

# Managing Digital Content with Design Automation API v3 for Revit

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## About the speaker

### Mustafa Salaheldin

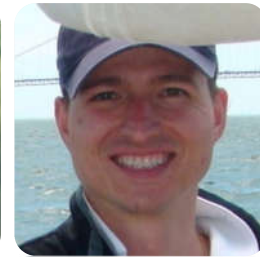
A multi-disciplinary subject-matter expert and one of the few professionals in the Digital Transformation field. He has a strong technical experience of BIM and is mastering the full-stack application development at the same time.

Mustafa joined Atkins Middle East and Africa, part of the SNC-Lavalin Group in Canada, as the Data Science Manager to lead the Digital R&D there.



# Dedication and Special Thanks

I want to dedicate this class to Jeremy Tammik for his continuous support and for being my first mentor of Revit API programming. As well as I want to thank everyone in the Forge team for their quick response and collaboration.



# Agenda

**What is Forge Design Automation for Revit?**

**Why to use Revit.io?**

**How does Revit.io work?**

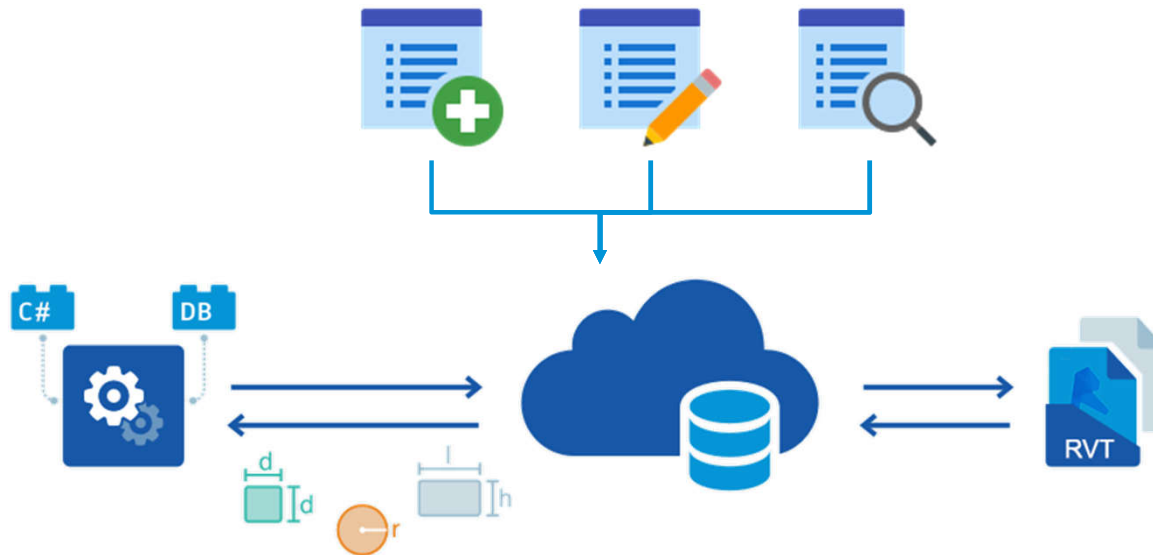
**How to execute Revit.io Add-in?**

**Showcase of Revit.io Applications**

**Using advanced technologies with Revit.io**

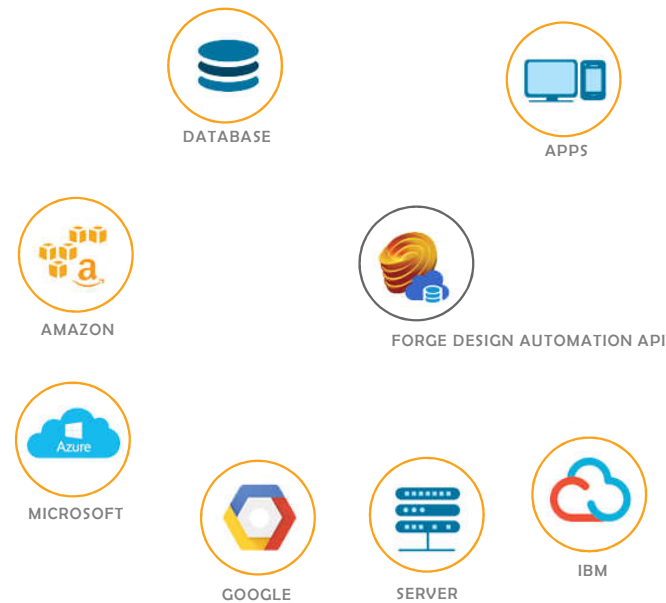
# What is DA4R (A.K.A. Revit.io)?

Design Automation for Revit (DA4R) also known as Revit.io is a part of the Forge platform API which allows the Cloud-based version of Revit to execute users add-ins.



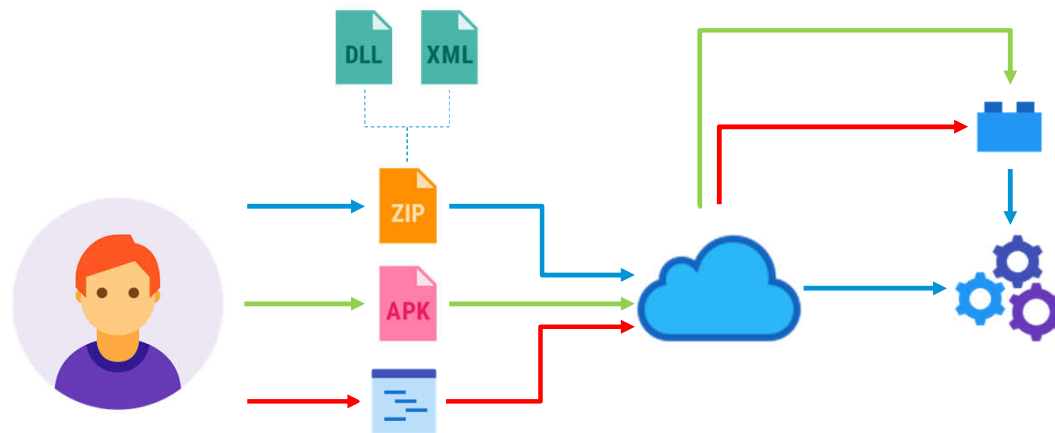
# Why to use Revit.io?

The harmonization between a digital operating model, predictive analytics, and a microservices architecture allows digital organizations to quickly take customer desires and feedback and turn them into actionable, revenue-generating business solutions.



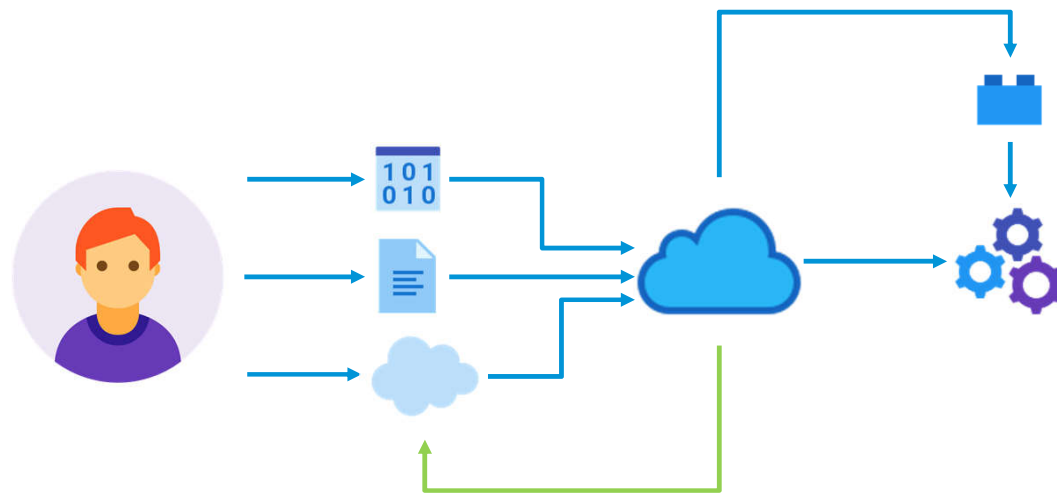
# How does Revit.io work?

Like other Forge services, you'll create a Forge client application which will call DA4R REST API endpoints.



# How to execute Revit.io Add-in?

Executing Revit.io Add-in is different than the regular way of executing the desktop version.





# Showcase of Revit.io Applications

**Extracting Families from Project using Revit.io**

**Adding Loadable Families to a Template using Revit.io**

**Adding System Families to Templates using Revit.io**

**Creating Revit Model Queries on Real-Time using Revit.io**

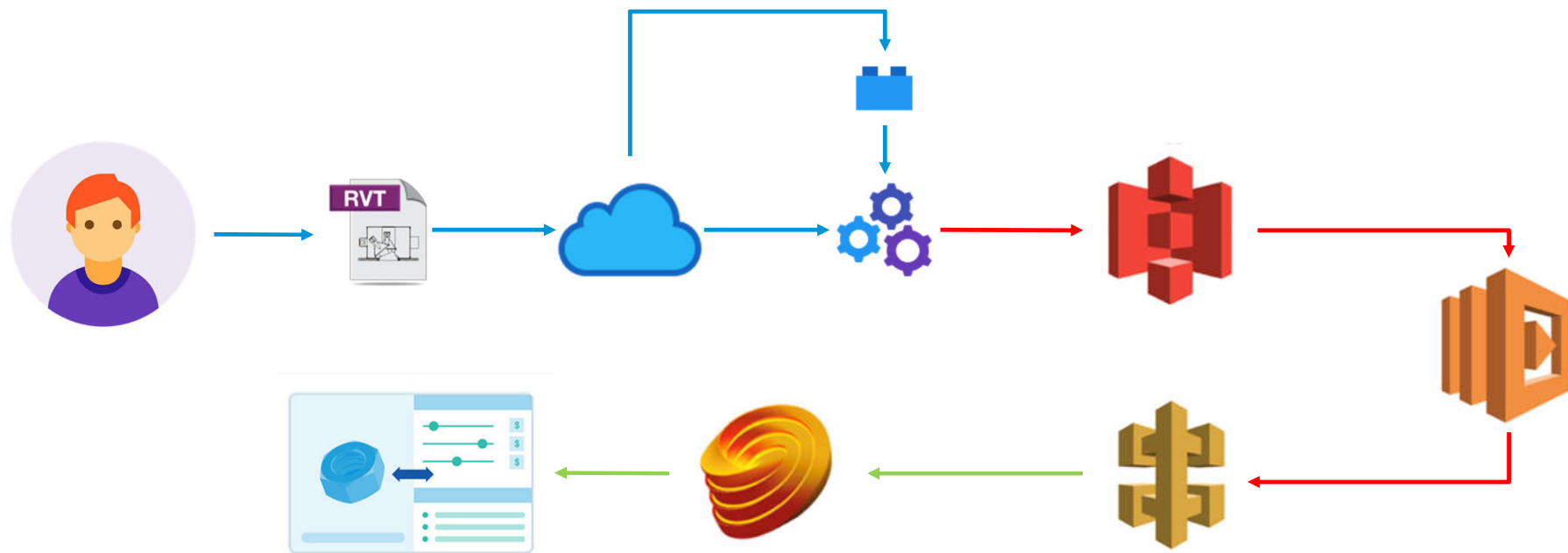
**Getting Revit Model Analytics using Revit.io**

# Extracting Families from Project using Revit.io

A simple application that shows the steps of creating DA4R AppPackage and execute it to extract families from Revit file and save them in the catalogue.

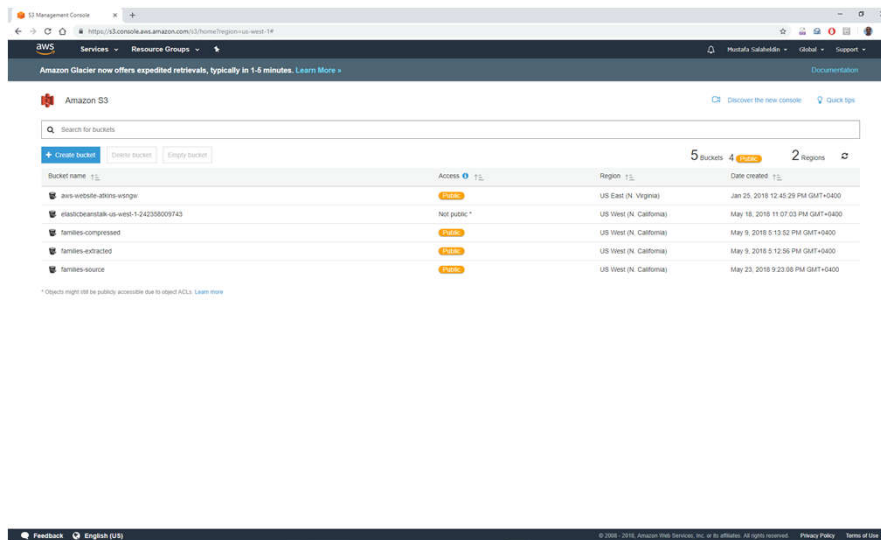
# Extracting Families from Project using Revit.io (Cont'd)

What happened behind the scenes

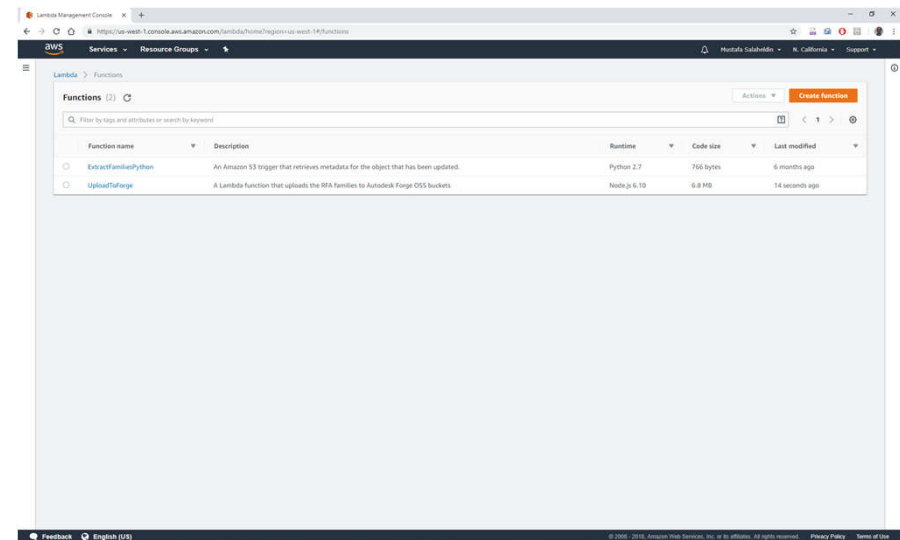


# Extracting Families from Project using Revit.io (Cont'd)

Connecting Revit.io to other Cloud services from different vendors.



Creating buckets in AWS S3 to contain the output from the Revit.io processing.



Creating AWS Lambda functions to do the further processing of the output from the Revit.io.

## Adding Loadable Families to a Template using Revit.io

It is so easy now to use DA4R Add-in to embed all the Revit Families you need from the online catalogue into your template.

# Creating new System Families Types using Revit.io

Using DA4R we can create new Revit System Families and insert them into Families catalogue or your template.

# Adding System Families to Templates using Revit.io

Once we have a catalogue for system families, we can use DA4R to embed them into template files.

## Creating Revit Model Queries on Real-Time using Revit.io

DA4R allows you to quickly make queries from your model directly. The Revit model is a database in the first place, so there is no need to store the information outside.

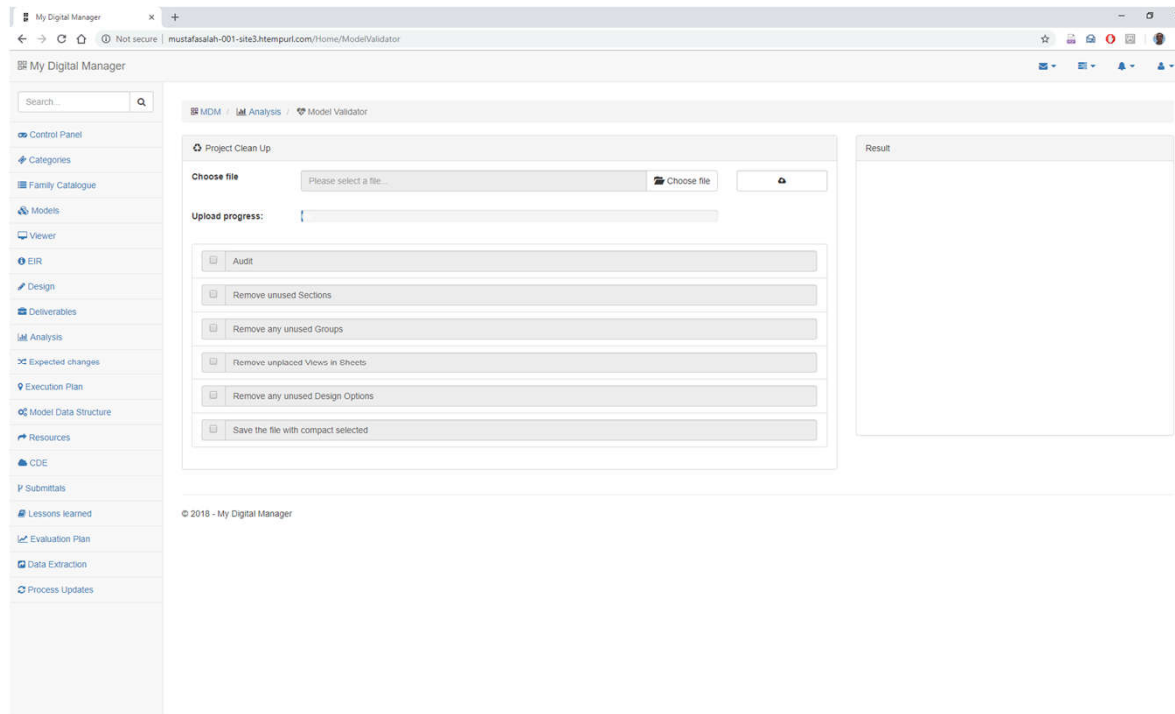


# Getting Revit Model Analytics using Revit.io

Now you can quickly and easily analyze and present your designs using DA4R APIs.

# Maintain and Sanitize the Revit Model using Revit.io

Cleaning up the Revit Model Content is very critical to enhance the Model performance and its integrity.



# Using advanced technologies with Revit.io

**Photogrammetry**

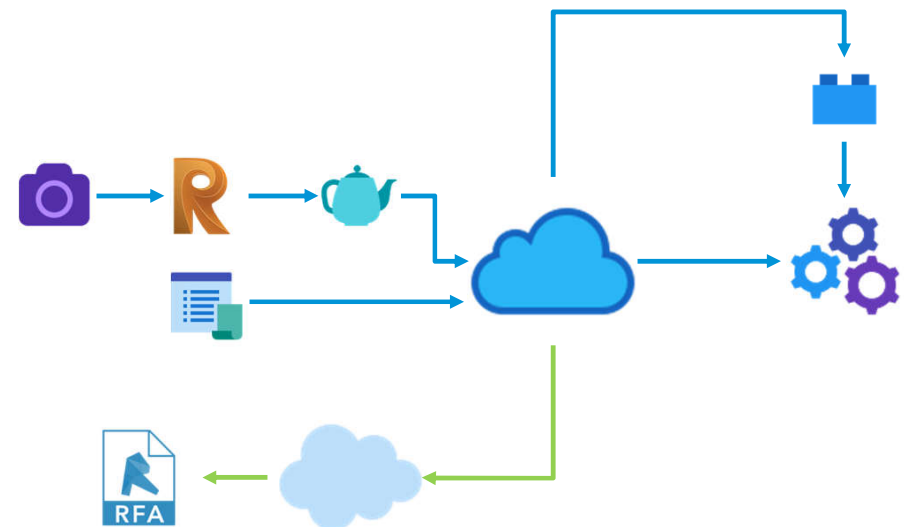
**Mesh simplifying**

**Families Classification using ML**



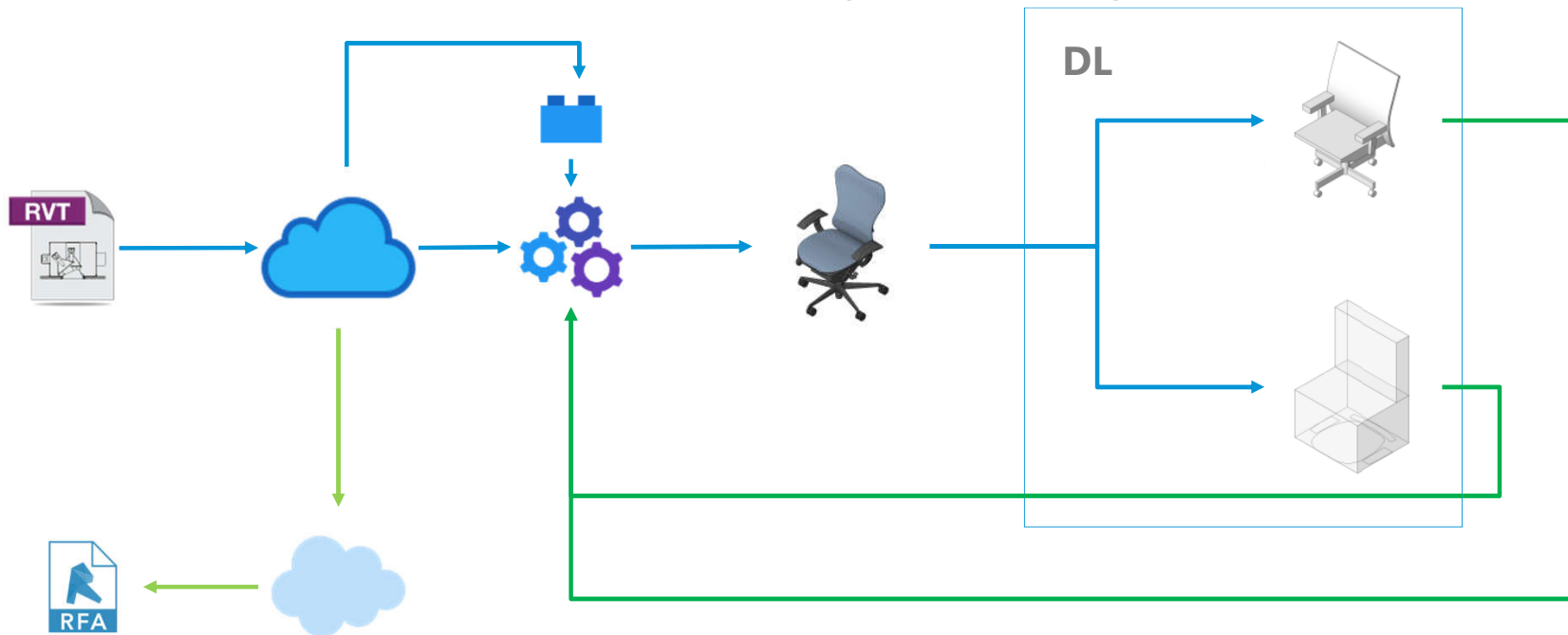
# Photogrammetry

With the recent advancements in computer vision, spatial computing devices (VR/AR headsets), and aerial capture technology, a 3D scanning technique called Photogrammetry has become more accessible to AEC Designers. We can use the same technique to build Revit Families Geometries digitally.



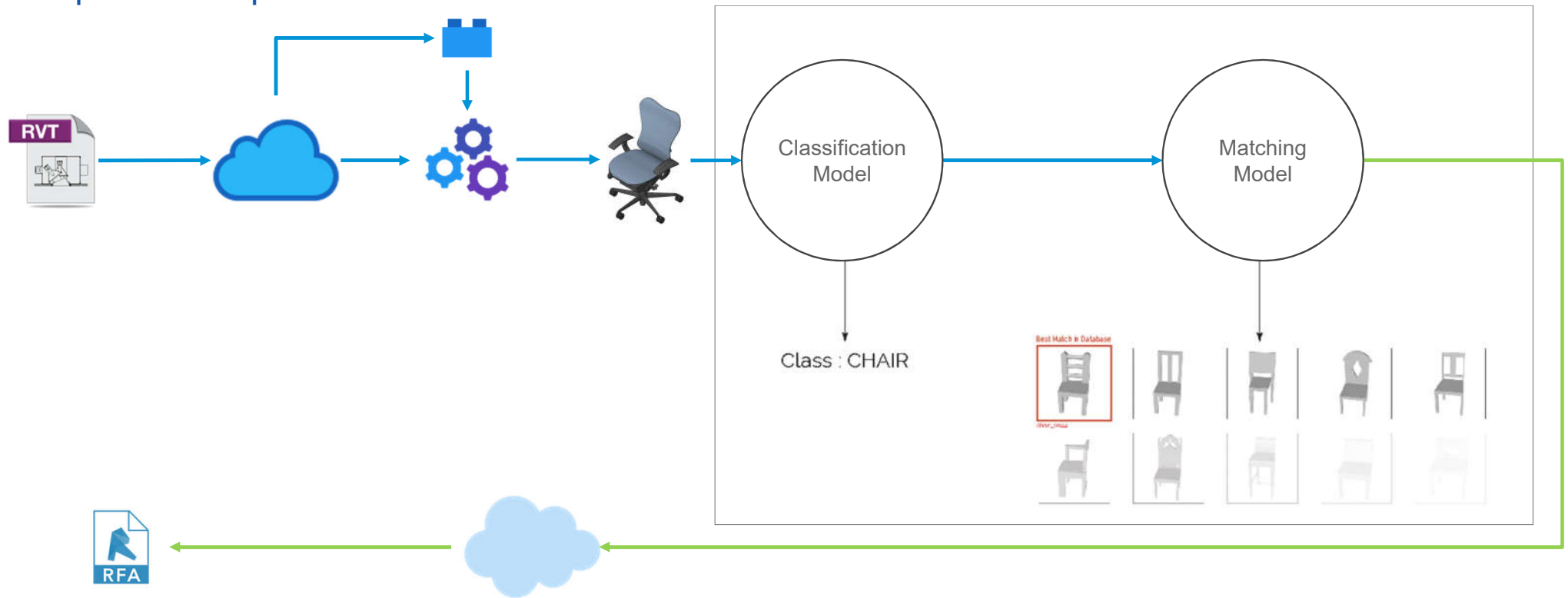
# Mesh simplifying

Reducing the complexity of model elements by using Deep Learning to simplify the Family mesh will allow us to create different versions of the Families come from the manufacturer to be used in the proper stage of the design.



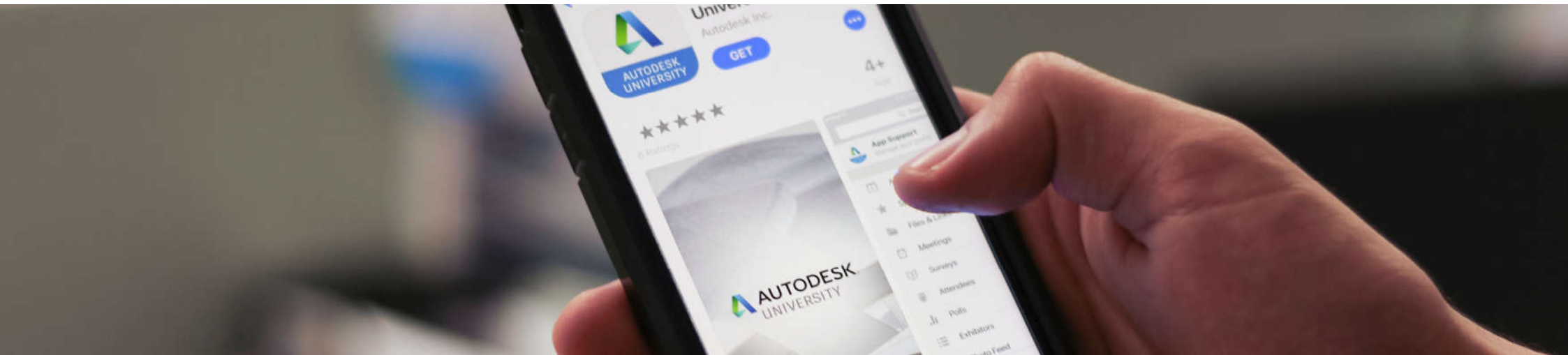
# Families Classification using ML

Using Machine Learning to Compare Families by geometry to prevent duplication or update new parameters.



# Thank You

Please don't forget to take the CLASS SURVEY in the app



# Questions and Answers





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