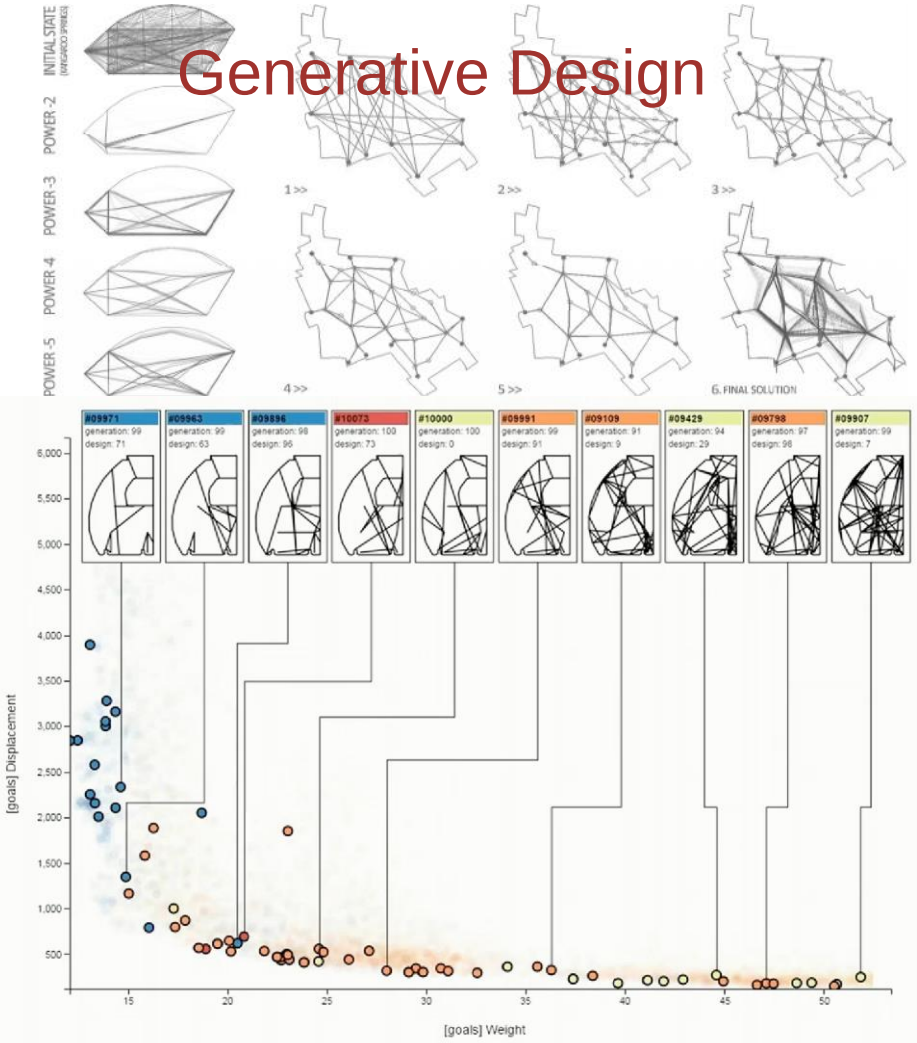
MDUG

Dynamo: From **Generative Design** to **Data-driven** processes

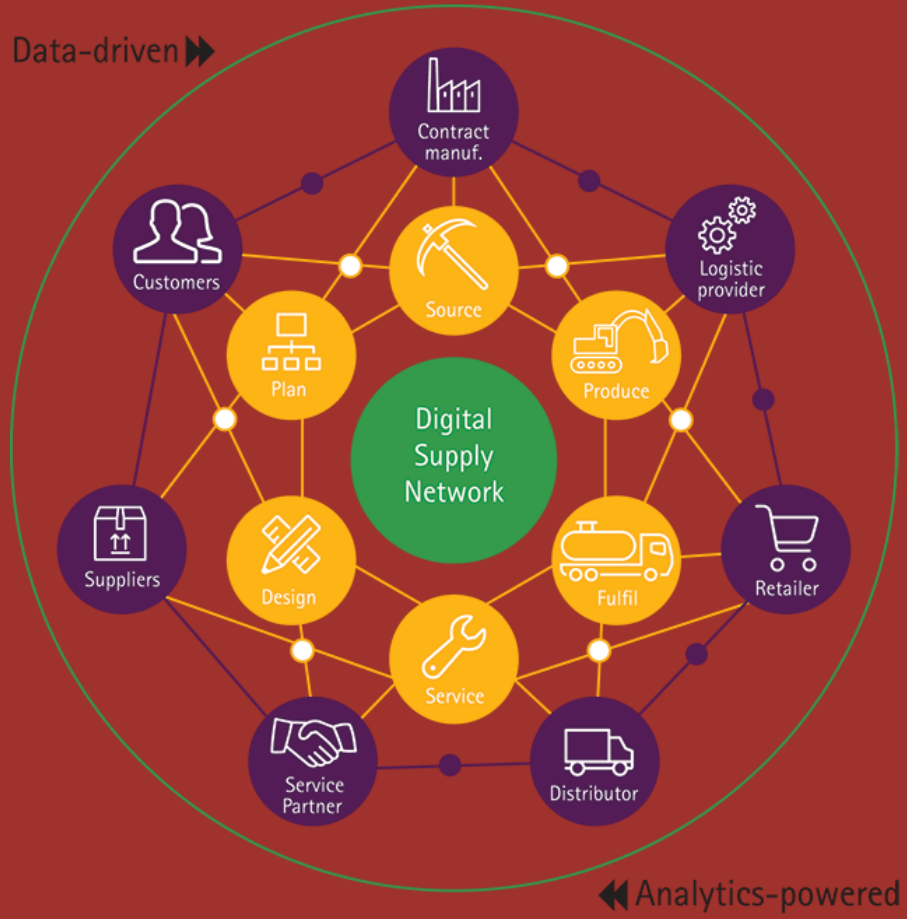
How Dynamo can **Leverage data** & **Enhance design**

Ponente: Francisco Javier López Martín

Generative Design



Data-Driven



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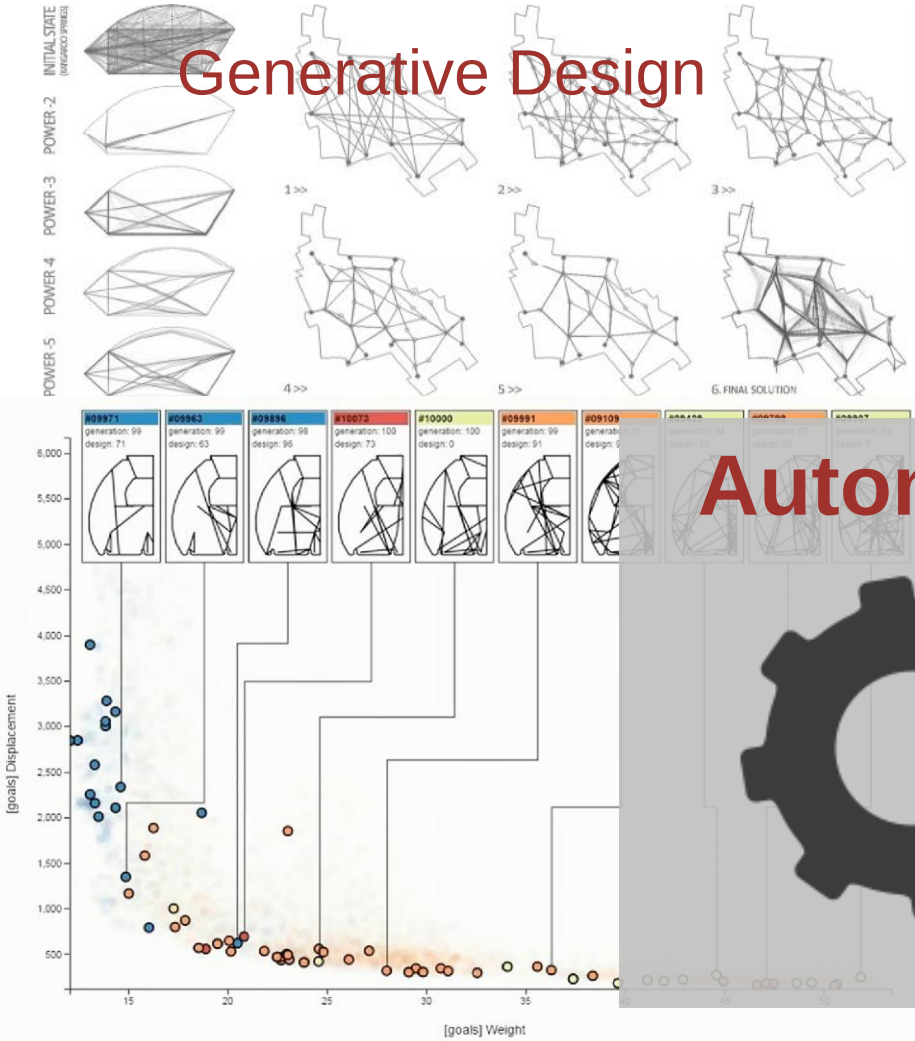

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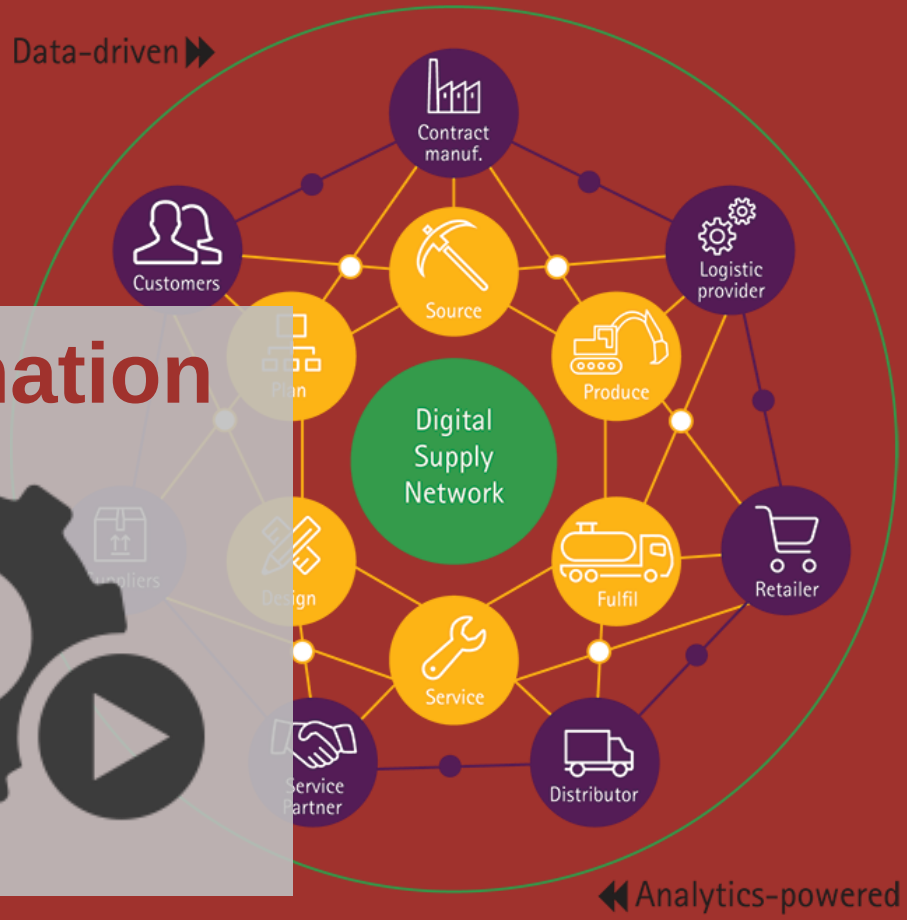
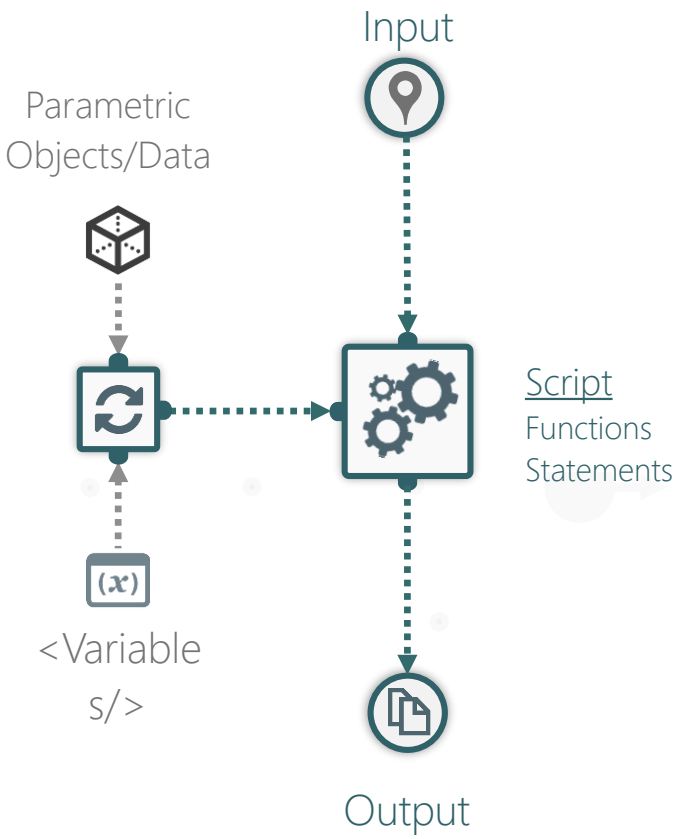


Automation

01. Generative Design

Flexible deployment



Generative Design

Feasibility study
Design Options
Plan Generator
Route Finding
Fire protection QAC

Data-driven

Data Extraction
Data visualization
Spaces

Automation

WallTypeCreator
Positioning
Data integration

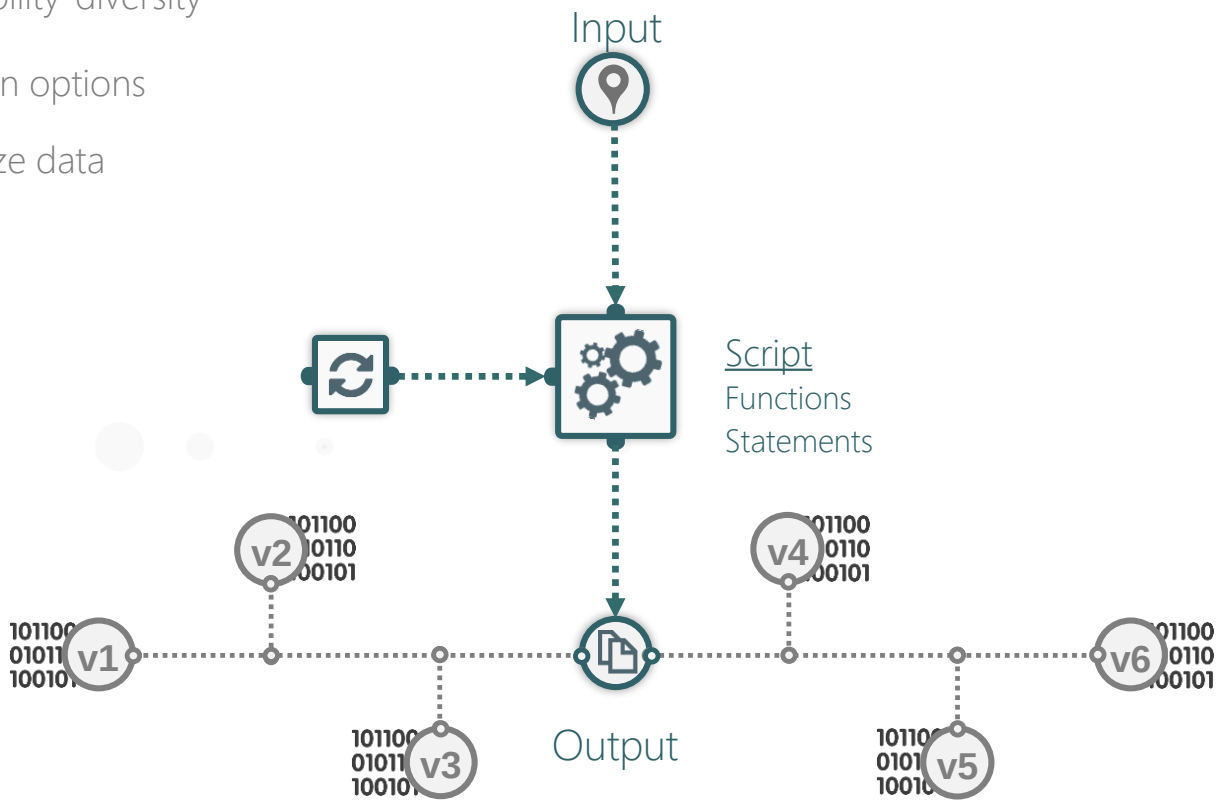
Lessons learnt

Flexible deployment

Scalability-diversity

Design options

Analize data



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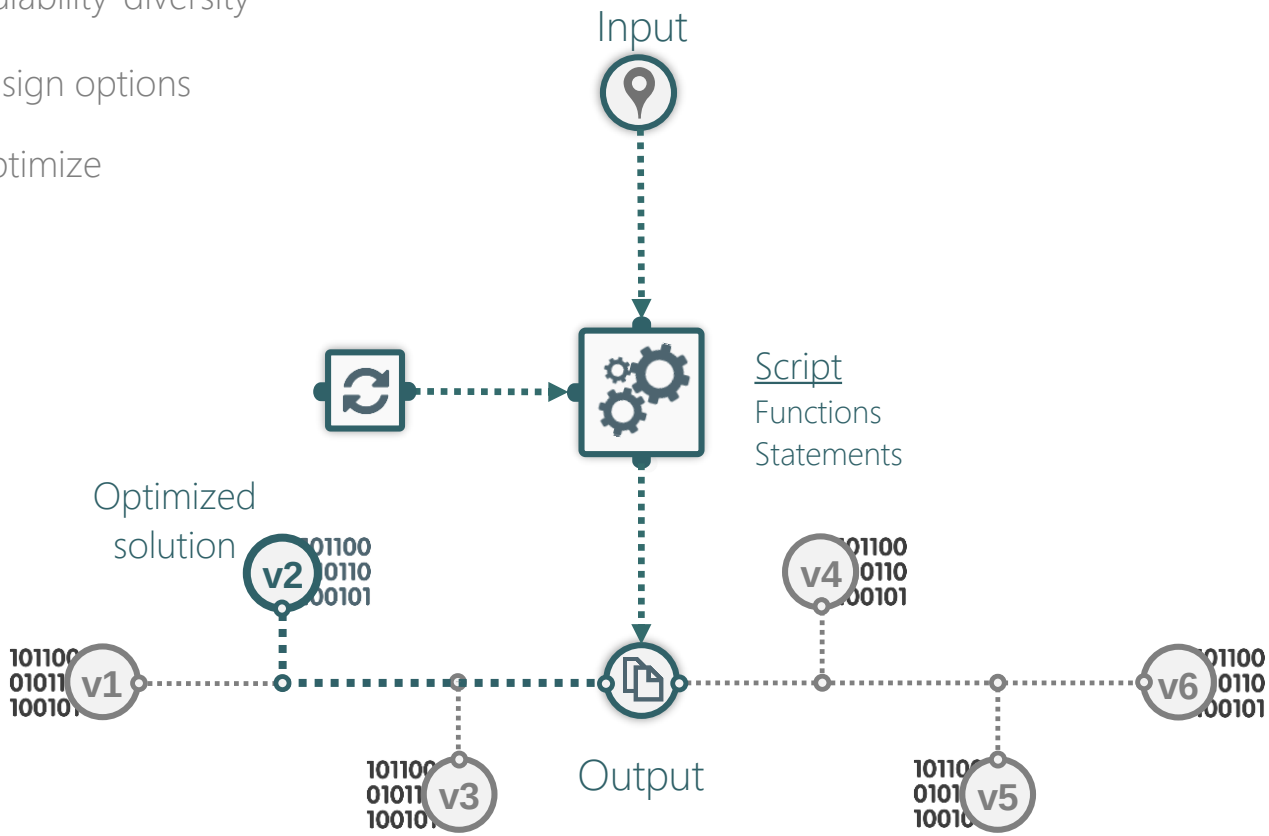
Scalability-diversity

Design options

Optimize



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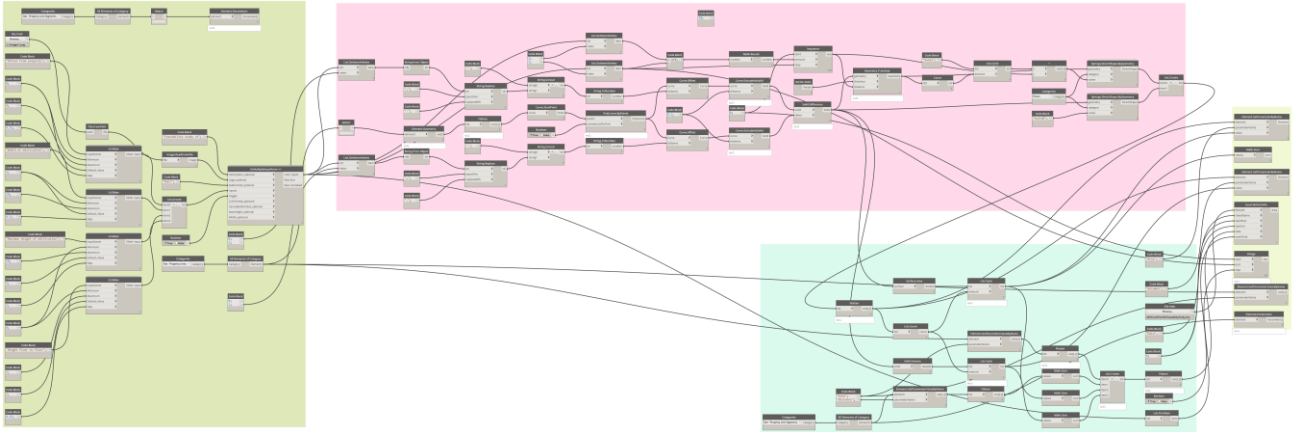
01. Feasibility Study

User Interface
Design script
SteamNodes pack

- Limite de propiedad
- Alineación / retranqueo
- Numero de plantas
- Altura libre entre plantas

Condiciones Externas → Solución → Datos

- Opcion de diseño viable



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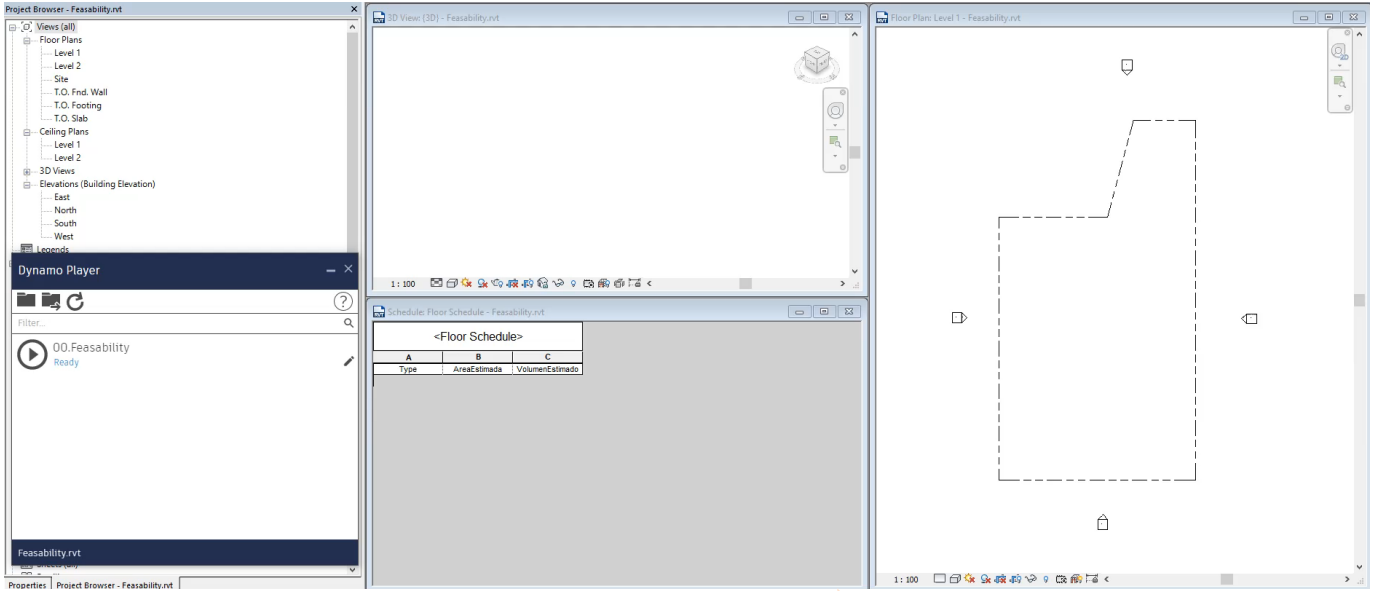

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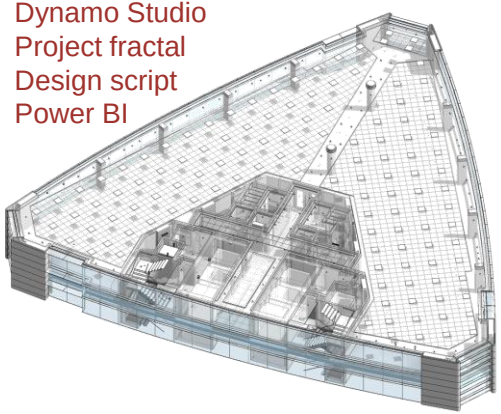
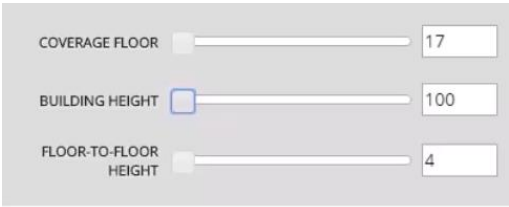
02. Design Options

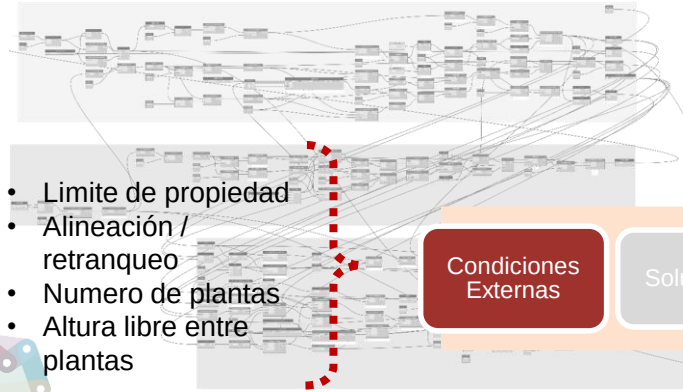
From parametric objects...

Dynamo Studio
Project fractal
Design script
Power BI



Inputs





- Limite de propiedad
- Alineación / retranqueo
- Numero de plantas
- Altura libre entre plantas

Condiciones Externas → Soluciones → Optimizacion

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02. Design Options

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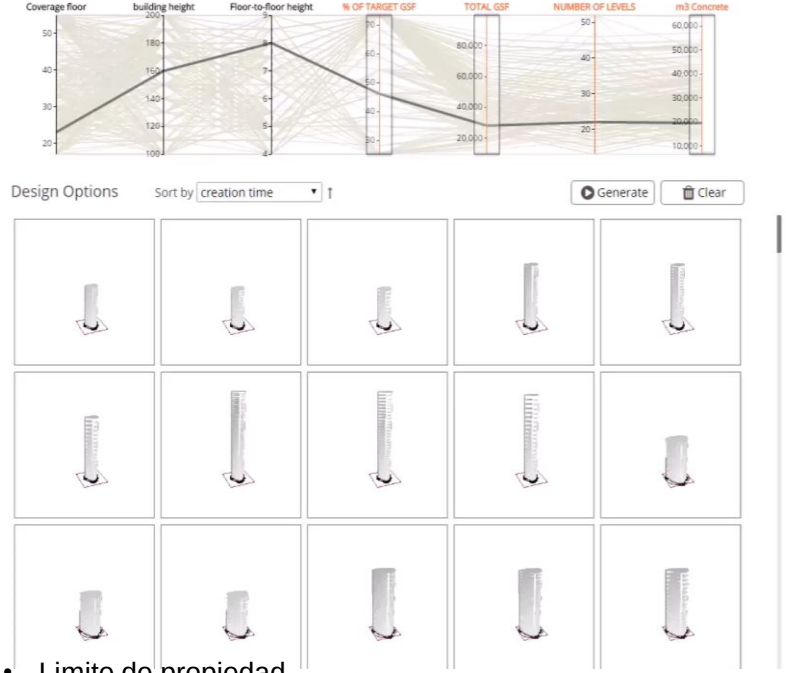
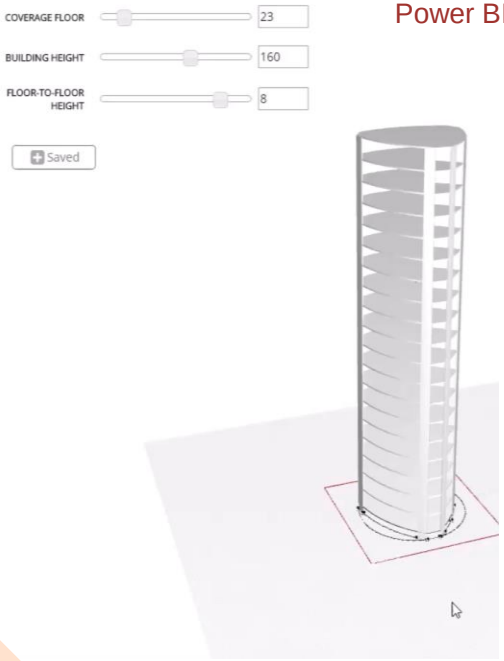
Power BI





- Limite de propiedad
- Alineación / retranqueo
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- **Volumen de hormigon**

Condiciones Externas → Soluciones → Optimizacion

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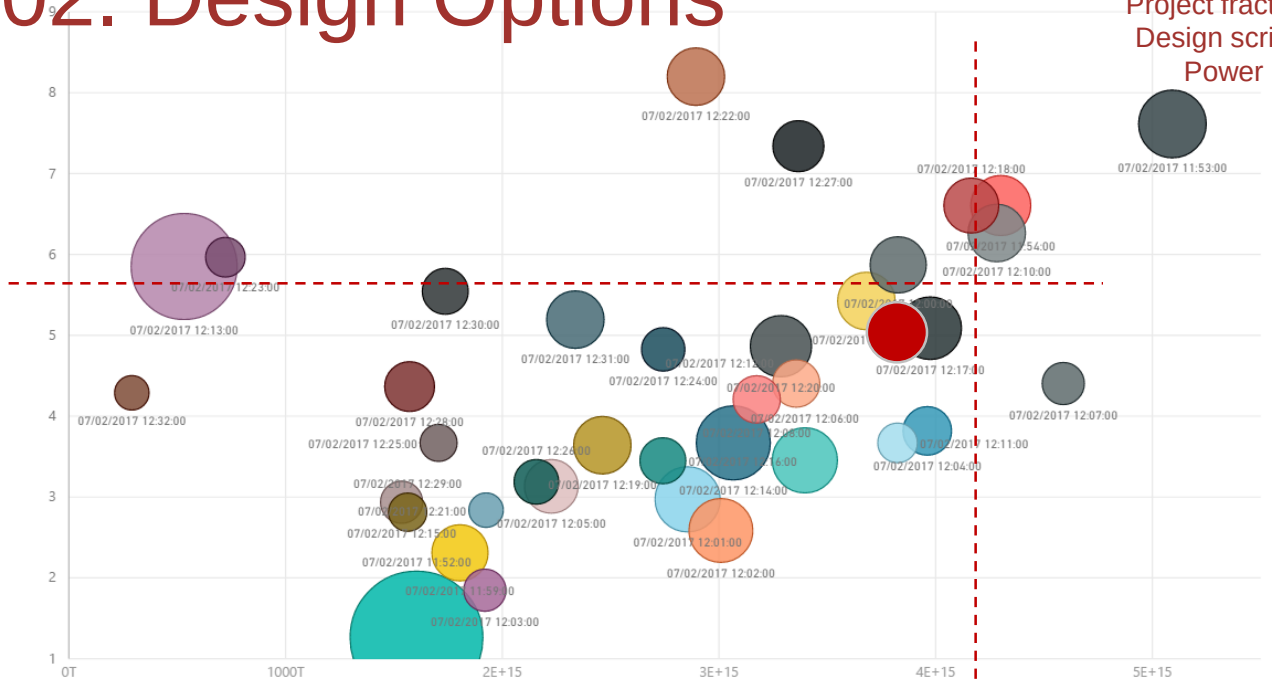

- Limite de propiedad
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- Altura libre entre plantas
- **Volumen de hormigon**

Condiciones Externas → Soluciones → Optimizacion

- Opción de diseño más eficiente

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03. Plan Generator*

Dynamo Studio
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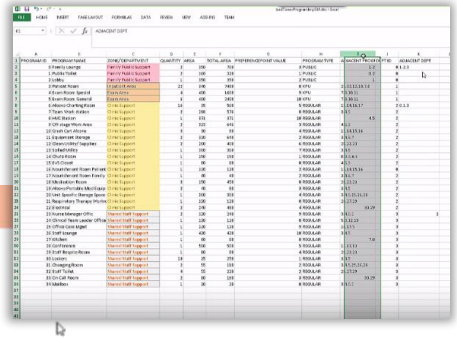
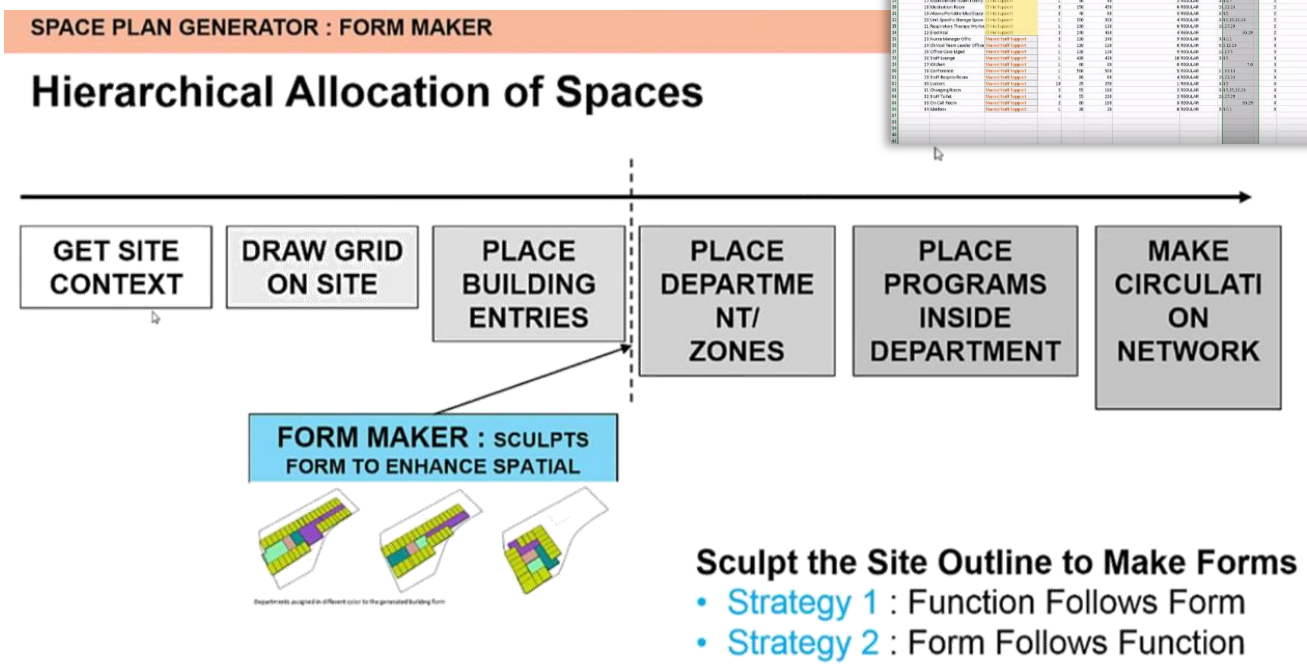
Project fractal





(*) SFDUG August 2016: RTC 2016 | Space Plan Generator

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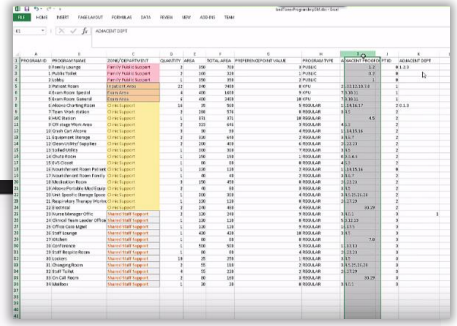
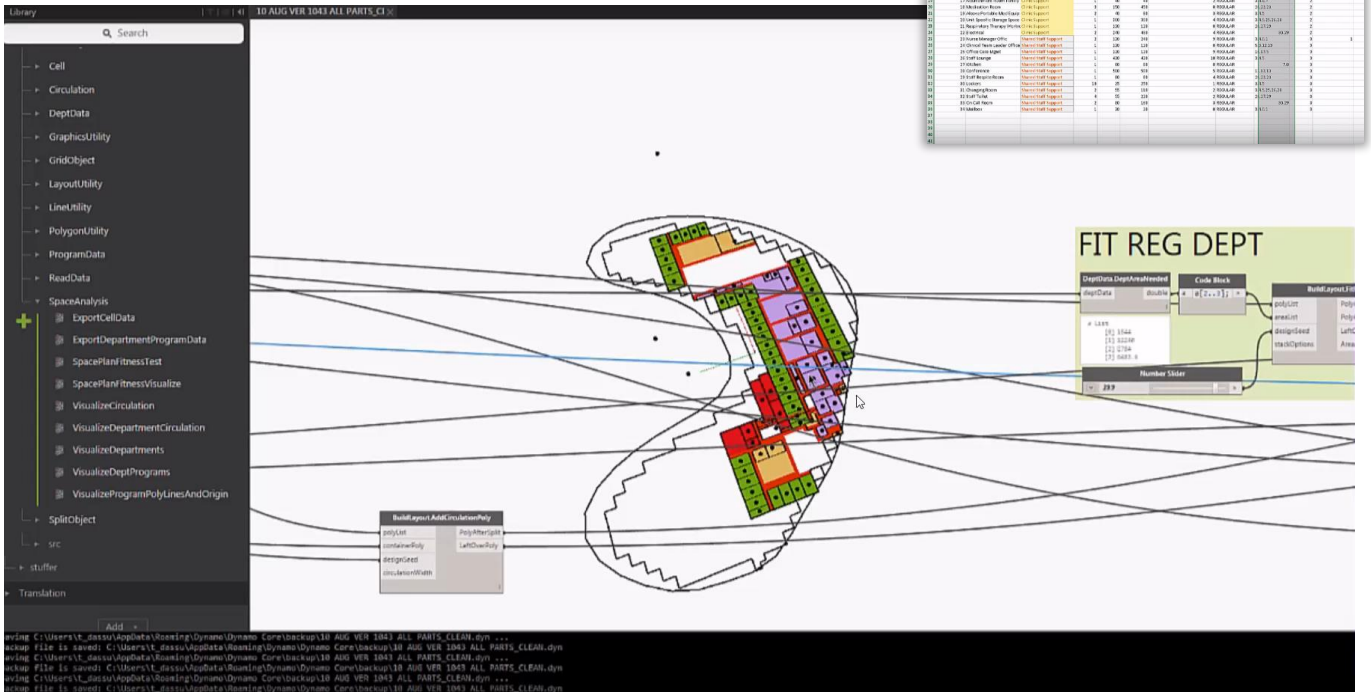
Dynamo Studio
Design script
https://www.youtube.com/watch?v=ujG2Kans1UA
Project fractal





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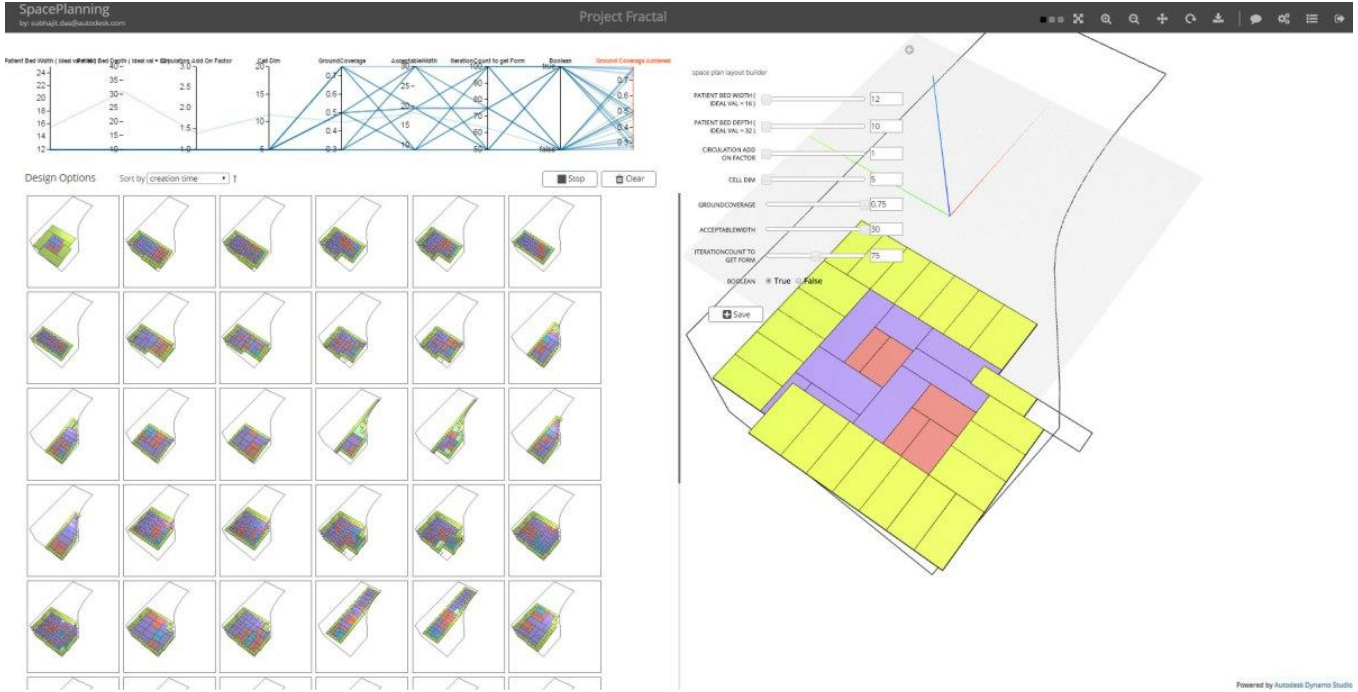

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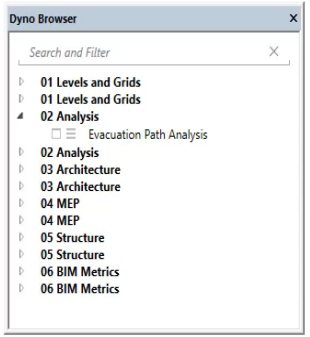
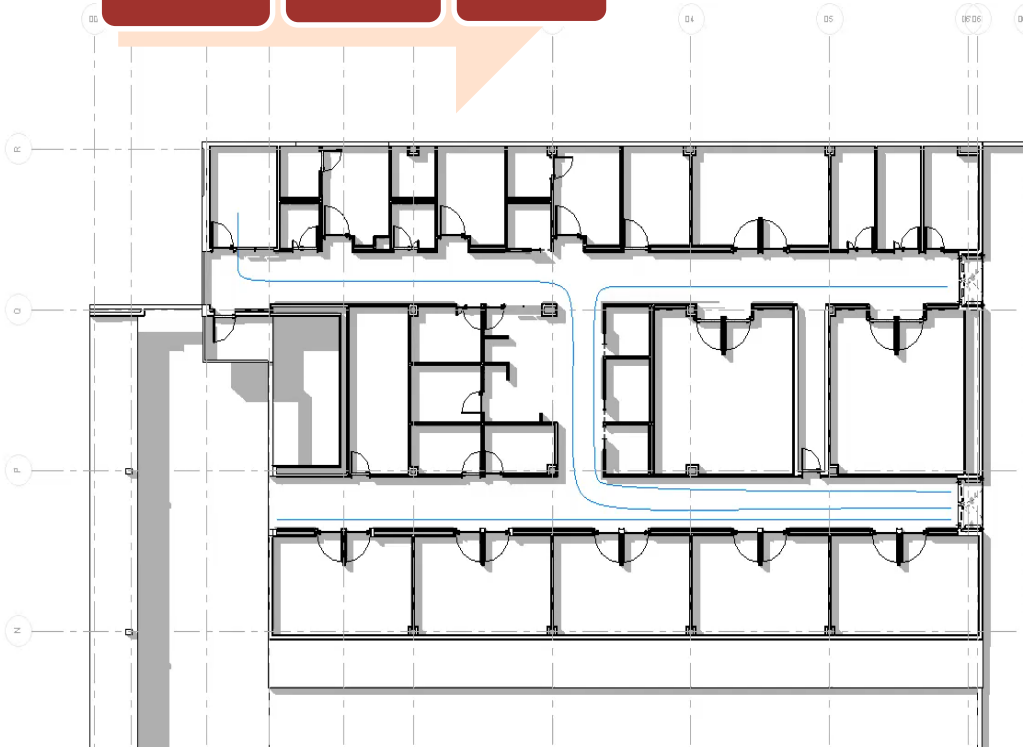
04. Route Finding

Dynamo
Steam Nodes package
UI++ Data Shapes
Dyno Browser

Condiciones Internas → Simulacion → Optimizacion





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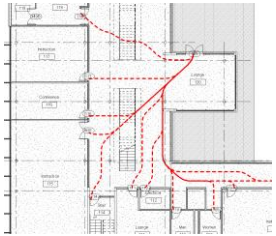
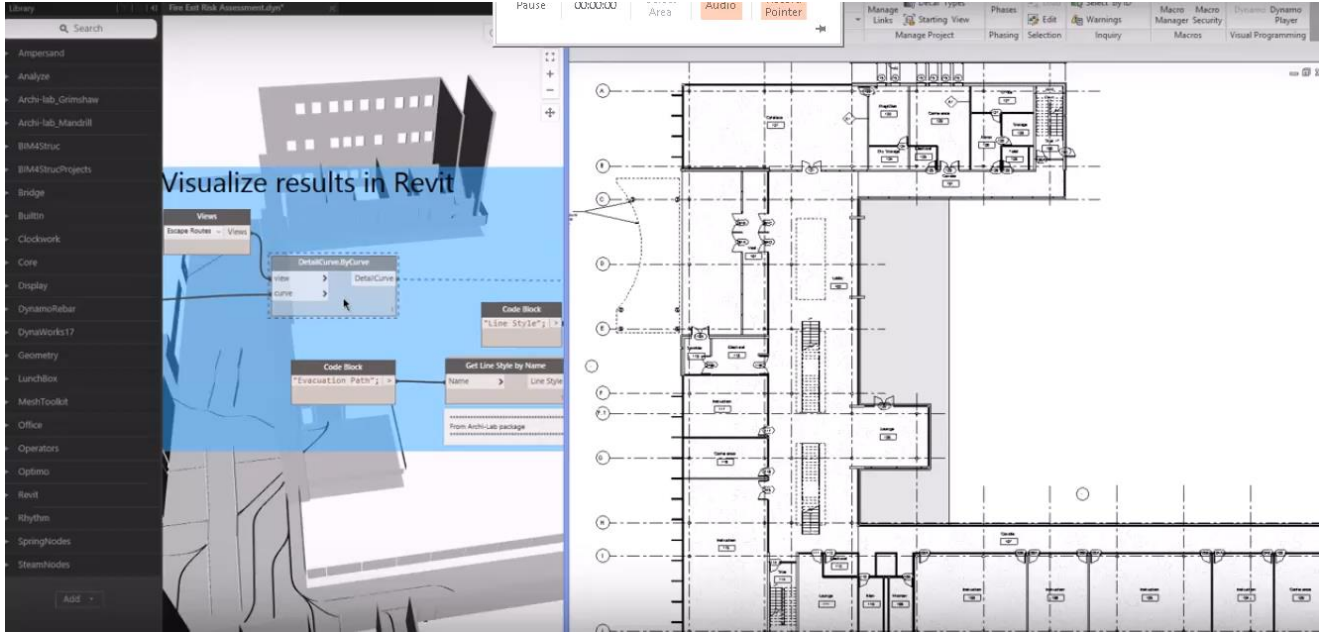
06. Risk Analysis

https://www.youtube.com/watch?v=nHKrxw-FsRE



Dynamo
Archilab



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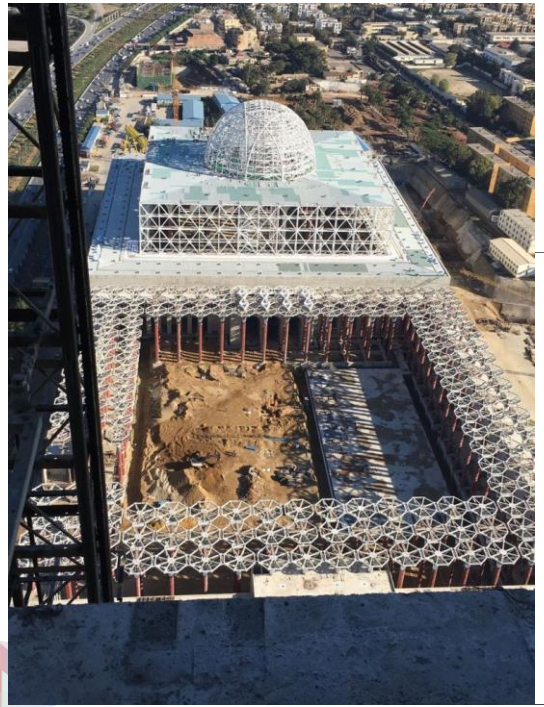
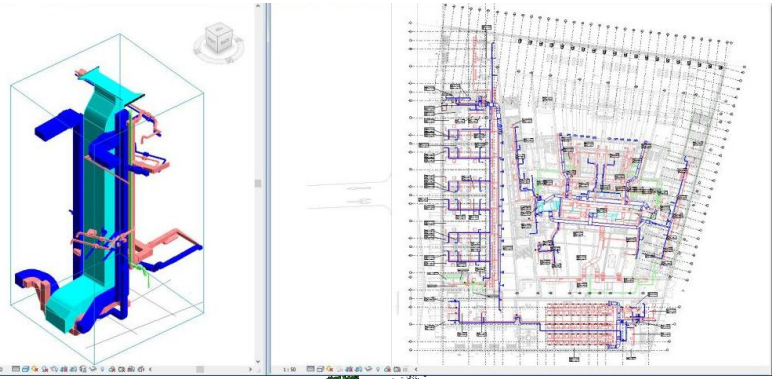
(*) **Revit Beyond BIM -** Fire Exit Risk Assessment - Automated creation of evacuation

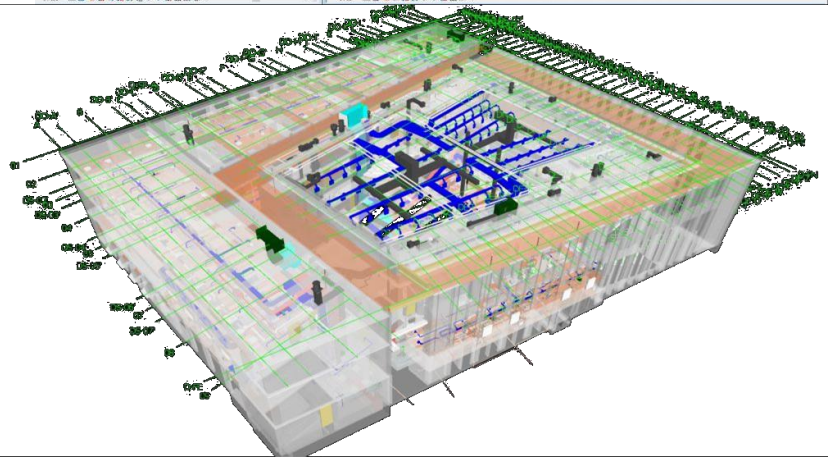
07. Fire Protection QA/QC

Dynamo
Steam Nodes package
UI++ Data Shapes
Dyno Browser

Condiciones Internas → Cumplimiento → Solución







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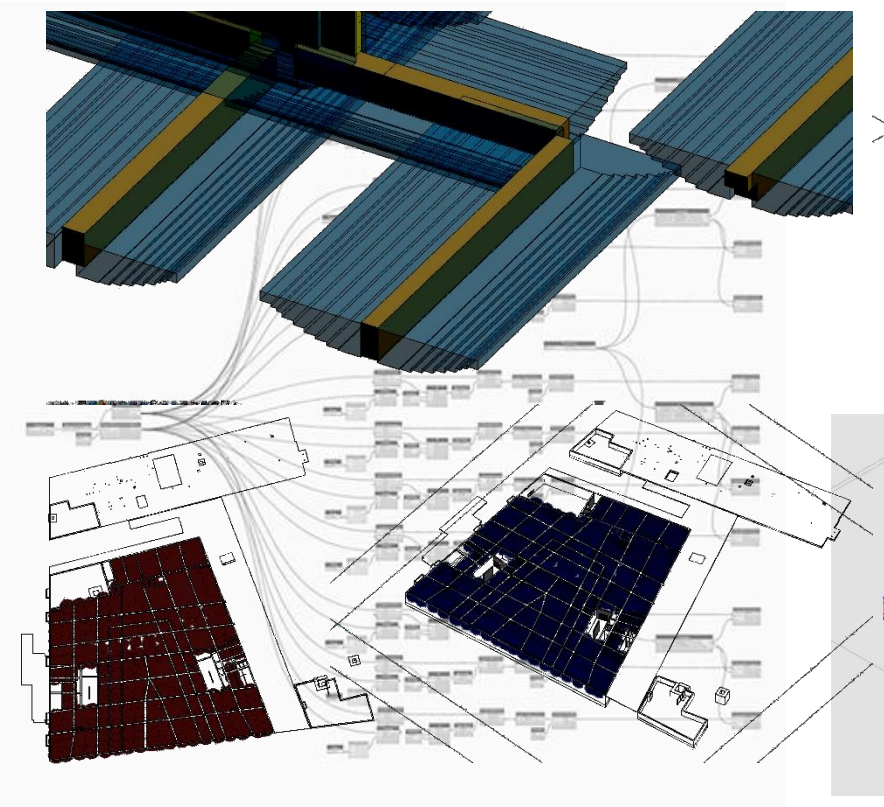

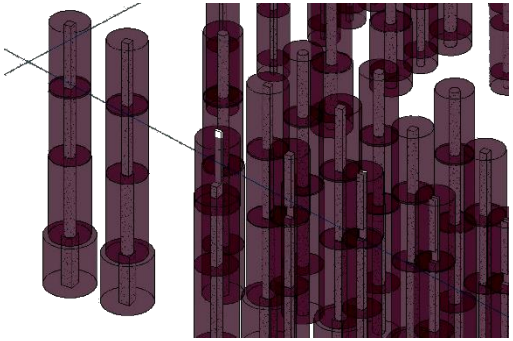

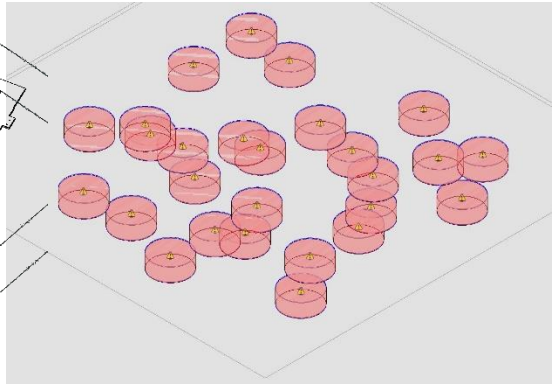

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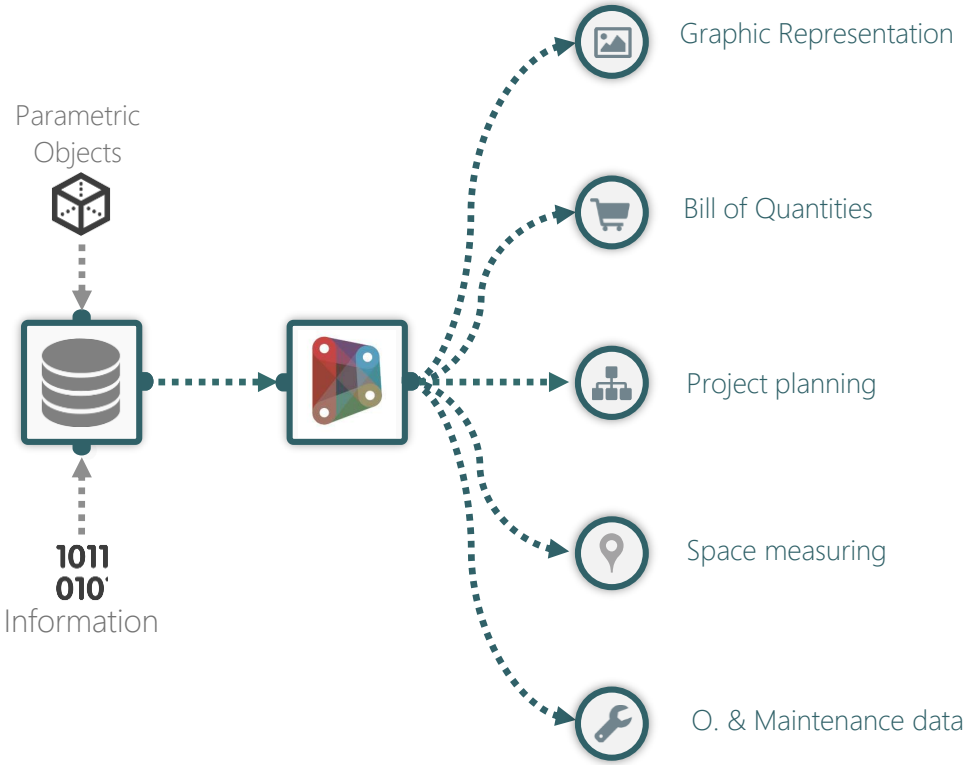
02. Data-driven processes



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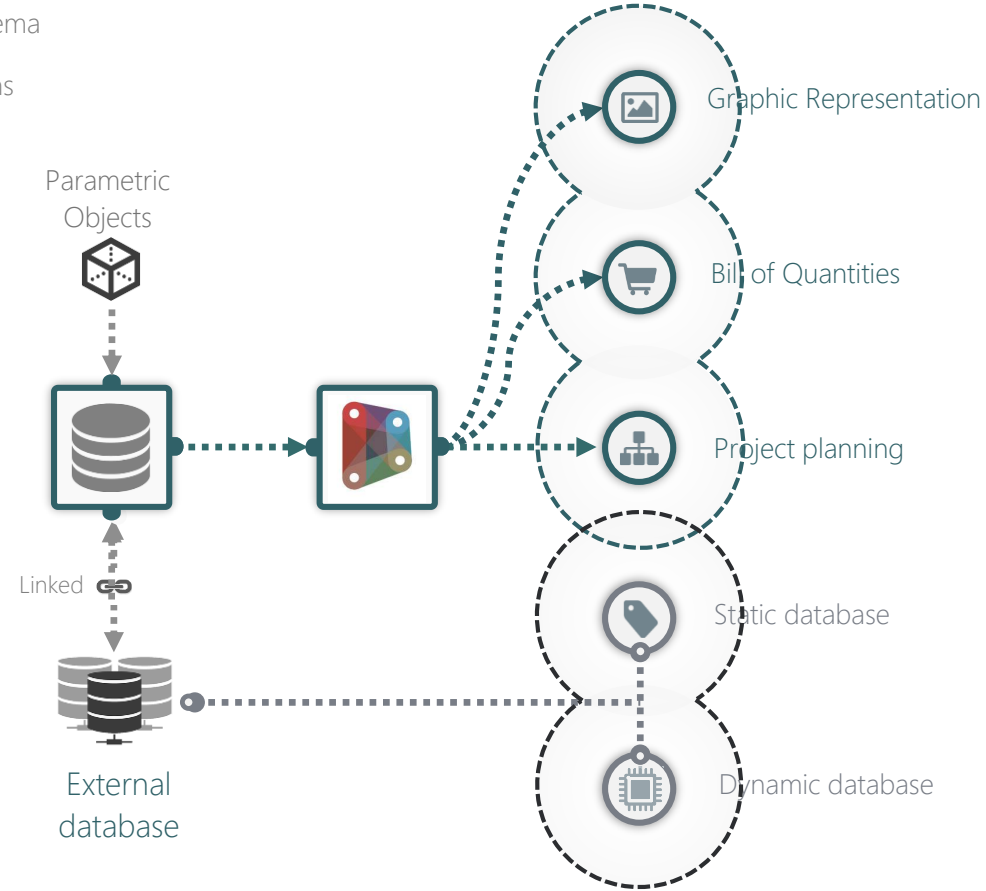
Lessons learnt

External database (S/D)

Integration schema

Data interactions



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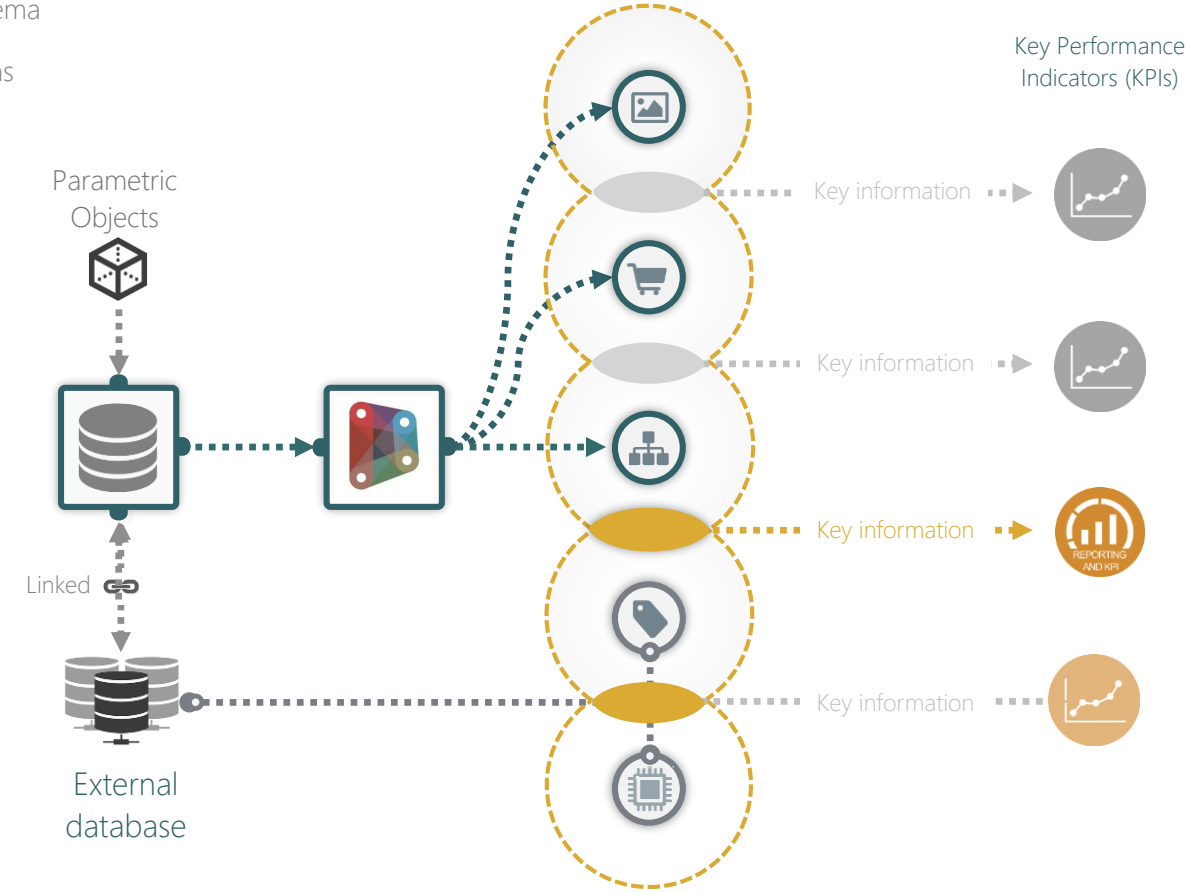

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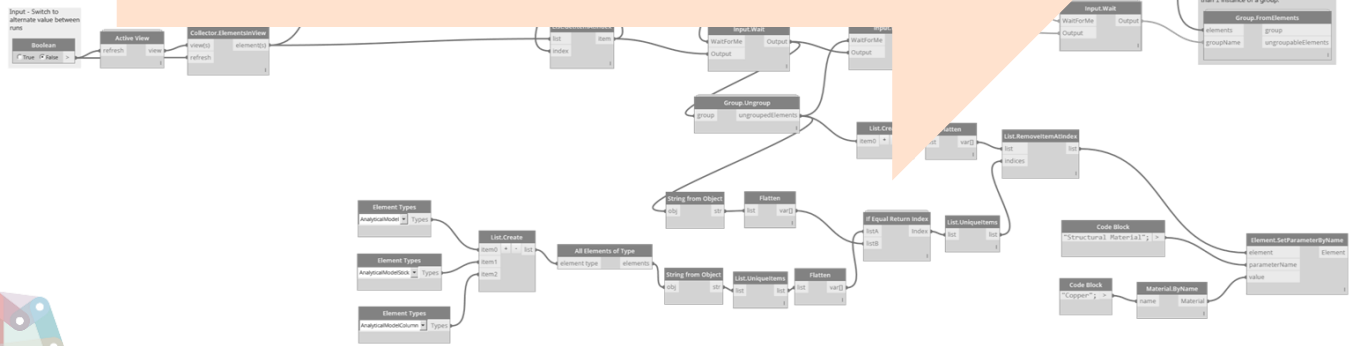
EXTRACCIÓN DE DATOS

BASE DE DATOS RELACIONALES

VISUALIZACION



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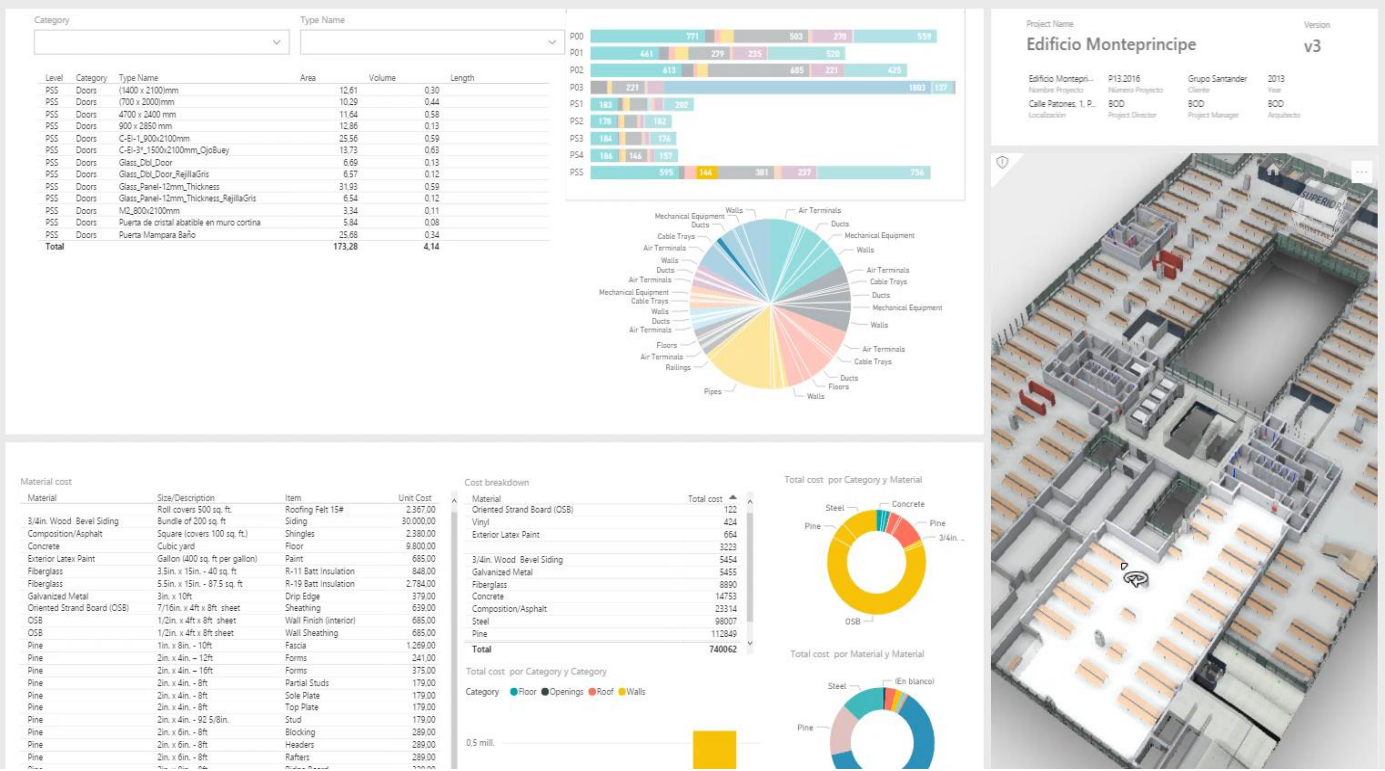
09. Data visualizacion (II)



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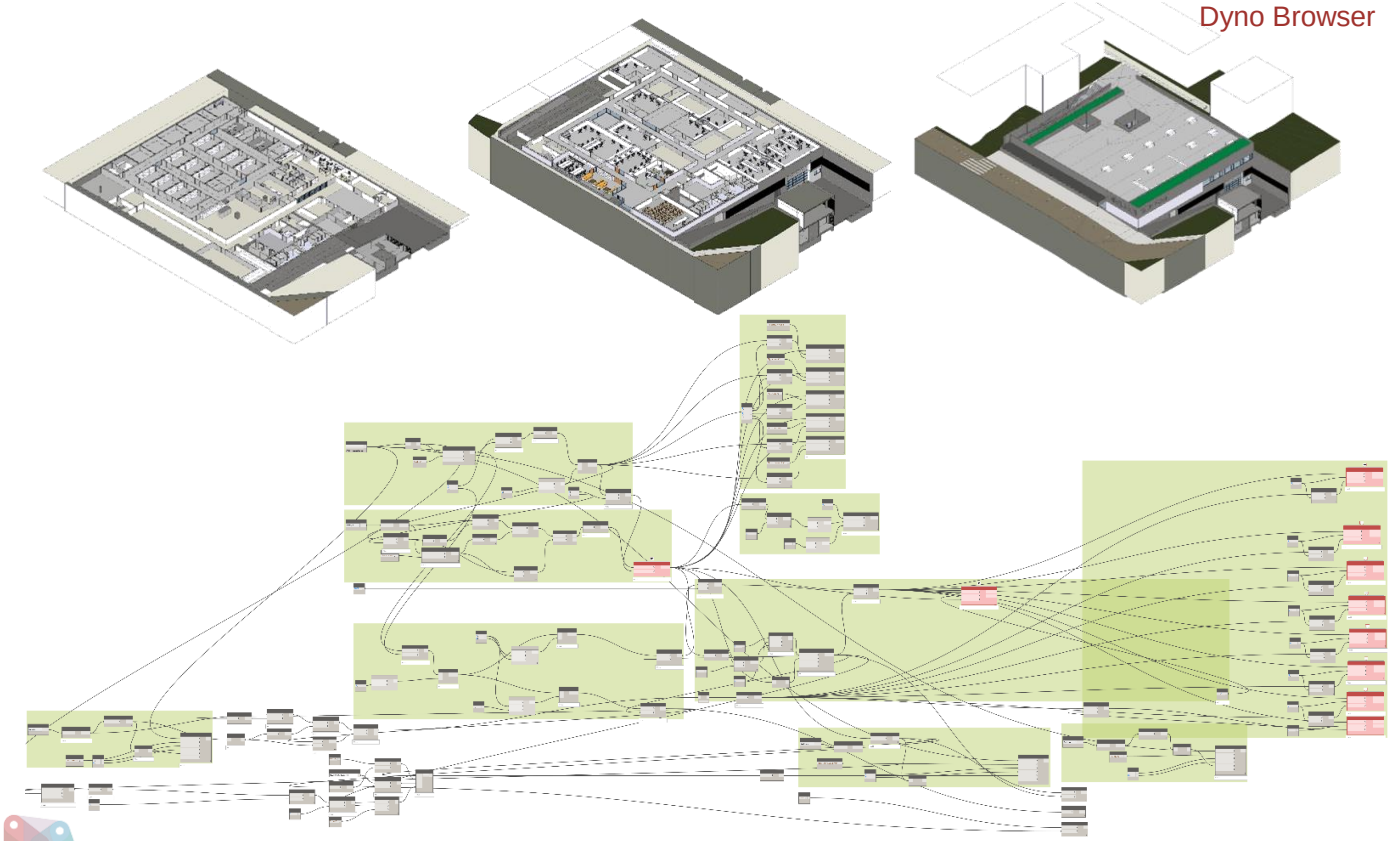
03. Automation

11. Wall Type creator

Dynamo
Steam Nodes package
UI++ Data Shapes
Dyno Browser



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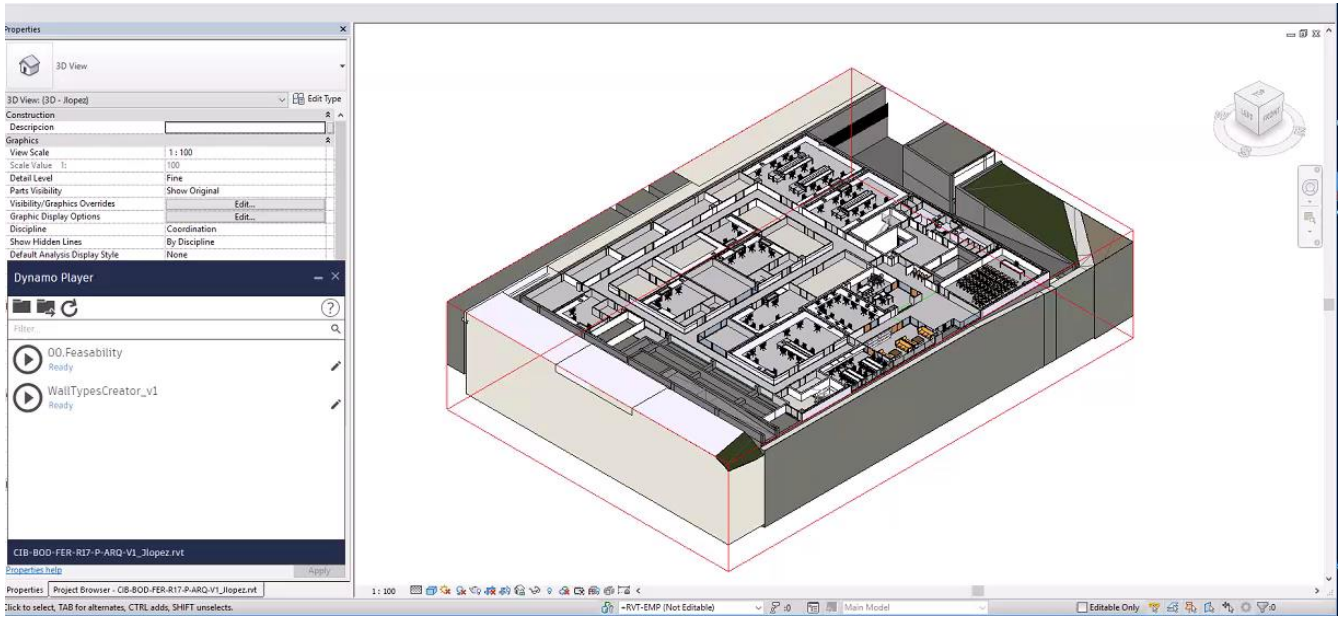
WallType		Info				
WallType	DuplicateFrom	AssemblyCode	TypeMark	Keynote	FireRating	TypeComments
MUR-BLO-1.1.1-Aplacado-Alicatado	00-MUR-blo-M5C		1.1.1			Muro de bloque de 6 cm con enfoscado de cemento con aplacado YAKAITA WENGE y alicatado DUO NACAR
MUR-BLO-1.1.2-Alicatado-Alicatado	00-MUR-blo-M5C		1.1.2			Muro de bloque de 6 cm enfoscado de cemento y alicatado DUO NACAR en ambas caras

WallConstruction																															
Ext	Layer1		Layer2		Layer3		Layer4		Layer5		Layer6		Layer7		Layer8		Layer9		Layer10		Int
	Material	Width	Material	Width	Material	Width	Material	Width	Material	Width	Material	Width	Material	Width	Material	Width	Material	Width	Material	Width	
	MAT-Pintura-LacaMatAmaglodaAmbaCeramica	1	MAT-EnfoscadoCemento-RefladoEscayola	15	MAT-Hormigon-Bloques	60	MAT-EnfoscadoCemento-RefladoEscayola	15	MAT-Ceramica-AlicatadoPorcelanosa-DuoNacar	10											
	MAT-Ceramica-AlicatadoPorcelanosa-DuoNacar	10	MAT-EnfoscadoCemento-RefladoEscayola	15	MAT-Hormigon-Bloques	60	MAT-EnfoscadoCemento-RefladoEscayola	15	MAT-Ceramica-AlicatadoPorcelanosa-DuoNacar	10											
	MAT-Hormigon-Bloques	90	MAT-EnfoscadoCemento-RefladoEscayola	15	MAT-Ceramica-AlicatadoPorcelanosa-DuoNacar	10															



Generative Design

Feasibility study
Design Options
Plan Generator
Route Finding
Fire protection QAC

Data-driven

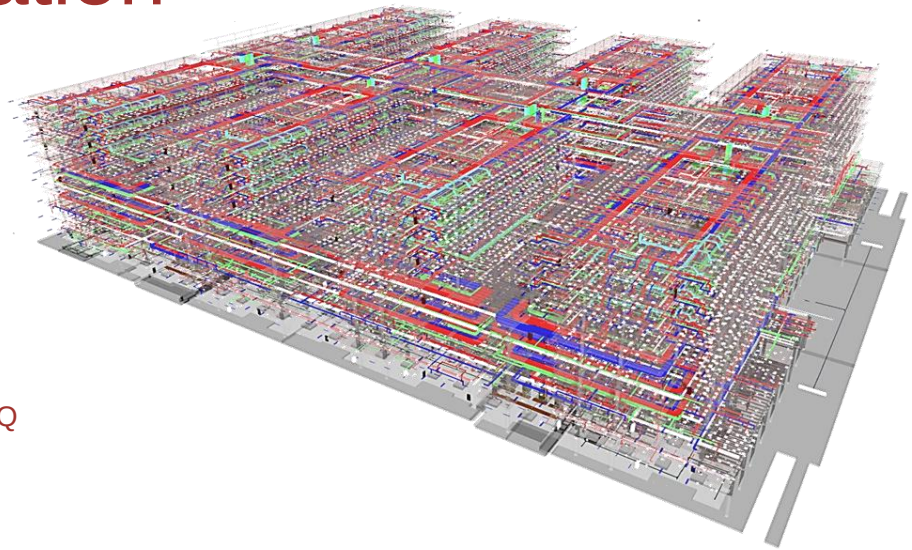
Data Extraction
Data visualization
Spaces

Automation

WallTypeCreator
Positioning
Data integration

Lessons learnt

Full-automation



01. Relleno de parametros
02. Gestion de vistas
03. Gestion de planos
04. Instance positioning
05. Rooms a Espacios
06. BoQ
07. Integración de datos
08. Creación de contenido
09. Sincronización con Modelo ARQ
10. Creación de Workset
11. Vistas a partir de Rooms

Generative Design

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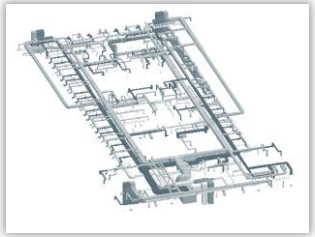
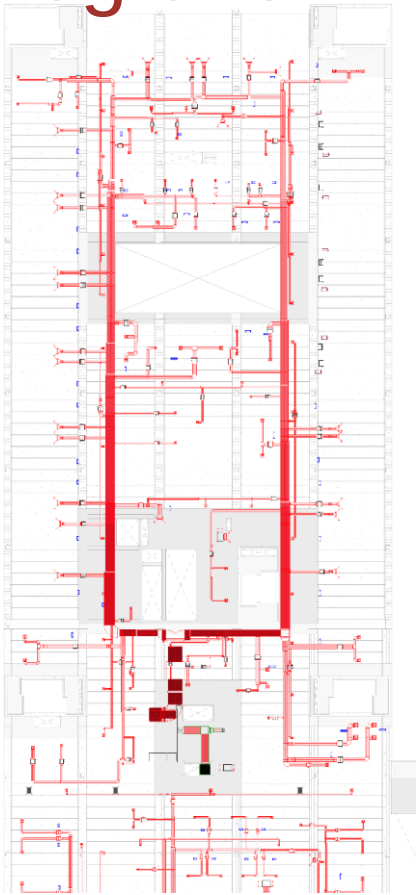
Lessons learnt

11. Positioning & Data integration



Duct Color Fill FLOW

- Less than 1.0 m³/h
- 1.0 m³/h - 144.0 m³/h
- 144.0 m³/h - 288.0 m³/h
- 288.0 m³/h - 1800.0 m³/h
- 1800.0 m³/h - 3600.0 m³/h
- 3600.0 m³/h - 5400.0 m³/h
- 5400.0 m³/h - 7200.0 m³/h
- 7200.0 m³/h - 9000.0 m³/h
- 9000.0 m³/h - 10800.0 m³/h
- 10800.0 m³/h - 12600.0 m³/h
- 12600.0 m³/h - 14400.0 m³/h
- 14400.0 m³/h - 16200.0 m³/h
- 16200.0 m³/h - 18000.0 m³/h
- 18000.0 m³/h - 19800.0 m³/h
- 19800.0 m³/h - 21600.0 m³/h
- 21600.0 m³/h - 23400.0 m³/h
- 23400.0 m³/h - 25200.0 m³/h
- 25200.0 m³/h - 27000.0 m³/h
- 27000.0 m³/h or more



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Lessons learnt

04. Lessons Learnt

Generative Design

- EQUIPO COMPUTACIONAL
- PRUEBAS DE CONCEPTO
- EMPEZAR CON EL FIN EN MENTE

Data-Driven

- SELECCIÓN DE DATOS IMPORTANTES
- ESTRUCTURA DE DATOS
- VISUALIZACIÓN CORRECTA DE DATOS

Automation

- TIEMPO DESARROLLO < TIEMPO PRODUCCIÓN
- ESCALABILIDAD

GRACIAS

MDUG