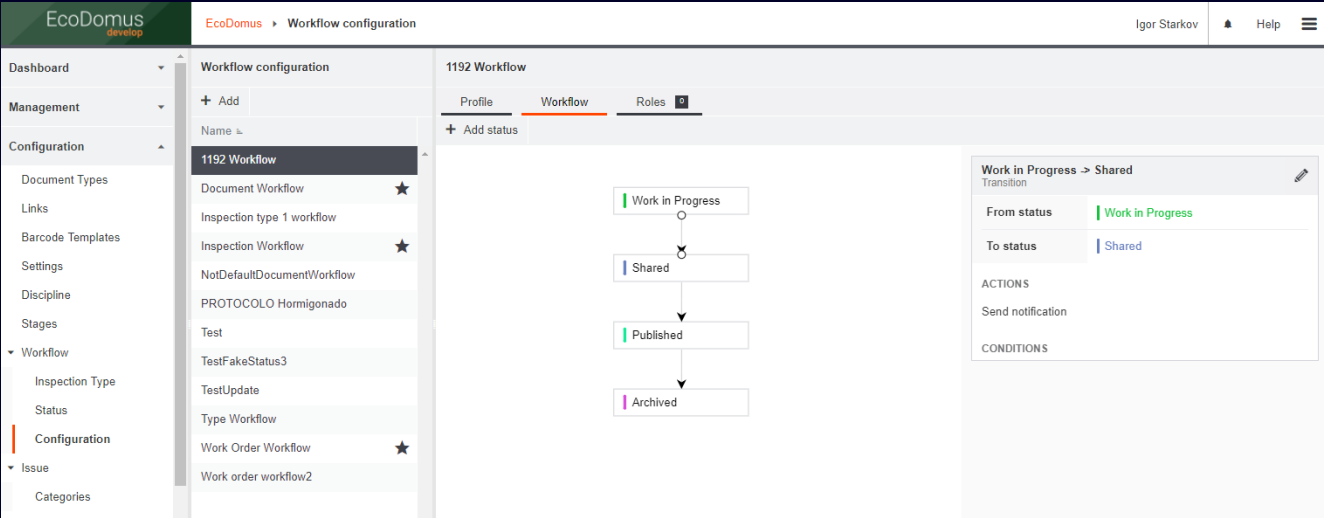
Access rights (security) for files and folders

Customizable Workflows

CAD and BIM files can be stored in folders, and auto-renamed on upload using formulas.



Files' status can be changed according to workflows (i.e., ISO 19650), that admin users can customize using web interface.



Files' properties can be customized via a web interface. This helps to search/find files, link files to BIM objects (i.e. instance or type or system), edit files' status and revision.

Ecodomus Tasks Management System

- Tasks (field issues, design coordination problems, work orders, RFIs, hot/cold calls, service requests, etc.) can be created via a web form, on a mobile device, or within a 3D viewer
- Various reports can be built and exported to Excel or to BI tools
- If Tasks are not properly addressed, users can create Notices, which can be used to generate a template-based PDF documents sent to the responsible party

No.	Name	Created On	Category	Priority	Component	Status	Spaces
WO-0000248	Pressure problem	11/17/2020 10:30 AM	BIM Coordination	EMERGENCY	AC-1	Open	2XS1 - Roof_1A4 - f
WO-0000247	VAV 39 Inspection Issue	11/2/2020 11:08 PM	BIM Coordination	URGENT	VAV-1-1-01	New	1A0 - Lobby
WO-0000246	Grass is too green	10/27/2020 12:45 PM	Service Request	URGENT	(L)(10)	Open	1CSA - Electrical
WO-0000244	Gridbis incorrect	10/26/2020 9:38 AM	Lighting Issue	LOW	45 gradus	New	1CSA - Electrical
WO-0000243	Door is not closed	10/22/2020 7:33 AM	Installation	URGENT		New	1A4 - Break Area
WO-0000242	Book 1A4	10/21/2020 2:44 PM	Space Booking	NORMAL		Approved	1A4 - Break Area
WO-0000241	AC-2	10/16/2020 3:38 PM	PM		AC-2	New	2XS1 - Roof
WO-0000239	wrong doc	10/13/2020 6:15 PM	BIM Coordination			New	
WO-0000238	Coffee machine is broken	10/13/2020 2:08 PM				Open	1A4 - Break Area
WO-0000237	Wrong door finish	9/21/2020 12:15 PM	Design Coordination	URGENT	DR_118	New	C1W - Corridor
WO-0000236	Example issue	9/17/2020 7:03 AM	BIM Coordination		DR_164	New	1P9F - Hardwell
WO-0000235	Verify location of duct	9/17/2020 6:10 AM	BIM Coordination			New	
WO-0000234	Air supply problem	8/24/2020 5:34 PM	RFI	LOW	AC-1	InProgress	2XS1 - Roof
WO-0000233	Test barcode issue	8/24/2020 5:18 PM	SCADA Alarm	URGENT	(L)(16)	New	
WO-0000232	Redlining test	8/19/2020 9:25 PM	Data Missing			New	
WO-0000231							

No.	Category	Name	Created On	Status	Due Date	Modified On
Opened:						
WO-0000135	Hot/Cold Call	Too hot in room 1A3	8/14/2019 5:42 PM	On-Hold		8/14/2019 5:45 PM
WO-0000099	Missing Asset in Model	Add pump to the model	1/5/2019 9:33 PM	New	1/7/2019	1/9/2019 2:20 PM
WO-0000017	Request	Missing spare part		New	11/28/2017	
Closed:						
WO-0000013	Installation	wrong installed equip...		Completed		
WO-0000024	Installation	Door paint bad		Completed		11/16/2020 3:30 PM

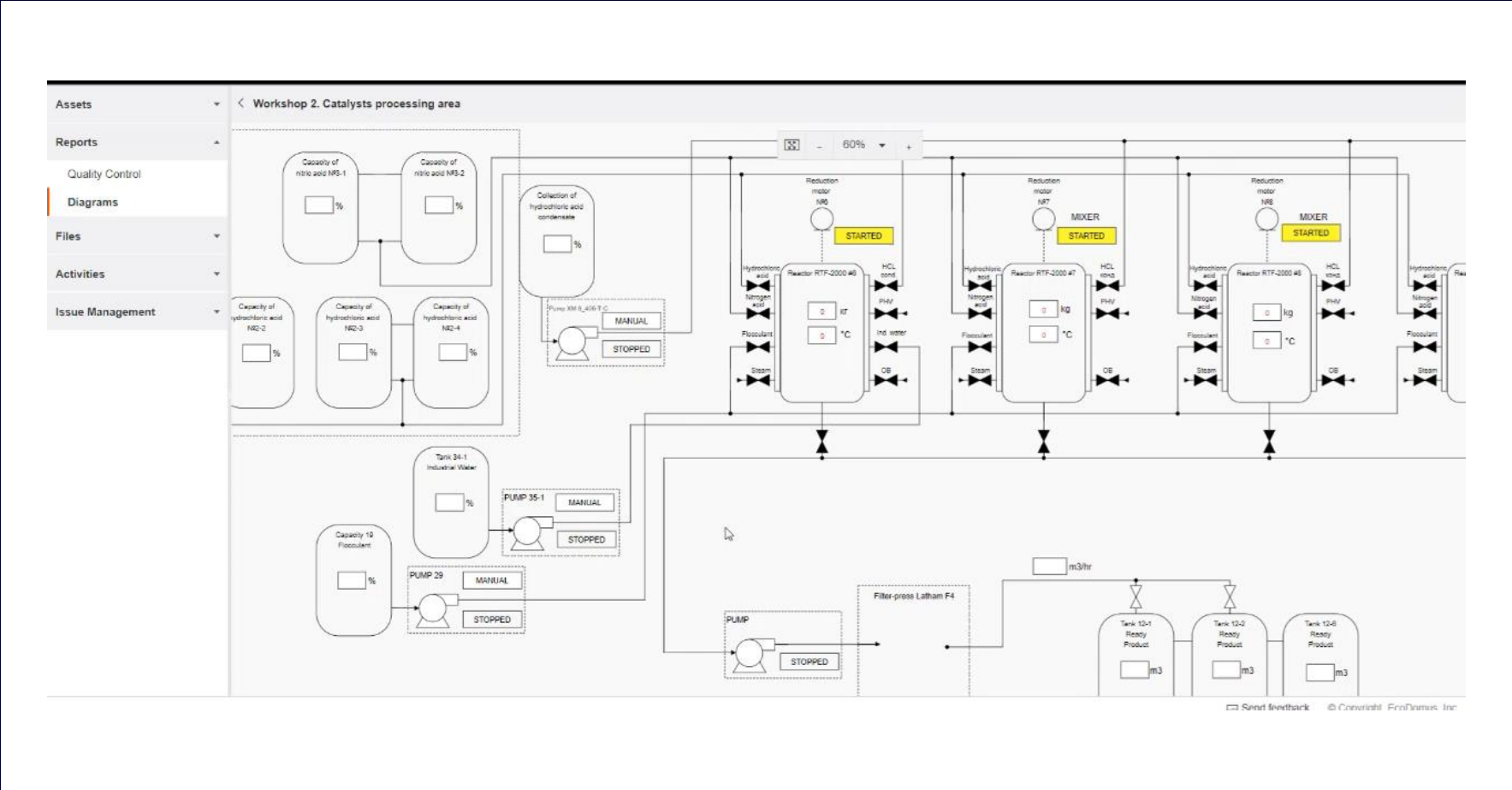
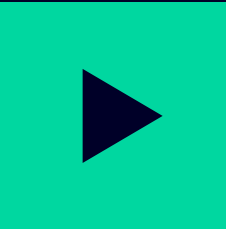
2D Interface as a Valuable Addition to 3D

- Every element of the 2D electrical diagram on the left can be linked to a BIM object or show real-time data from a sensor
- The “affects” schema below shows relationships between the elements of the electrical system

The screenshot displays the ecodomus software interface. The top navigation bar includes 'AECOM > Projects > AECOM Demo Project > Diagrams > Power Riser Diagram'. The left sidebar contains a navigation menu with categories like Assets, Reports, Diagrams, Files, Viewer, Documents, and Activities. The main workspace shows a 2D electrical diagram of a power riser system across four floors (4TH_FLOOR, 3RD_FLOOR, 2ND_FLOOR, 1ST_FLOOR) and a BASEMENT. The diagram includes various components such as panels (PANEL RP3 SEC-3, PANEL RP3 SEC-2, PANEL RP2 SEC-1, PANEL RP2 SEC-2, PANEL RP2 SEC-3, SUB PANEL RP4), transformers (T(E) 75KVA, T(E) 25KVA, T(E) 45KVA, T(E) 30KVA), and a generator (TO 325KVA GENERATOR(E)). Red arrows point from the text 'Linked to BIM objects' to a transformer and a panel, and from 'Linked to IoT/BAS' to a panel. Below the diagram, an 'affects' schema for 'Distribution Panelboard DB-S-GF-LL-01' is shown, listing various light fixtures and control panels. The schema includes:

- DB-S-GF-LL-01 - [B1]
- DB-S-GF-LL-01 - [B10]
- Control Panel ACP-1-S-1
- Control Panel ACP-2-S-1
- Light Fixture C1 LB04-1 - 1
- Light Fixture C1 LB06-1 - 2
- Light Fixture C1 LB06-1 - 3
- Light Fixture L3 SH43.0 - 1
- Light Fixture L3 Short N24 - 1
- ACP-1-S-1 - [1]
- ACP-1-S-1 - [3]
- ACP-1-S-1 - [4]
- ACP-1-S-1 - [5]
- ACP-1-S-1 - [6]
- ACP-1-S-1 - [7]
- ACP-1-S-1 - [8]
- Card Reader - 61
- Access Device - 244
- Access Device - 245
- Access Device - 243
- Exit Button 197-6 - 1
- Card Reader LB04-2 - 1
- Card Reader 167-07 - 1
- Access Device - 327
- Access Device - 328
- Access Device - 326
- Exit Button 197-07 - 1

Ecodomus Diagrams: Connect 2D & 3D & IoT

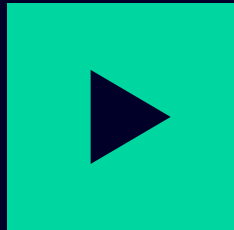


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Section 8	Laser scanning technology for 3D asset management
Questions and Answers	



BIM and Project Management Integration



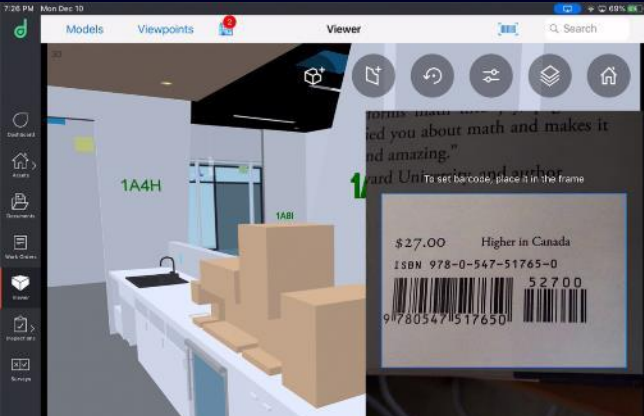
Unifier + EcoDomus: Lifecycle BIM Integration Demo



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Mobile BIM and Quality Control on iPad



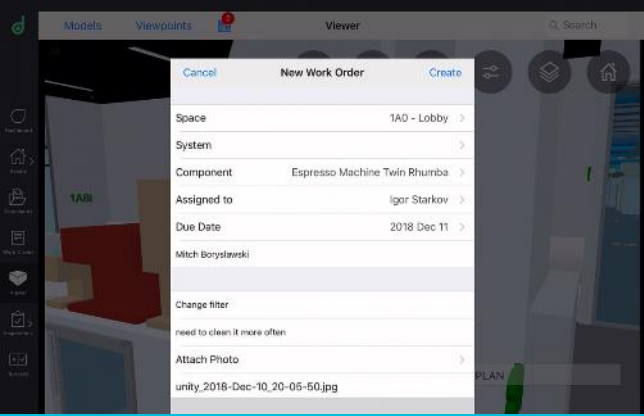
Scan QR/Barcodes or Use RFID



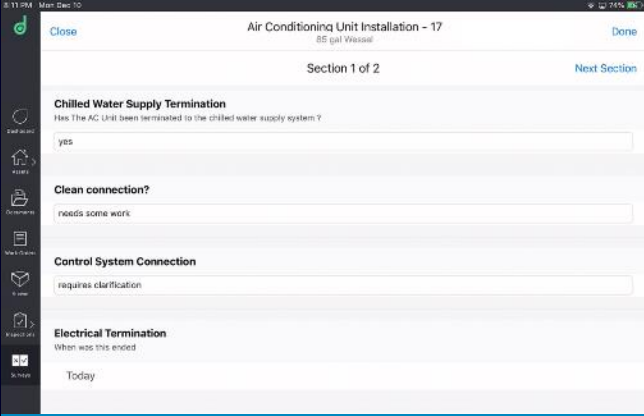
Find Assets & View Attributes



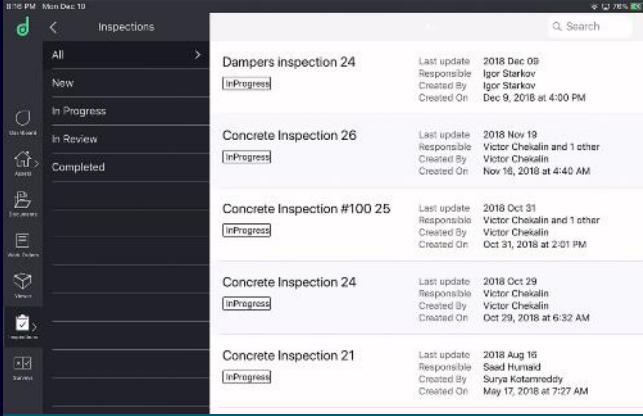
Review & Markup Documents



Manage Issues

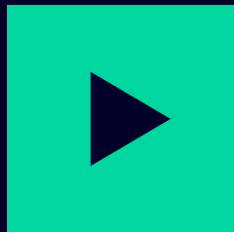


Fill Out Forms

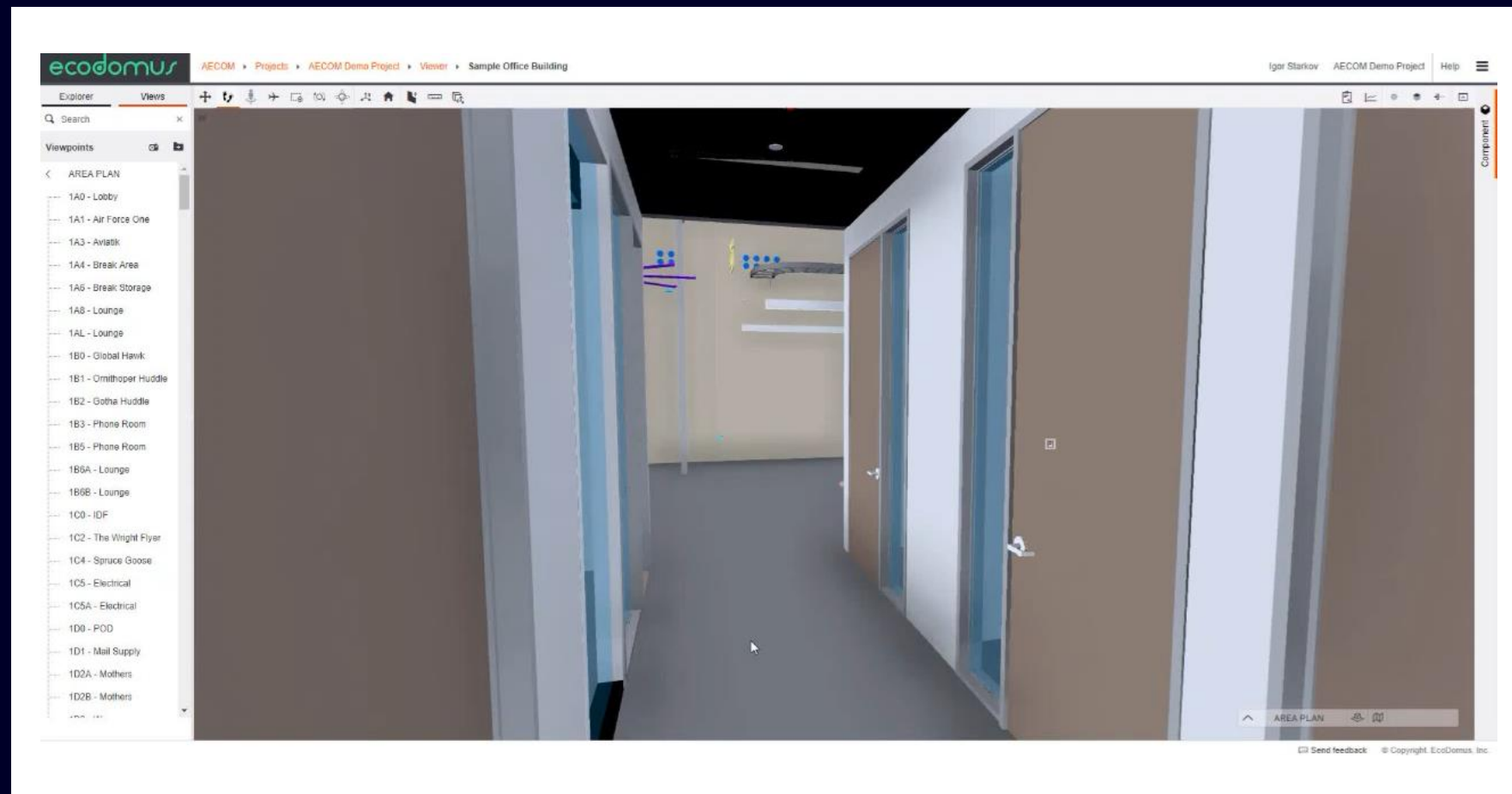
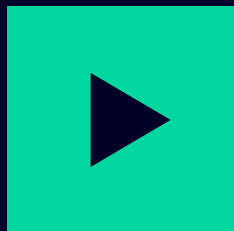


Complete Inspections

Mobile Inspections, Documents, Forms



Issues Management in 3D BIM & Point Cloud



Issues Activity History

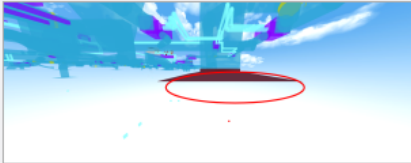
- A chat-like window on the right of issue's profile allows tracking all activities related to an issue and collaborate with your colleagues in real-time
- Issue status changes are reflected in the Activity window
- Images (from 3D viewer, photos taken on mobile devices, etc.) are attached to the issue and shown in the Activity window

Air not flowing into room Completed
WO-0000193

Profile Files 1 History 4 Notices 1

Name	Air not flowing into room
Description	
Category	BIM Coordination
Priority	URGENT
Facilities	AECOM Office
Location	
Space	AECOM Office / AREA PLAN / 1E2 - Albatros
Component	SA DIFF Rectangular 24x24 12 neck (11)
Assigned To	EcoDomus (Ju Lee Kang)
Requested By	
Due Date	6/3/2020
Scheduled Start Date	
Actual Start Date	11/17/2020 8:13 PM
Closed Date	11/17/2020 8:13 PM
Created On	6/3/2020 4:25 PM
Created By	Ju Lee Kang
Last Updated On	11/17/2020 8:13 PM
Last Updated By	Igor Starkov

6/3/2020

Ju Lee Kang:

pls check today
6/3/2020 12:27 PM

Ju Lee Kang:
I chcked but dont see a problem. Air seems to flow but is hot still. But also I see someone changed filter already. So i dont think is the filter
6/3/2020 12:35 PM

7/29/2020

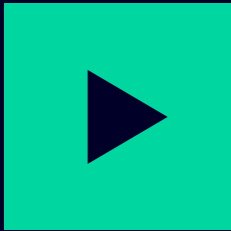
Igor Starkov:
No it's not the problem as i see it
7/29/2020 5:48 PM

11/17/2020

Igor Starkov:
[New -> Open]
11/17/2020 3:13 PM

Igor Starkov:
[Open -> Completed]
11/17/2020 3:13 PM

Augmented & Mixed Reality Interface



Agenda

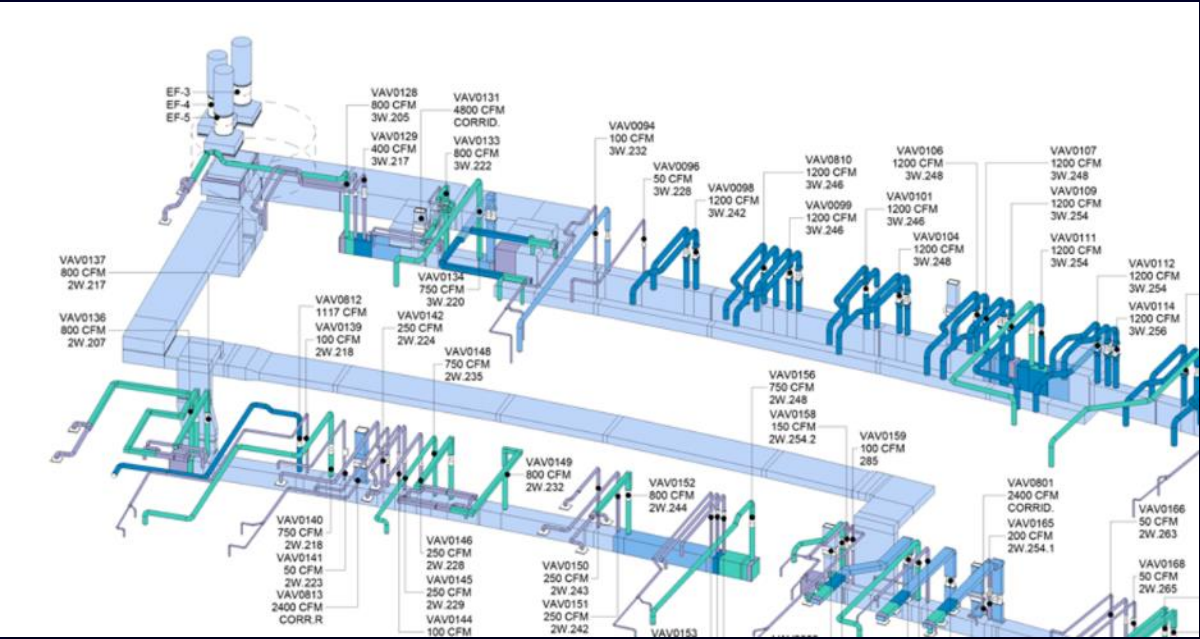
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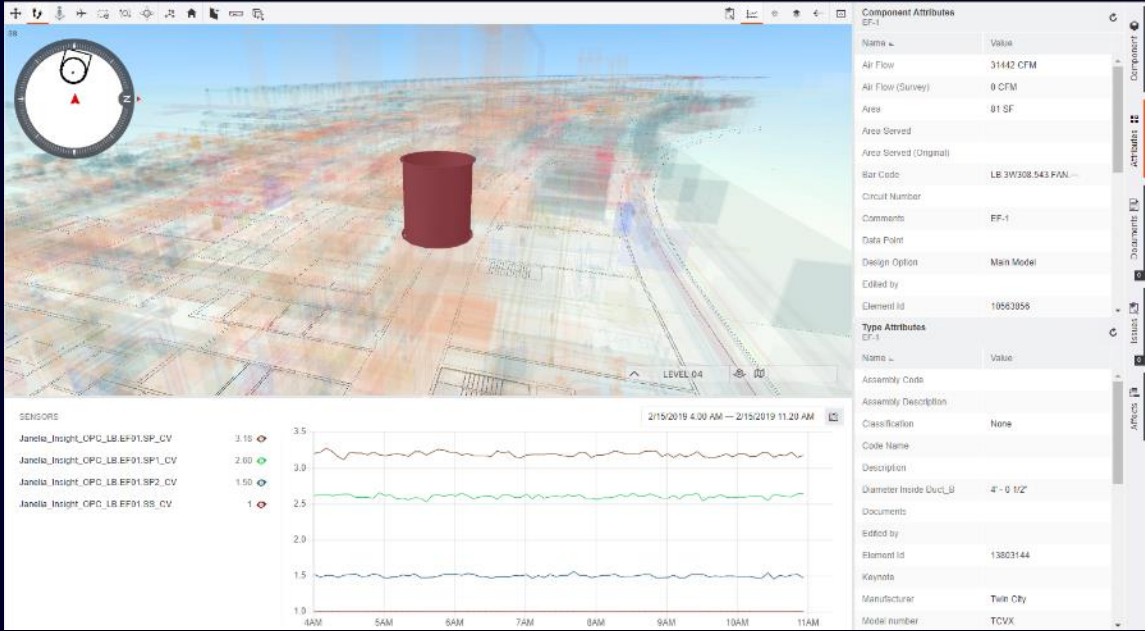
Using BIM/BAS Integration for Analytics

We get “as designed” (intent) BIM from architects/engineers and “as built” values from builders and commissioning agents, and link sensors’ data to objects to see how close the actual values “as operated” are compared to the “design intent” and “as built”.

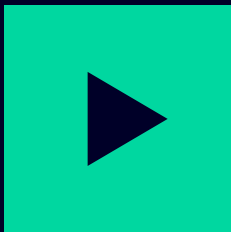
As Designed/As Built



As Operated



BIM and SCADA/ BAS Integration



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Questions
and Answers



Case Study: Creating Digital Twin for Existing Facility



Laser Scanning & Aerial Photography For Modeling

BIM and GIS Integration

The logo for ecodomus, featuring the word "ecodomus" in a lowercase, rounded, sans-serif font. The letter "o" is stylized with a dot above it, resembling a lowercase "o" with a dot, or a "d" without the vertical stem. The background of the logo area is a solid yellow color.

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Questions and Answers



Contact



Igor Starkov

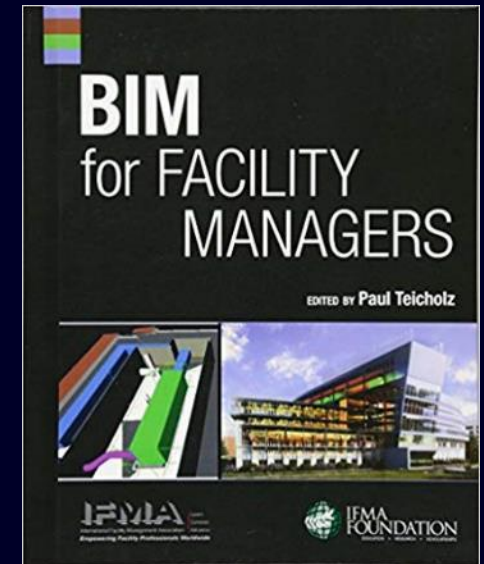
Mobil: Tel.: +1 571 277 6617

Mail: igor.starkov@siemens.com

Read about Ecodomus:



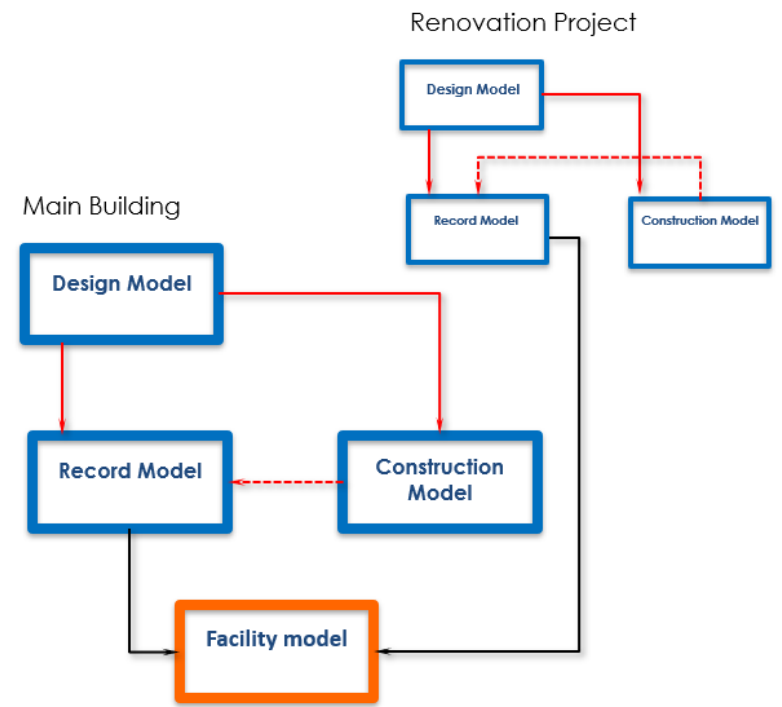
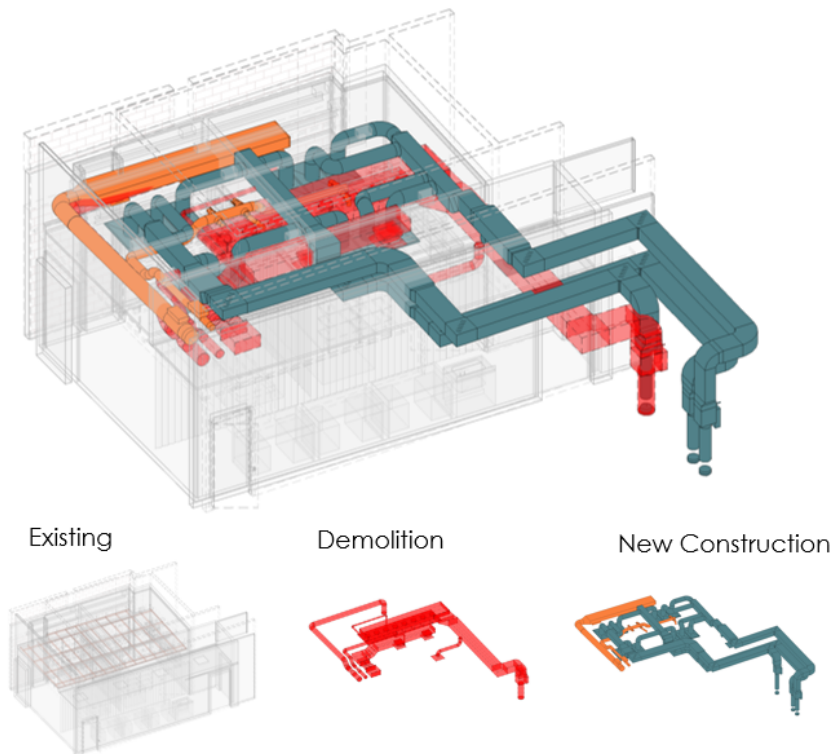
#1 book on BIM in the industry.
3 out of 11 case studies are
from Ecodomus projects:
*Howard Hughes Medical,
Stanford, Medina Airport*



Ecodomus is the only software
with a dedicated chapter.
The image on the cover is
from our USC project.

How to Create Facility Model for Digital Twin

Integrating Fitout, Reconstruction, Addition Projects



How to Maintain Digital Twins

All renovation projects are managed using phases in Revit and provide ability to review what changed (“before” and “after” views).

Managing and Integrating Fitout / Renovation Projects

The image illustrates the management of renovation projects using Revit phases. It features a 2D architectural plan with various areas highlighted in different colors (purple, green, brown, red) to represent different project phases. A 3D cutaway view of a building shows these phases in red, and another 3D cutaway view shows them in yellow and red. A 'Phasing' dialog box is overlaid on the plan, showing the following information:

Phasing	
Phase Created	20060526 Interior Fit Out
Phase Demolished	None

The 'Project Phases' dialog box is also open, showing a list of project phases:

Project Phases	
PAST	
1	20051012 Landscape Building
2	20060526 Interior Fit Out
3	20070228 EM Suite I
4	20070411 4 Bay Optics
5	20070516 NMR First Floor
6	20070914 APiG
7	20070924 Second Floor High Bay
8	20070924 High Bay Vivarium
9	20071120 Transgenic Mouse Wet Stamp
10	20071217 Vivarium Expansion
11	20080411 Second Floor Labs
12	20080502 Dragonfly
13	20080512 Second Floor Modifications
14	20090217 Redundant UPS Room
15	20090302 Vivarium Expansion II
16	20090412 Technology Conference
17	20090515 ID&BF
18	20110419 EM Suite II
19	20131011 EM Suite III
20	Facility Management
FUTURE	