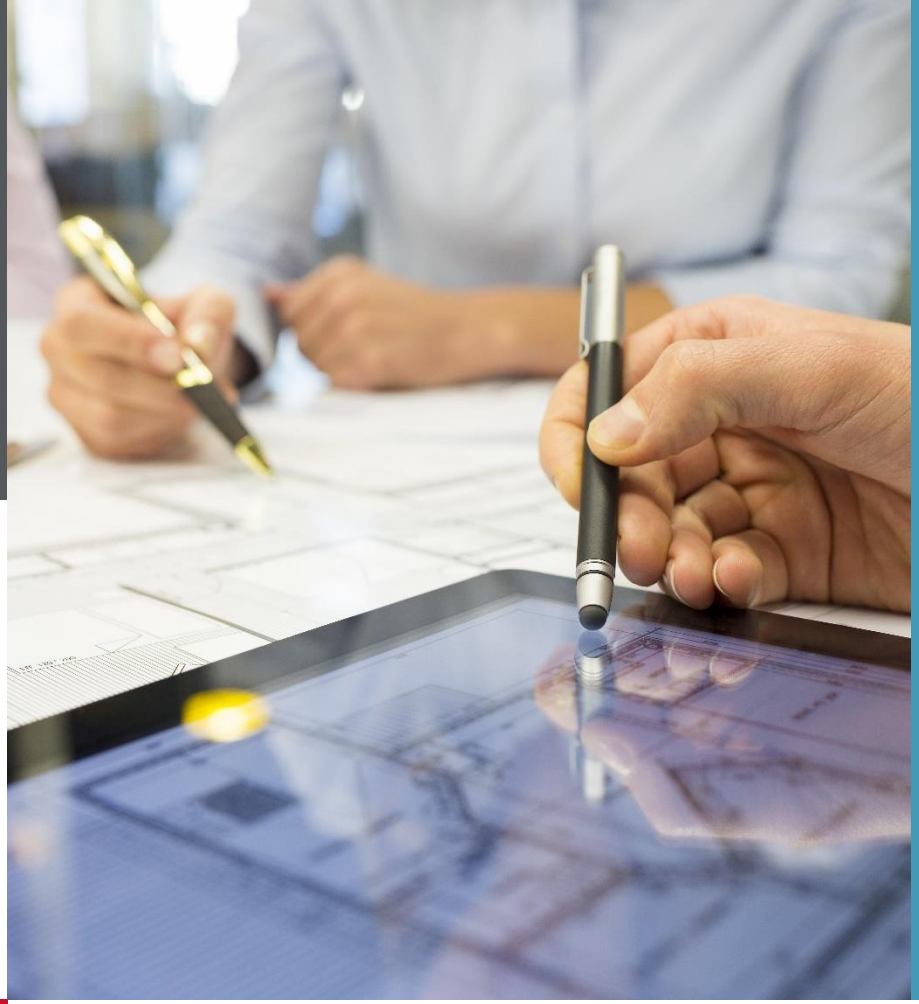
BIM +
Design Technology



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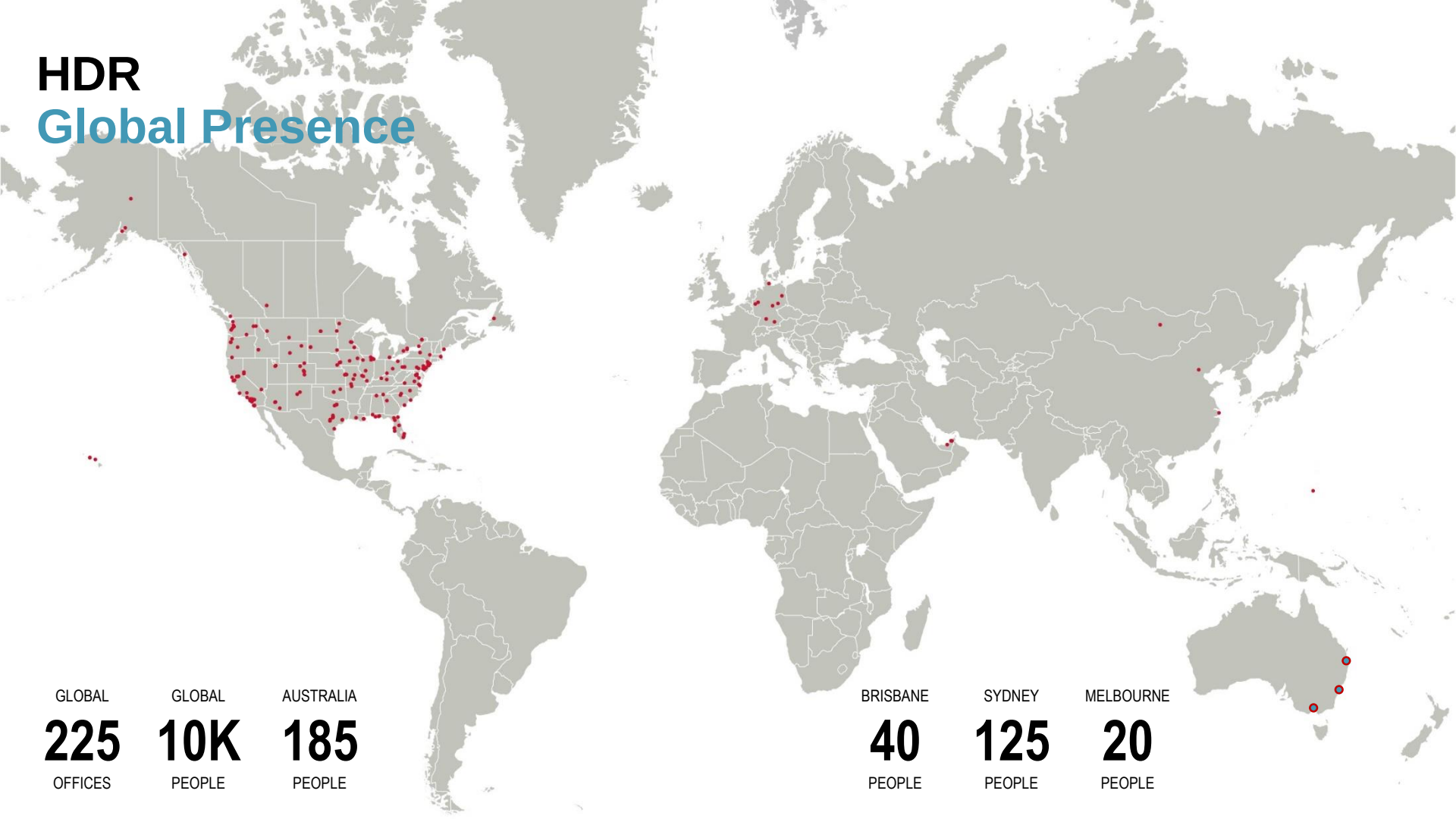
HDR
Profile

HDR is a creative firm for architecture and engineering with experience spanning over 40 years in the Australian market. With more than 10,000 employees in 225 offices worldwide, we have access to highly informed best practice, innovative future-thinking and top talent from around the world, allowing us to contribute world-class intellect, expertise and specialist knowledge to our projects.

HEALTH
COMMERCIAL
DEFENCE + GOVN'T
RETAIL + MIXED USE
+ URBAN LIVING
EDUCATION, SCIENCE +
TECHNOLOGY

HDR
Global Presence



GLOBAL	GLOBAL	AUSTRALIA
225	10K	185
OFFICES	PEOPLE	PEOPLE

BRISBANE	SYDNEY	MELBOURNE
40	125	20
PEOPLE	PEOPLE	PEOPLE

Holger de Groot

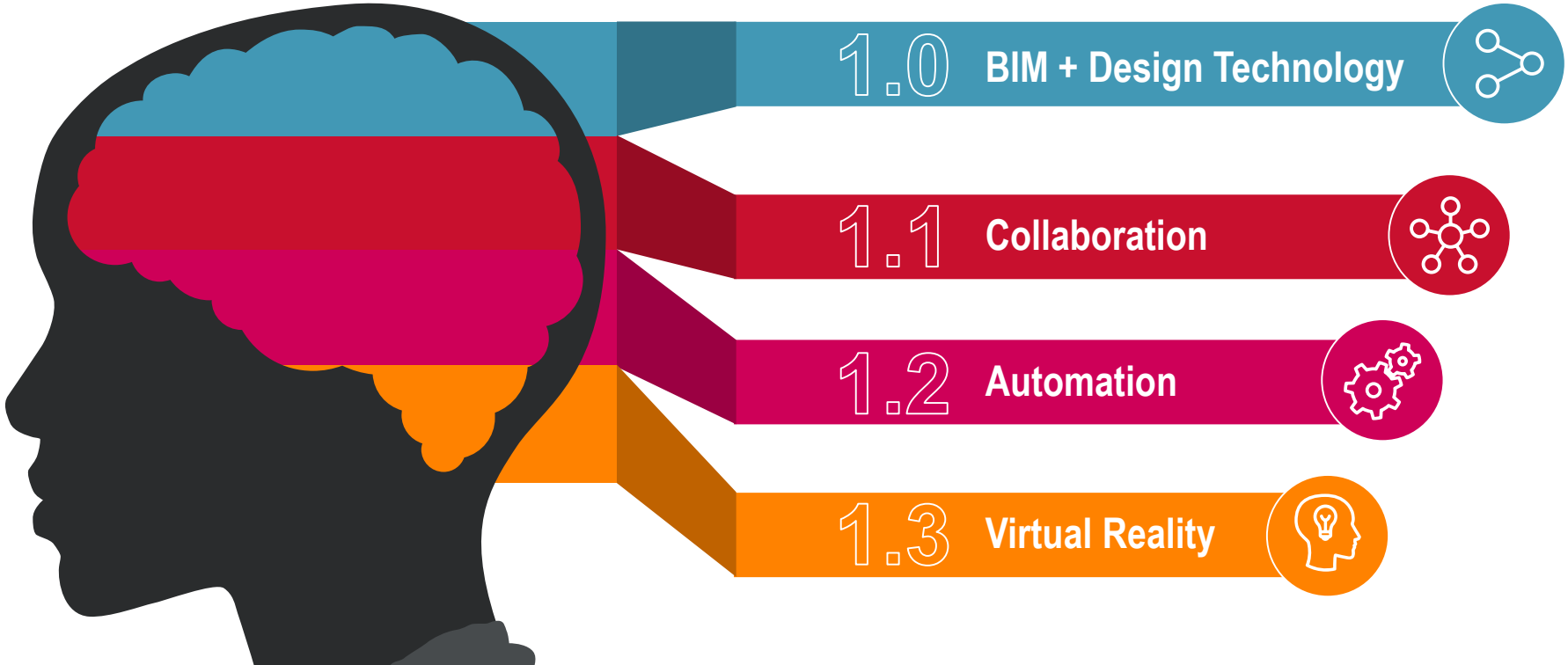
MArch, PGDipArch

Since 2017:	National Director of BIM *HDR*
2015 - 2017:	Office BIM Manager *Grimshaw Architects*
2013 - 2015:	Regional BIM Director *HDR TMK / SSP*
2010 - 2013:	BIM Manager, Project Architect *TMK Architects + Engineers*
2001 - 2010:	Various Positions *in the AEC Industry*

Helmholtz Zentrum Munich – Laboratory: 26,6 Mio. €
German Research Center for Environmental Health

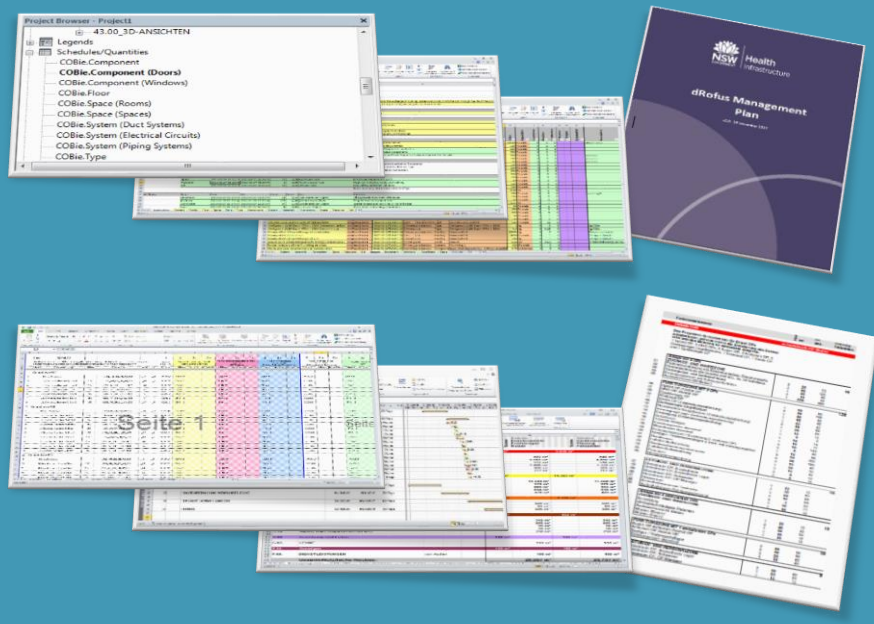
Darmstadt Clinic – Healthcare Design: 130 Mio. €
New Central Building for Restructuring of the Clinic

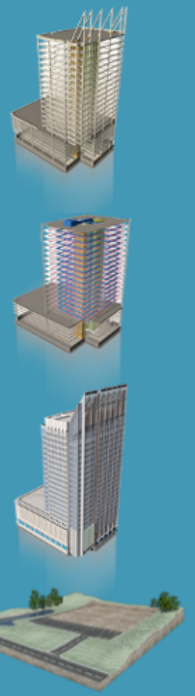
Class Summary



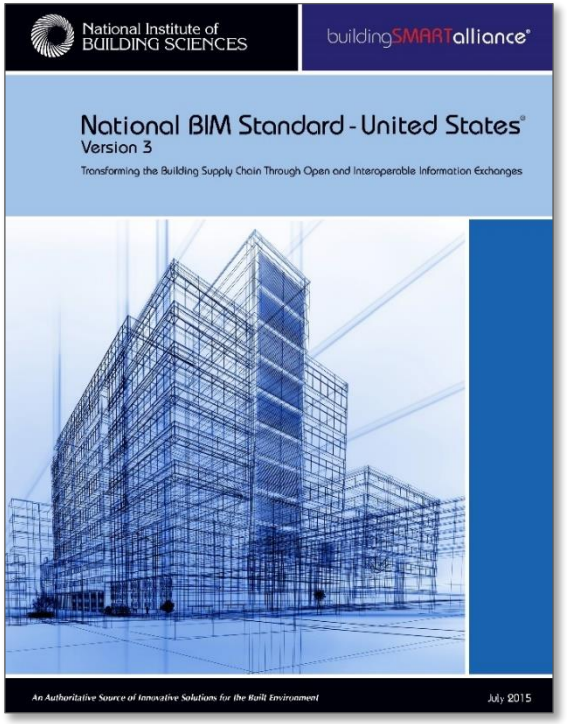
BIM + Design Technology
Intelligent 3D Design

Building Information Model





BIM + Design Technology
Definition of BIM

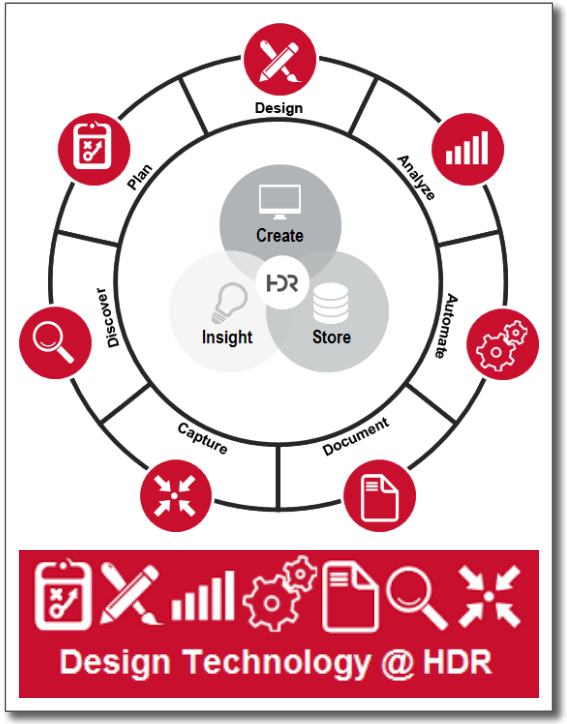


Building Information Management: "Is the **organisation and control** of the business process by utilising the information in the digital prototype to effect the sharing of information over the entire lifecycle of an asset [...]."

Building Information Modelling: "Is a **business process** for generating and leveraging building data to design, construct and operate the building during its lifecycle. BIM allows all stakeholders to have access to the same information at the same time [...]."

Building Information Model: "Is the **digital representation** of physical and functional characteristics of a facility. As such it serves as a shared knowledge resource for information about a facility, forming a reliable basis for decisions during its life cycle from inception onwards."

BIM + Design Technology
Definition of Design Technology



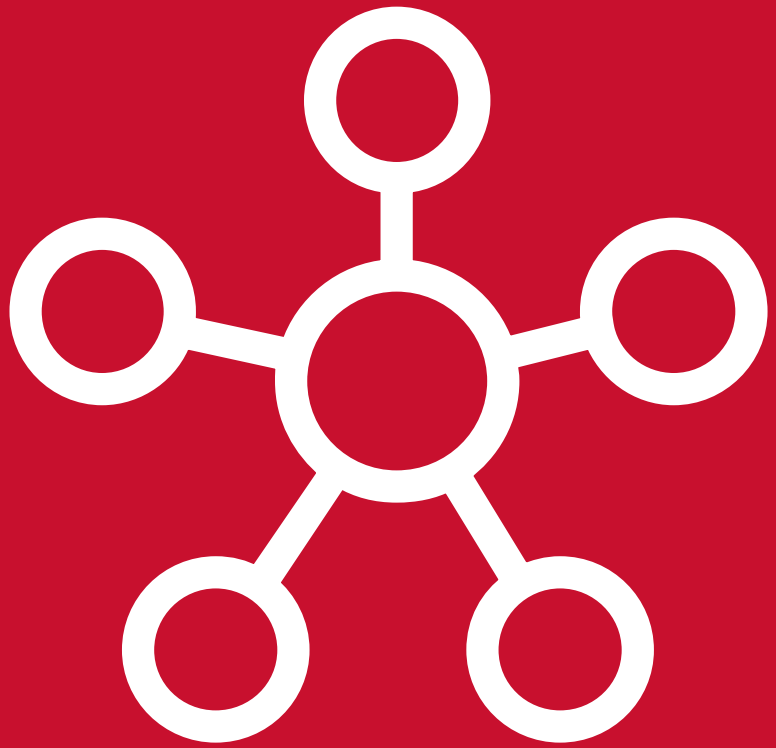
Design Technology: "Is the study, design, development, application, implementation, support and management of […] technologies for the express purpose of **communicating product design intent and constructability**." [https://en.wikipedia.org/]

Design Technology at HDR: While some technologies may be used to **inform the decision-making process**, some may be considered "infrastructure" and solely **support an environment in which reaching a design solution is possible**.

What makes Design Technology useful for BIM?

It contributes directly to the development of a **product that is centrally shared** and can be relied upon by all team members.

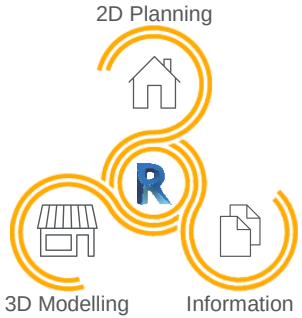
It may or may not depend on 3D geometry, but has the **ability to carry, produce, or process data**.



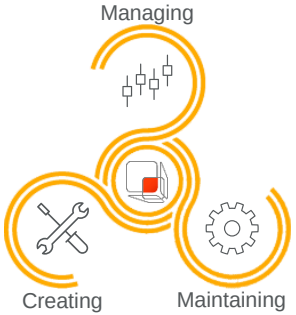
BIM + Design Technology

Collaboration

Collaboration
Autodesk Revit and dRofus

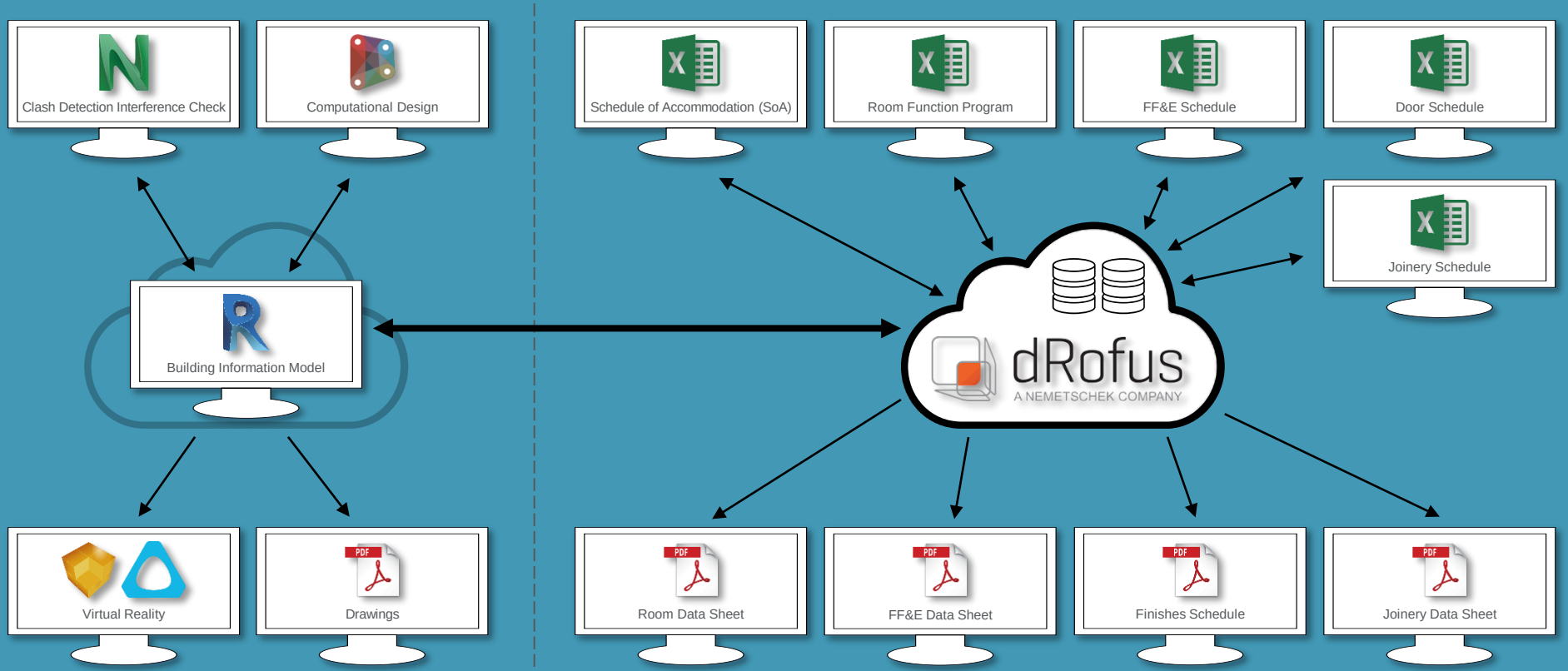


- Revit is a **BIM-authoring CAD software** for architects, structural engineers, MEP engineers, designers and contractors.
- It allows users to design a building and single components in **3D**, annotate the model with **2D** drafting elements and access **information** from the models database.

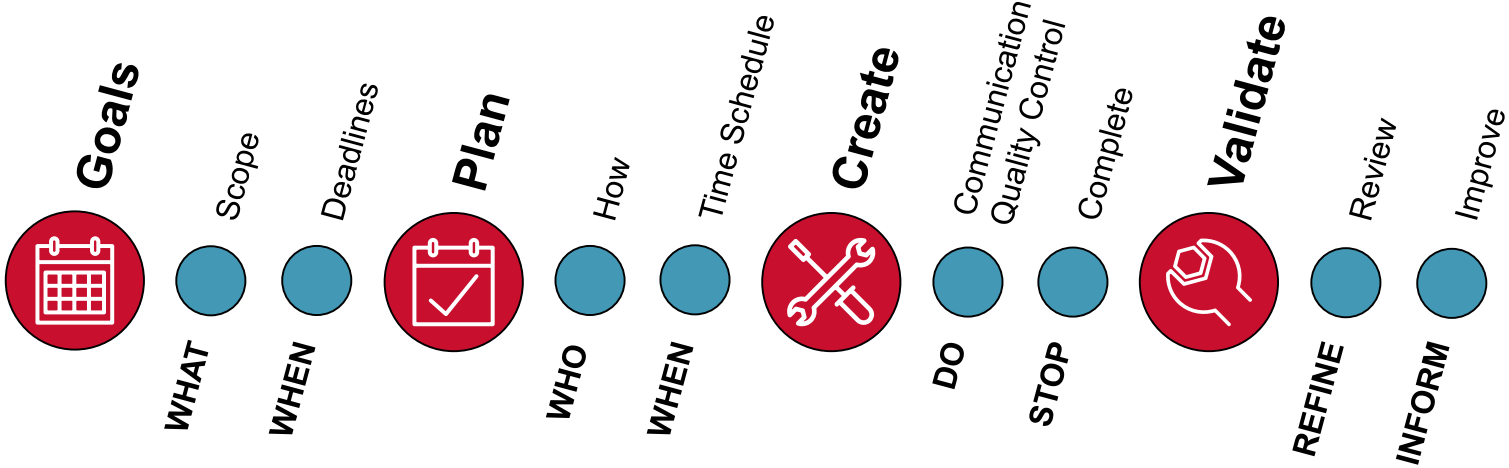


- dRofus is a SQL server database – a **data management and collaboration tool** for all stakeholders to provide access to building information throughout the building lifecycle.
- While Revit contains geometry and a minimum of data, dRofus is the model database **to create, manage and maintain data** for departments, rooms, room templates, finishes, items, systems, and components – all in a single cloud-based platform.

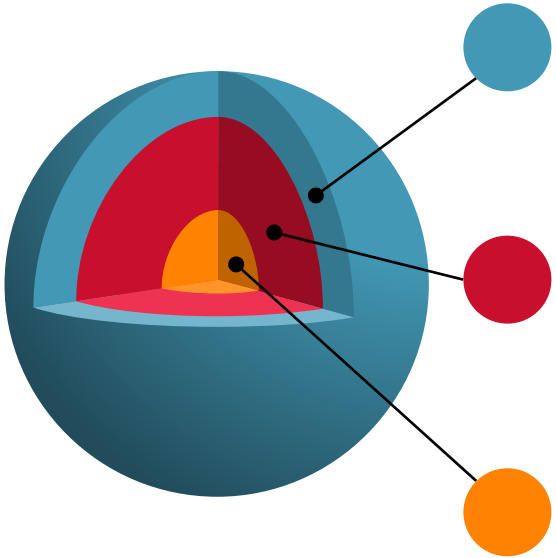
Collaboration
Autodesk Revit and dRofus



Collaboration
BIM Strategy



Collaboration
BIM Supporting Documents



BIM Brief (Employer's Information Requirements)

- ❑ Designed to be incorporated into the tender documents for the procurement.
- ❑ Documents the client requirements regarding BIM – what and what for?
- ❑ Outlines the scope of services to formulate an effective BIM strategy.

BIM Management Plan (BIM Execution Plan)

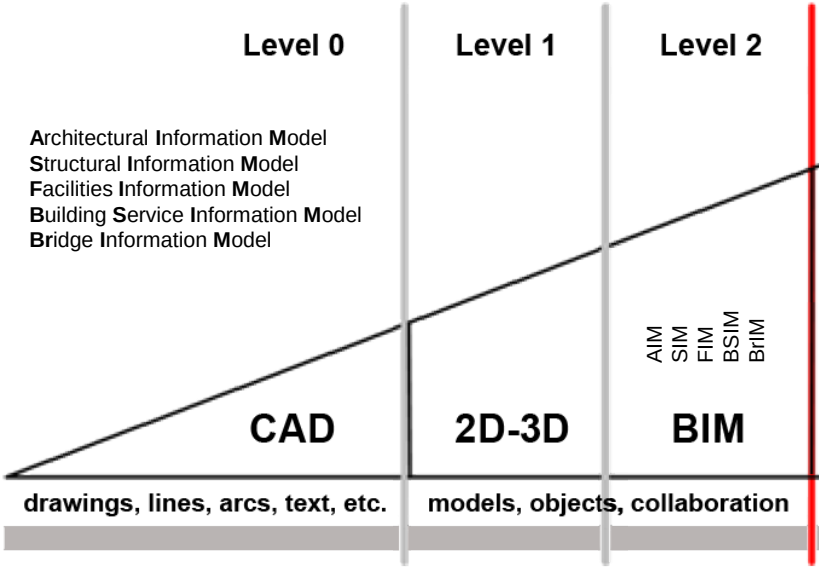
- ❑ A formal document used by the contractor and its subcontractors.
- ❑ Makes clear what project team members can expect from each other.
- ❑ Defines how a project will be executed, monitored & controlled with regard to BIM.

BIM Protocol

- ❑ Provides the legal framework which facilitates and promotes the use of BIM.
- ❑ Determines how requirements are being met – how and with what?
- ❑ A contractual document, which forms part of main contract.

Collaboration

Implementation of BIM in Australian Standard Contracts



Level 0

- Can use AS Contracts.
  (generally no specific BIM amendments required)

Level 1

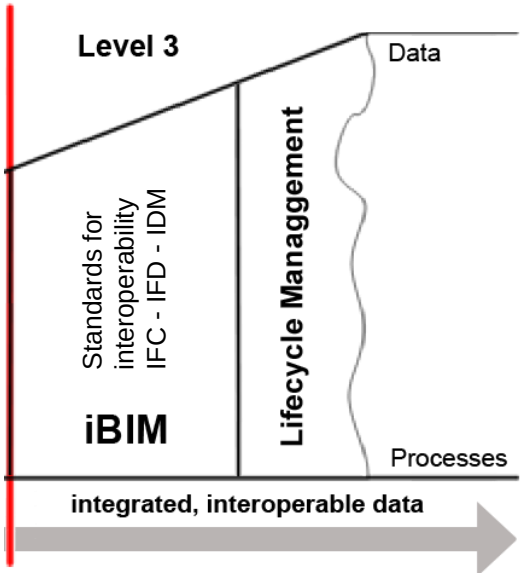
- Can use AS Contracts.
  (generally no specific BIM amendments required)

Level 2 BIM

- Can use AS Contracts but need BIM Protocol, BIM Management Plan and amendments in the body of contract are required as well.

Collaboration

Implementation of BIM in Australian Standard Contracts



Level 0

- Can use AS Contracts.
  (generally no specific BIM amendments required)

Level 1

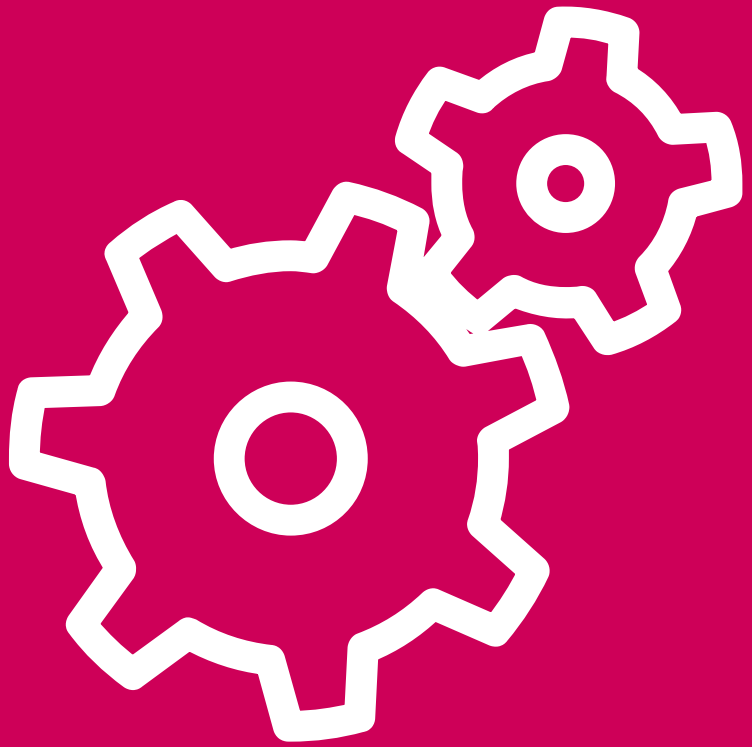
- Can use AS Contracts.
  (generally no specific BIM amendments required)

Level 2 BIM

- Can use AS Contracts but need BIM Protocol, BIM Management Plan and amendments in the body of contract are required as well.

Level 3 BIM

- New forms of contract are required. Can potentially use AS Contracts but substantial amendments are required, leading to a new form of contract.



BIM + Design Technology

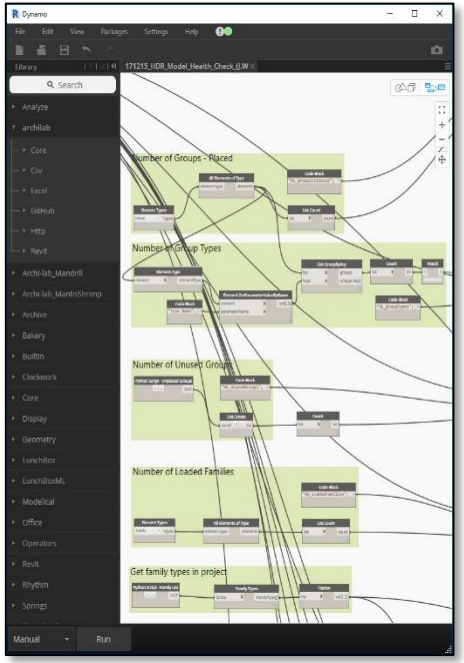
Automation

Automation
Methods

Add-ins

Each of these Revit automation methods has its own **advantages and disadvantages**.

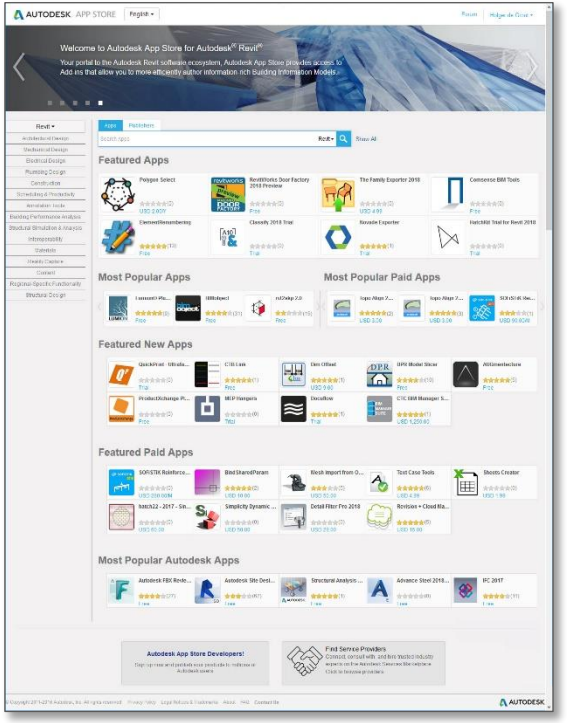
A well-written add-in, graph or macro can complete a tedious task with the click of a button, and **save users hours in the process**.



Dynamo

Macros

Automation
Add-ins



The right tool can make a huge difference!

Add-ins are the **most powerful** method for automating Revit, but they can also be the **most difficult** for beginners.

Add-ins for Revit are available on the **Autodesk App Store** or can be **individually created** using the Revit API and Visual Studio.

Add-ins are installed like a software and therefore, they are **easier to distribute** in the office environment.

Add-ins give users the **greatest control over Revit** and provide the **most seamless interface** with the software.

Automation
Add-ins

ideate BIMLink

Worksharing Monitor

eTransmit

ideate sticky

ideate explorer

Palladio X BIM WindowsLayout

UNIFI

BIM PROJECT SUITE

BIM MANAGER SUITE

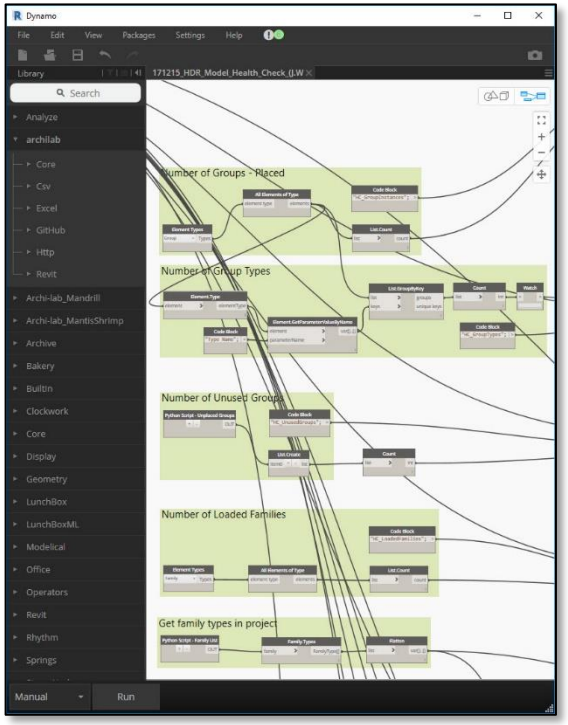
Preview Image Generator

Xrev Transmit

ENSCAPE™

BIM BATCH SUITE

Automation
Dynamo



An exciting option for automating Revit!

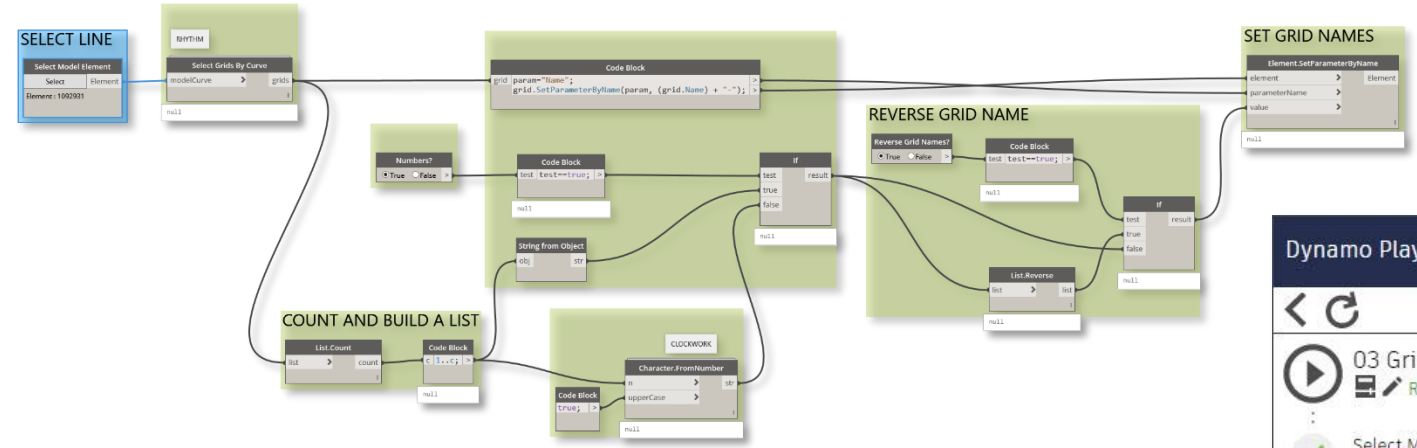
Dynamo is a **visual programming** environment for Revit which can be downloaded for free (**open-source software**).

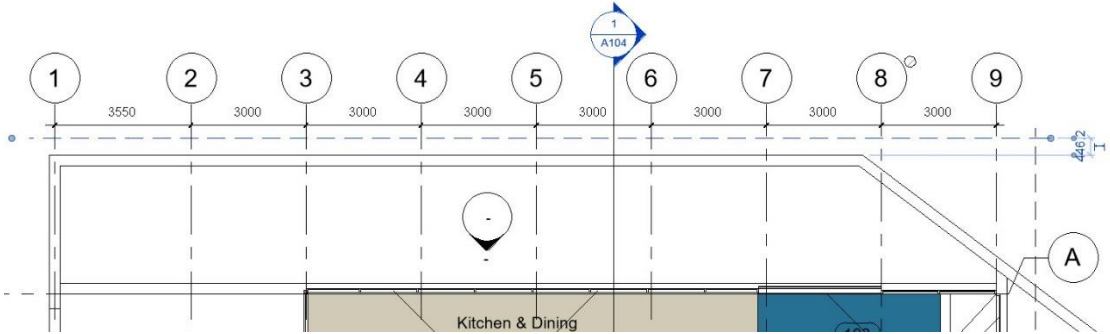
Manipulate data, explore design options, **automate processes** and create links between multiple applications.

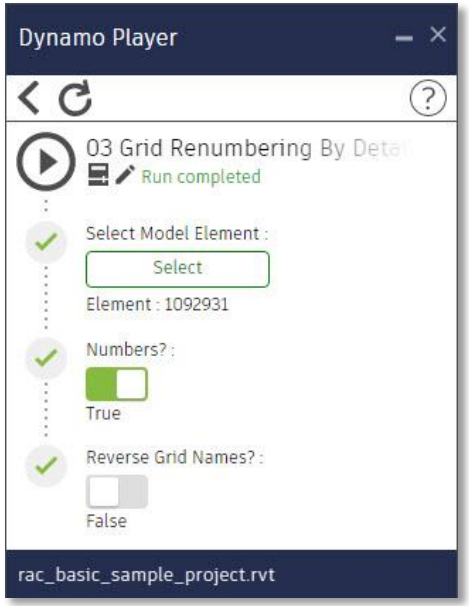
Create programs, called "**Graphs**" by connecting code blocks, called "**Nodes**" which perform a specific function.

Users **do not need to know how to program**, since the nodes contain all of the programming logic.

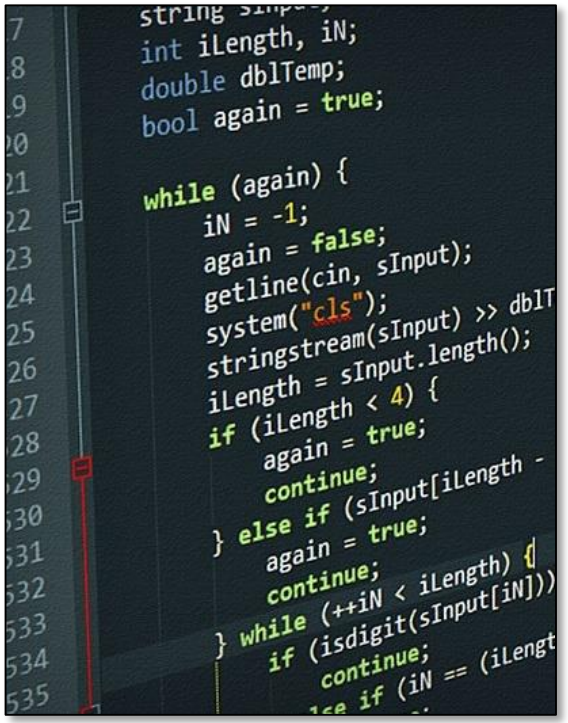
Automation
Dynamo







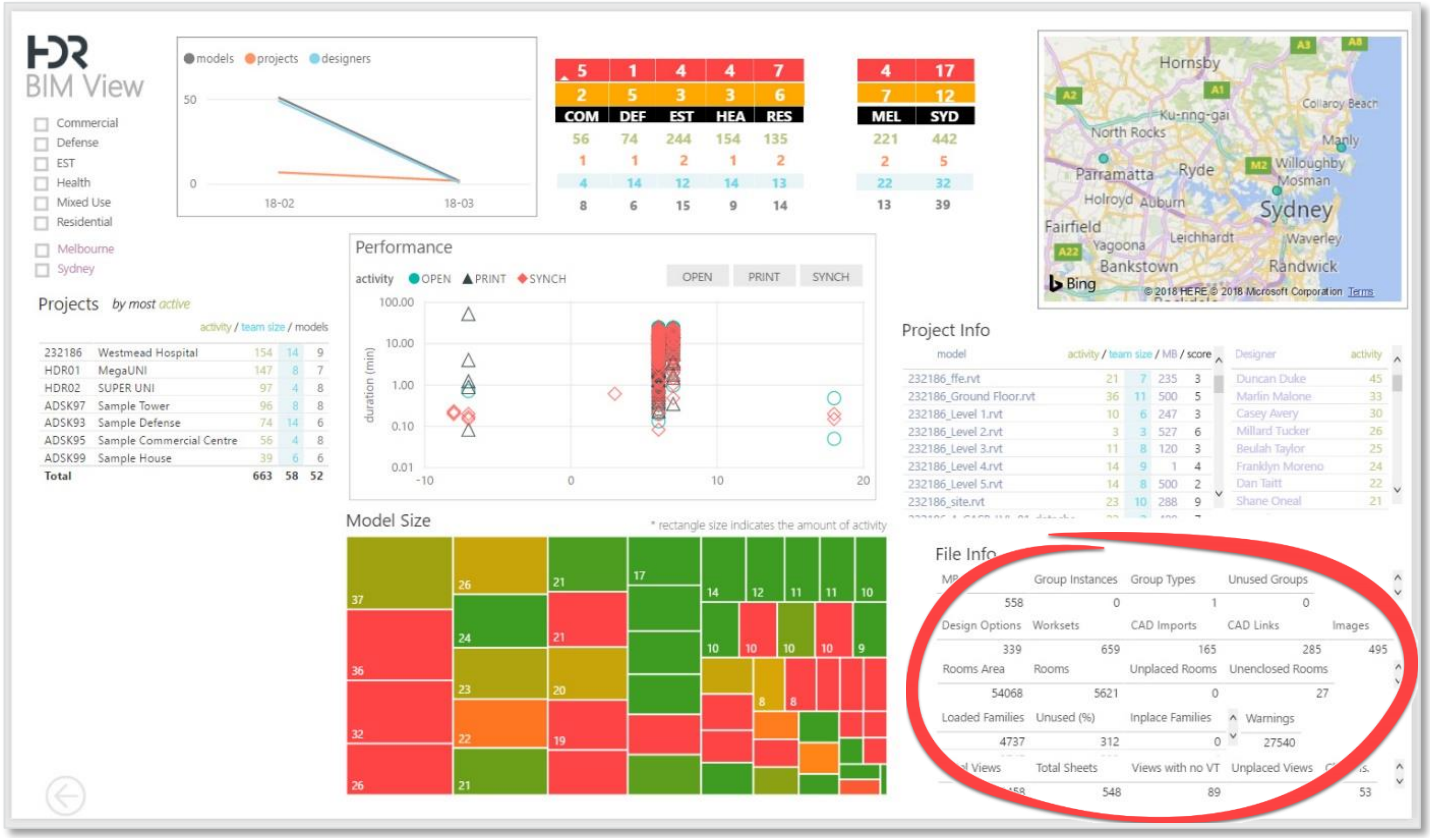
Automation
Macros



Automation takes time and patience!

- A macro is a series of **user-created commands and functions** that are written using the Revit API and created in SharpDevelop.
- Using macros does **not require to install any additional software** like it does for add-ins or Dynamo.
- Revit macros cannot be recorded but **can be converted into an add-in** since the code is the same.
- Macros are **not as easy to distribute as add-ins** because they are stored inside the Revit project files or the Revit application.

Automation
Macros



BIM + Design Technology

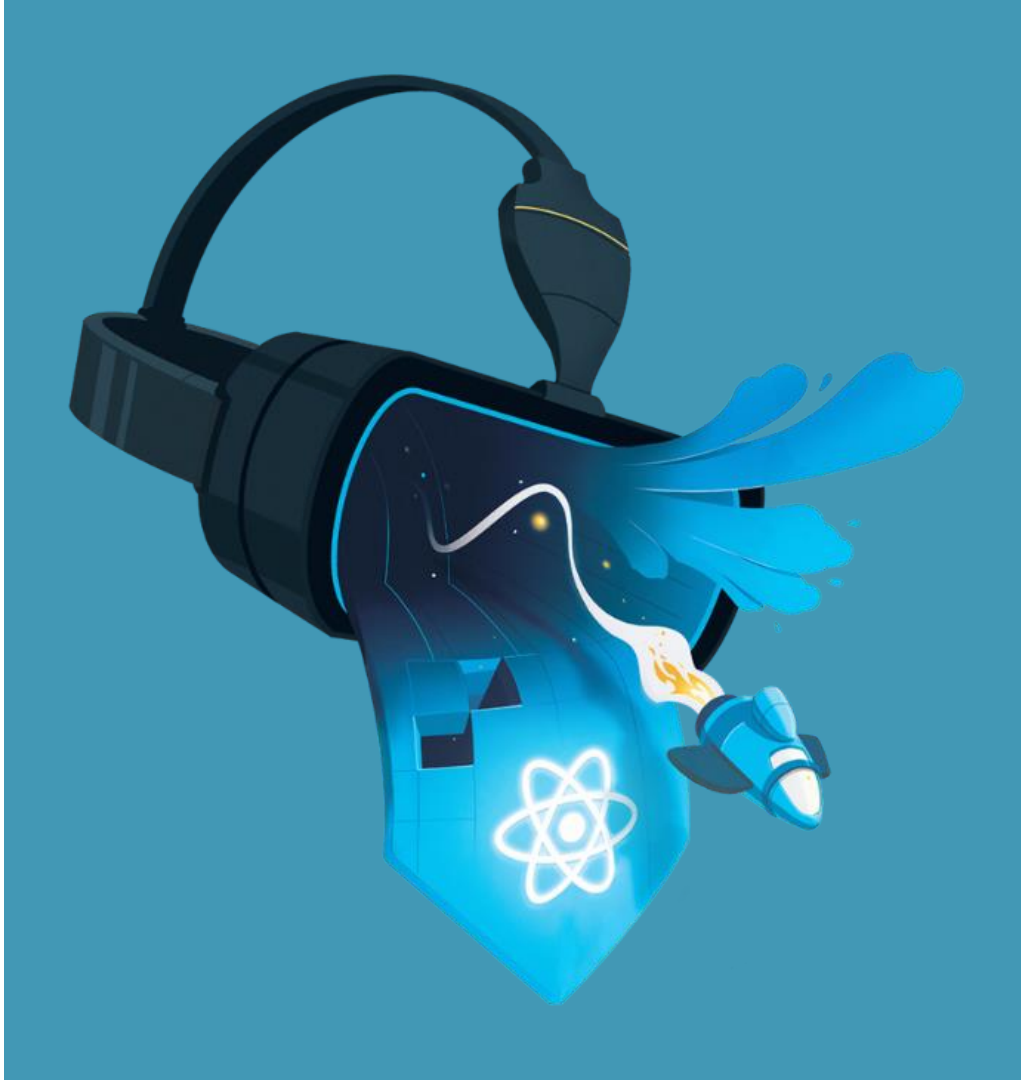
Virtual Reality

Virtual Reality
For the AEC Industry

VR is slowly becoming a medium that is **transforming the way we communicate**, create and experience content.

Traditional **2D drawings can be difficult to read** and therefore, can fail to help your client confidently make decisions.

Project owners have started to include a **“VR deliverable” as part of the scope of work**.



Virtual Reality
At HDR

VR is a collaboration tool, supporting **design reviews**, consultations and task sharing among multiple participants.

VR helps in understanding the space, layout and design, so **improves the approval process**.

VR has the potential to **benefit the design of hospitals** through:

- maximising the efficient use of space
- minimising staff travel distances
- improving sightlines, say from staff stations to beds
- ensuring the placement of equipment works
- creating a **safer work environment**
- improving way finding

Virtual Reality
Mobile VR

Detailed model documented and visualised **directly from Revit**, Sketch Up or Rhino.
Using Autodesk 360 cloud rendering, IrisVR Scope or Enscape to **export and upload 360° panoramas**.
Sharing these with clients and colleagues **using a smartphone and mobile VR device**.

3D MODEL
Revit | Sketch Up | Rhino

360° PANORAMAS
A360 | Scope | Enscape

SMARTPHONE
Android | iOS

MOBILE VR
Cardboard | GearVR

Virtual Reality
Desktop VR

Detailed model documented and visualised **directly from Revit**, Sketch Up or Rhino.
Using IrisVR Prospect or Enscape to instantly launch **interactive experiences in a VR headset**.

3D MODEL
Revit | Sketch Up | Rhino

RENDERING PLUGIN
Prospect | Enscape

DESKTOP VR
HTC Vive

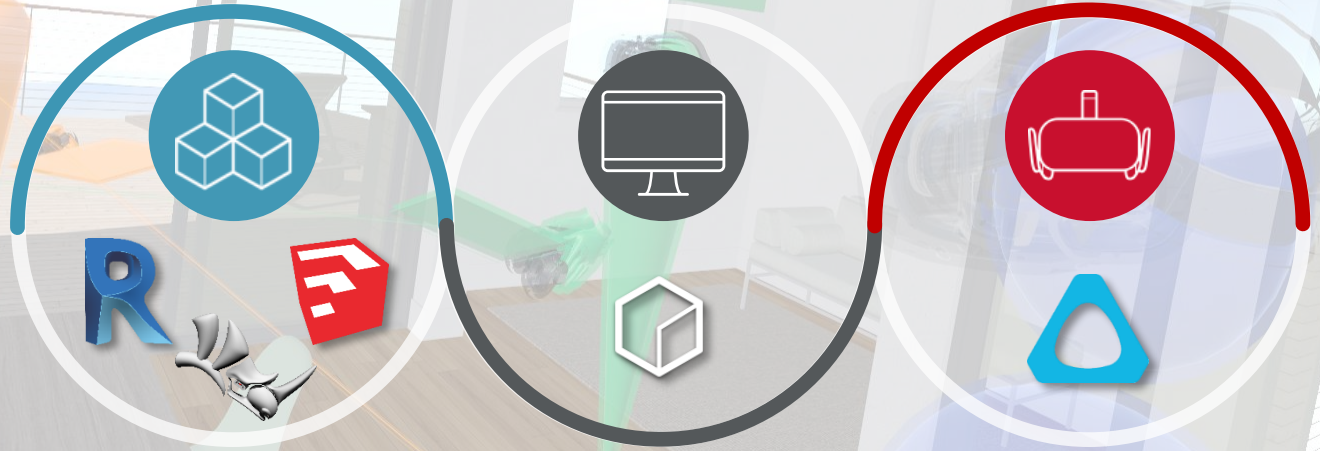
Virtual Reality
Multiuser Meetings

Mehdi

Detailed model documented and visualised **directly from Revit**, Sketch Up or Rhino.

Using **IrisVR Prospect to create a Multiuser Meeting** (export IVM file).

Using the free **IrisVR Prospect Viewer to join** and collaborate with colleagues.



3D MODEL
Revit | Sketch Up | Rhino

RENDERING PLUGIN
Prospect

MULTIUSER MEETING
Viewer | HTC Vive

Virtual Reality
What's Next?

- There is also an **entertainment aspect to VR**, and there is no limit as to how users could entertain their clients with new experiences.

Augmented Reality

- Rather than using a completely artificial VR environment, Augmented Reality (AR) could be used to **overlay assembly information on the real world**.
- Contractors could us AR to **overlay a "design intent" model over an "as-built" site**, to support layout, inspections and quality control.
- Owners could **overlay the "as-built" model with the "as-is" facility**, revealing hidden conditions during operations.

Thank you.

Level 1, 110 Walker Street
North Sydney NSW 2060 Australia
T: +61 2 9956 2666 D: +61 2 99562622
E: holger.degroot@hdrinc.com