AUTODESK UNIVERSITY

Let's Talk About Data!

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- Shelly Mujtaba - Autodesk
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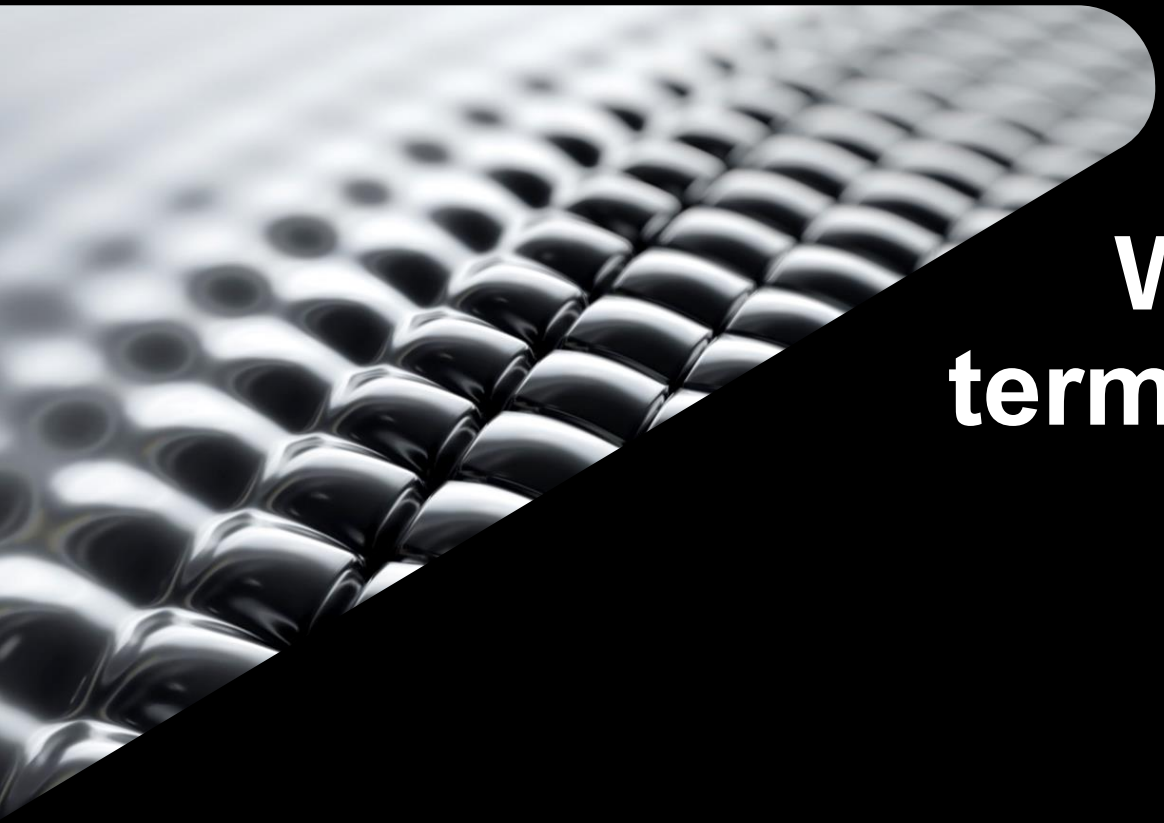
“Data” is probably the most generalized and overused term in our vocabulary when we are talking about anything that is important us.

But that is a key concept when we start talking about “data” to be shared and reused. What is important?

There-in lies the challenge. Once it is determined what is important, then more detailed questions arise about the data. How to structure it? How to store it? Where to store it?

As an example, this is one reason why Model Derivative service provides all data in a JSON structure with “key” and “value” pairs represented as strings. This allows consumption of the data in a generic way, but unfortunately puts the interpretation of that data onto the consumer.



What does the term “data” mean to you?

Historically, Autodesk has been concerned about data since the beginning of time (well, in the Julian calendar, at least as far back as 2445305.4167 😊). Even here, we can see that important data (date and time) needed to be packed into something that was compact and easily converted to something standard in various output formats.

Enter AutoCAD using the Julian calendar to specify date and time, and mainly decodable by using AutoLISP. Remember, we are talking about the days of MS DOS, and 640k of memory, so a critical design strategy was to make everything as compact as possible.

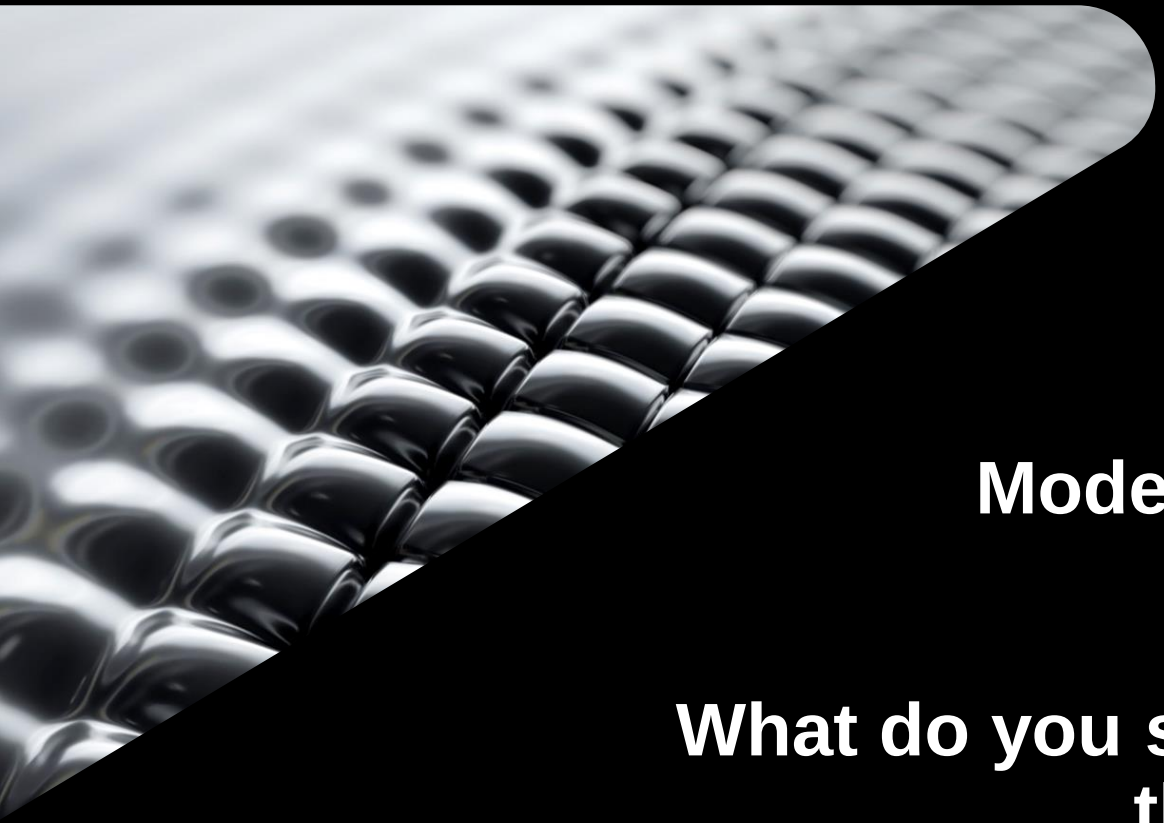
When you think of data, do you feel it is unique by any specific technology?

Is there data that should be standardized?

Fast-forward to today, and software data is still very file-based and containerized. When we talk about modern cloud solutions coming from traditional desktop software, we are still in a file-based world.

Let’s use Microsoft Office as another example, even though OneDrive and SharePoint allow collaboration in the cloud, the data is still contained with a “file” that can be edited in the cloud directly, downloaded or even in-line edited from the desktop app, while updating that cloud “file”. Even if we look at solutions that were “born-in-the-cloud” like Google docs, there is a still a file-like container. Yes, you can reference data across the containers, but it still feels like a file, and the syntax to reference across documents is not standardized.

Currently in the Autodesk eco system, a lot of data is stored in files. You’ve probably heard that Autodesk is working to move away from file-based data and bring the data to the cloud where it can be consumed and collaborated on without the need for the authoring product. The Forge platform is driving this vision and from data perspective, the Model Derivative and Design Automation services have lead those efforts.

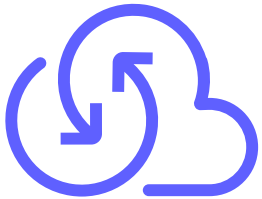


Show of hands…
How many people know about Model Derivative, Design Automation?

What do you see as the impact of those technologies?

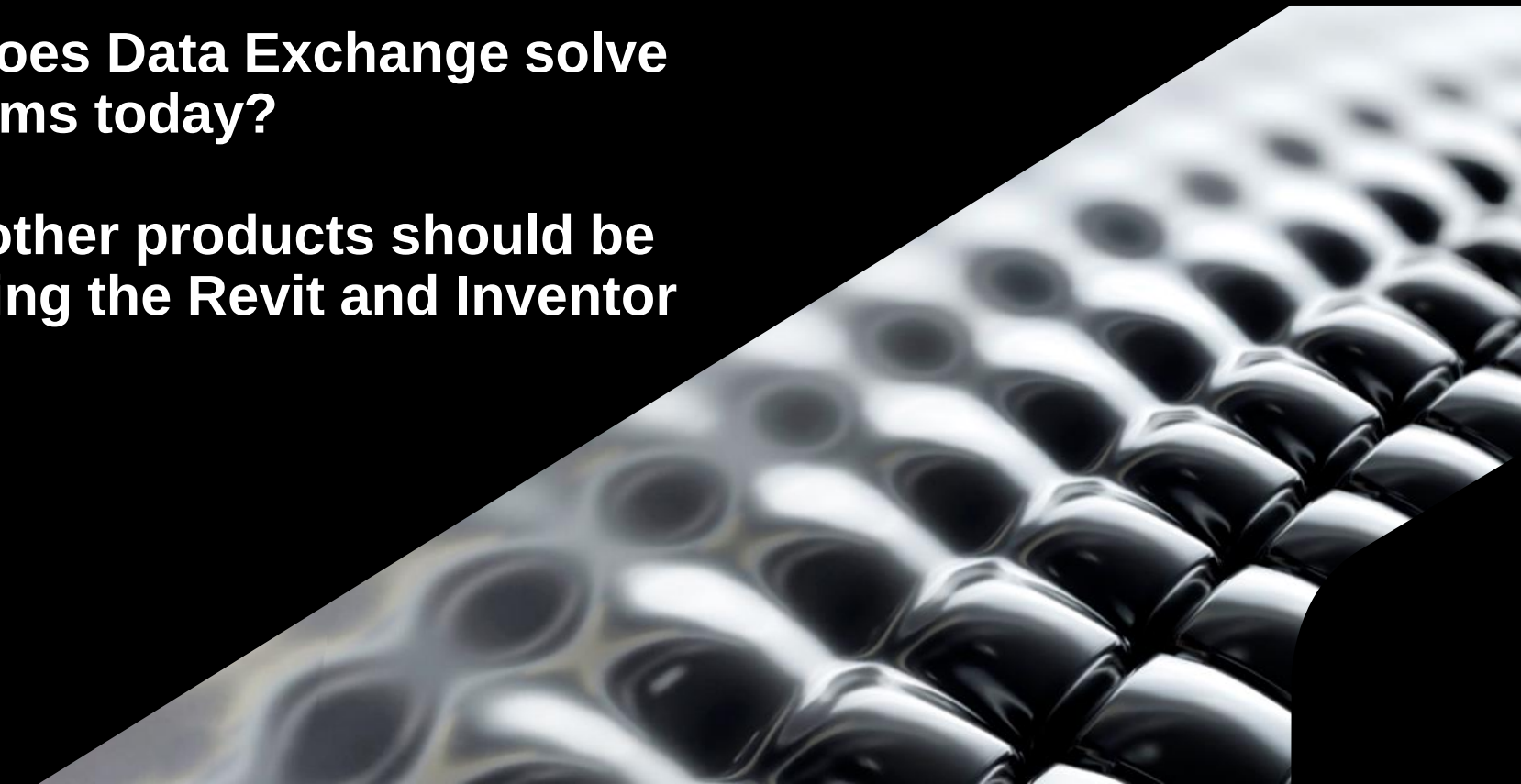
Onto the future… and it's now! Autodesk introduced the Data Exchange and Fusion Data features this year. Both are available to use NOW. The products are providing the data authoring capabilities seamlessly without the customer needing to understand the implementation, only the benefits. And from an API perspective, they are fully exposed through the Forge Data initiative.

Data Exchange allows workflows that "sub-set" data to be exchanged with other apps. It is currently working with Revit, Inventor, and Microsoft Power Automate, and with the API capabilities will be useful to other apps and workflows



How does Data Exchange solve problems today?

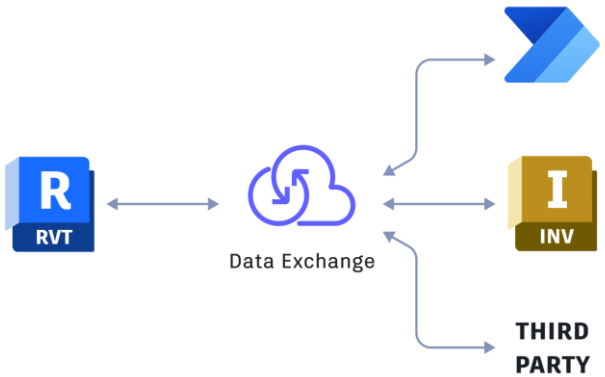
What other products should be following the Revit and Inventor lead?

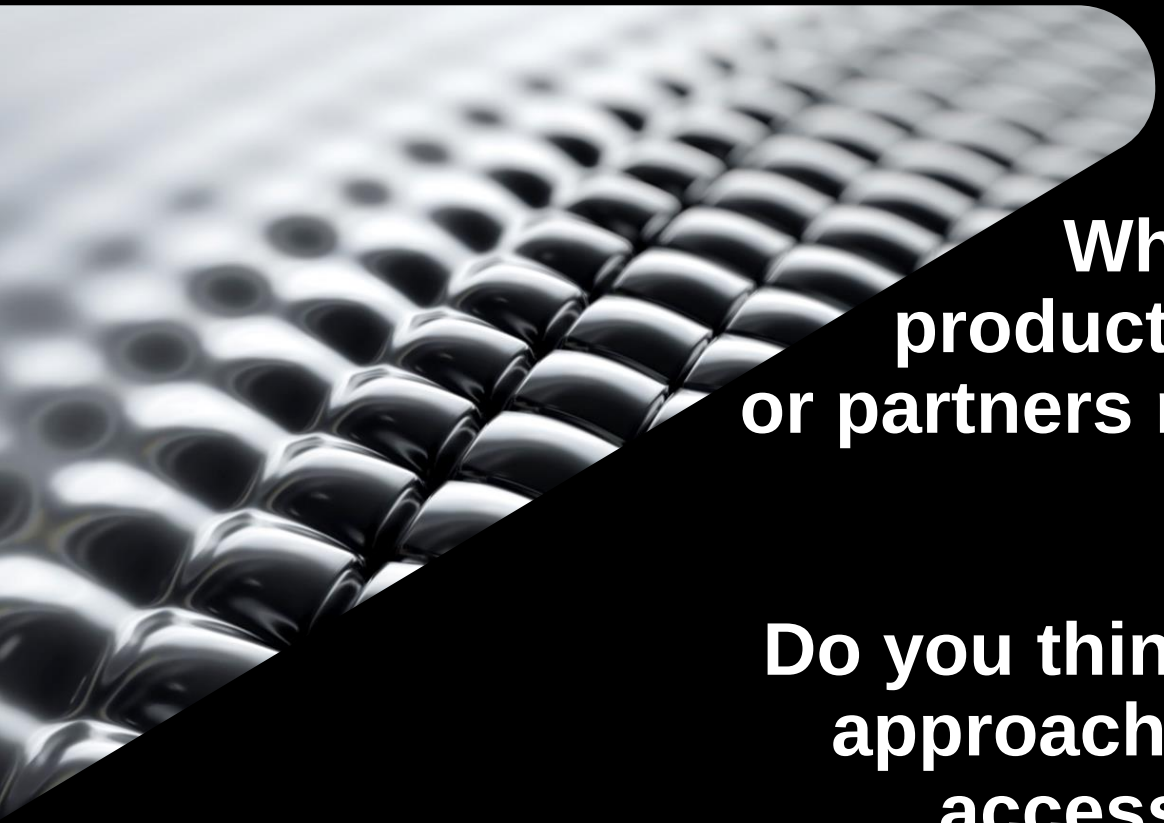


Coming soon will be additional features to expand the Data Exchange capabilities.

The DX connector SDK, DX Geometry SDK, and DX GraphQL will be coming soon. The connector SDK, along with the geometry SDK will allow developers to build additional workflows to connect to other applications.

GraphQL will provide more granular access to the data from an API perspective and eliminating having to search through a large response to get the specific data you need.





What types of data and product connectivity do we, or partners need to provide with Data Exchnage?

Do you think Graph QL is a god approach to simplify granular access to Data Exchange?

We also introduced a manufacturing information model. Early discussions called this “PIM” (Product Information Model) and was released as Fusion Data and supports Autodesk’s recognition of three major industry workflows: Fusion being manufacturing, Forma being AEC, and Flow being Media and Entertainment. These initiatives bring the idea of “real-time” and “source-of-truth” data aspects. What do those ideas mean?

- “Real-time” means that the data at design time is being authored into the information model. When the model is saved, the data is there. Period.

- “Source-of-truth” means that the data is NOT a copy, NOT translated from a file, NOT something that is unreliable. It means it is the data, as was last “saved”, and represents that last state of the design and version that was saved by the author (designer, cad manager, auditor, etc. Anyone who updates/saves the design).

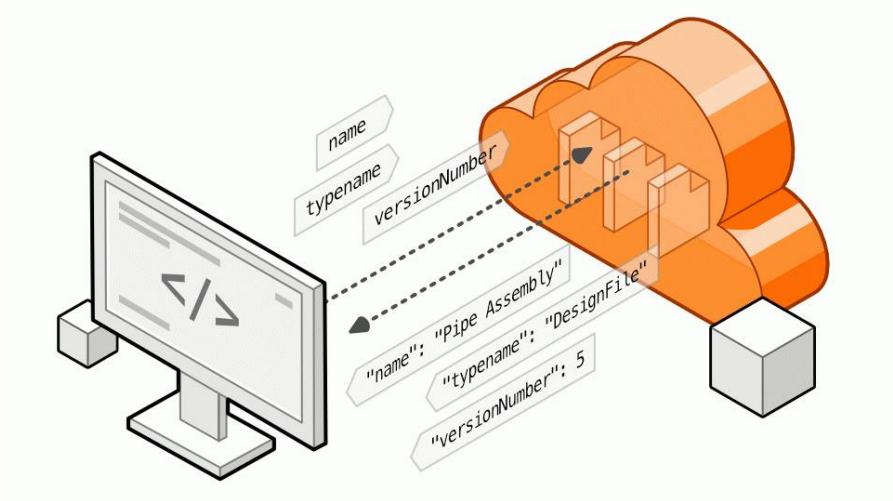
How does Fusion Data solve problems today?

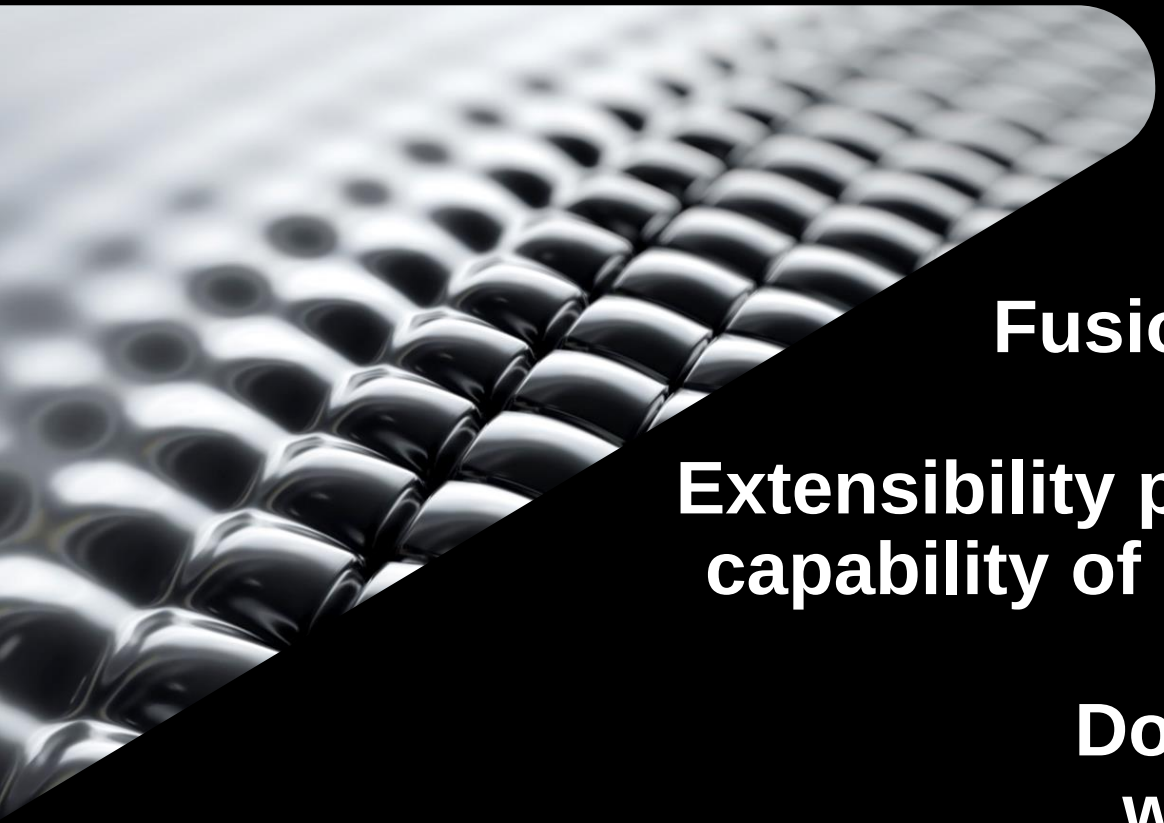
What does real-time and source of truth mean to you?

What other manufacturing products should be following the Fusion lead?

In Fusion Data we will be providing extensibility features that will allow you to add custom data.

Eventually the plan is to allow users to see this data on the Fusion 360 client side, too.





How do you see Fusion Data expanding?

Extensibility provides some write capability of custom properties?

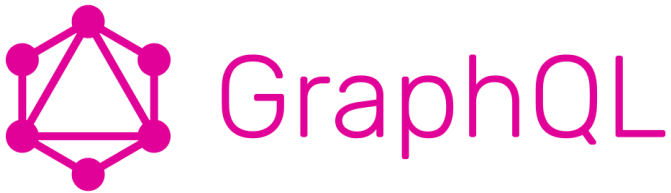
Do native values need write capability, too?

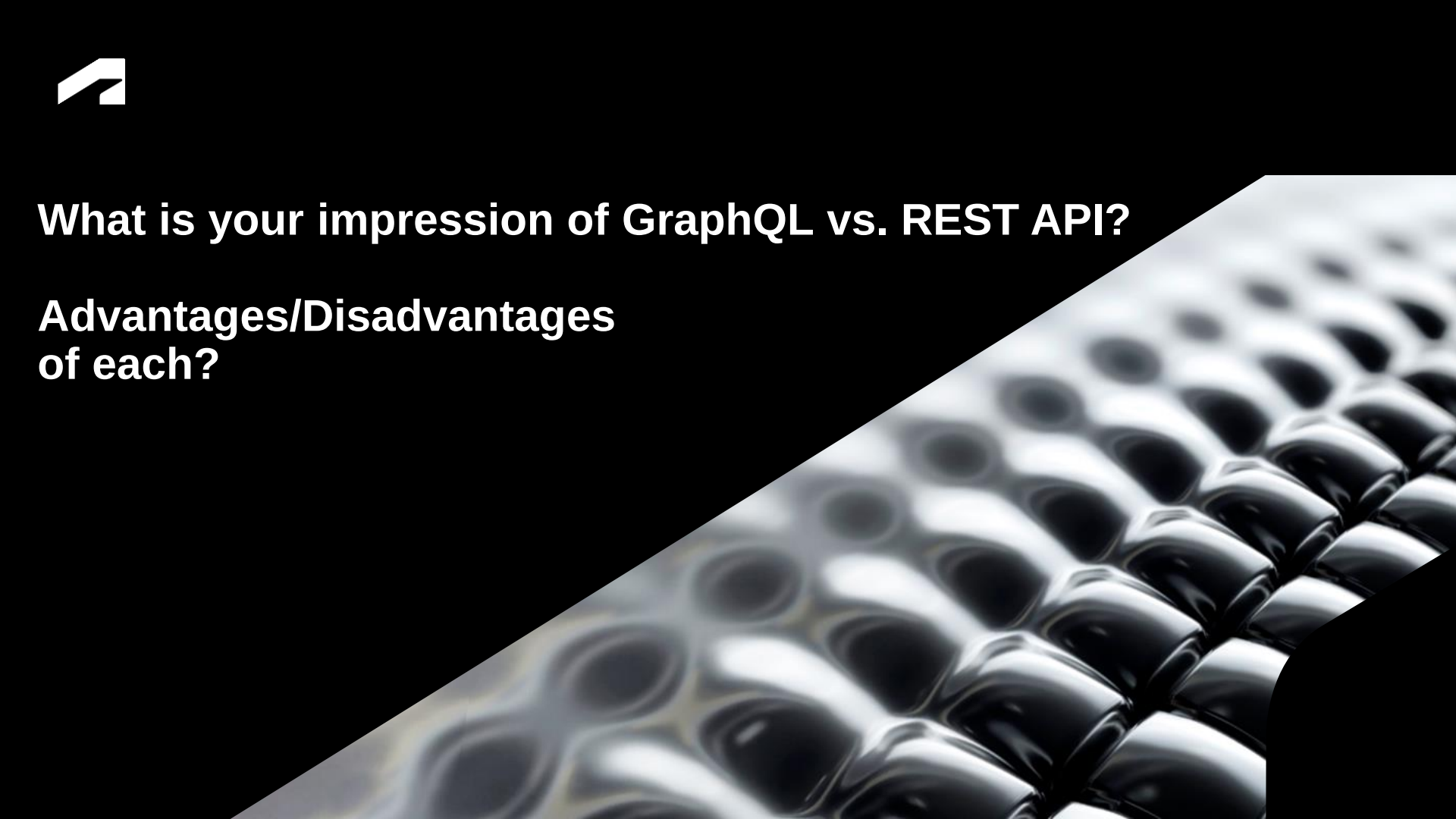
Along with these two services we have done some evaluation of how to provide access to pure data, on a granular basis.

When we talk about REST APIs, typically you would get back a JSON formatted payload. And it could contain much more data than you really need.

This is where the GraphQL approach shines.

We have adopted it for Fusion Data, and for Data Exchange it is coming soon.



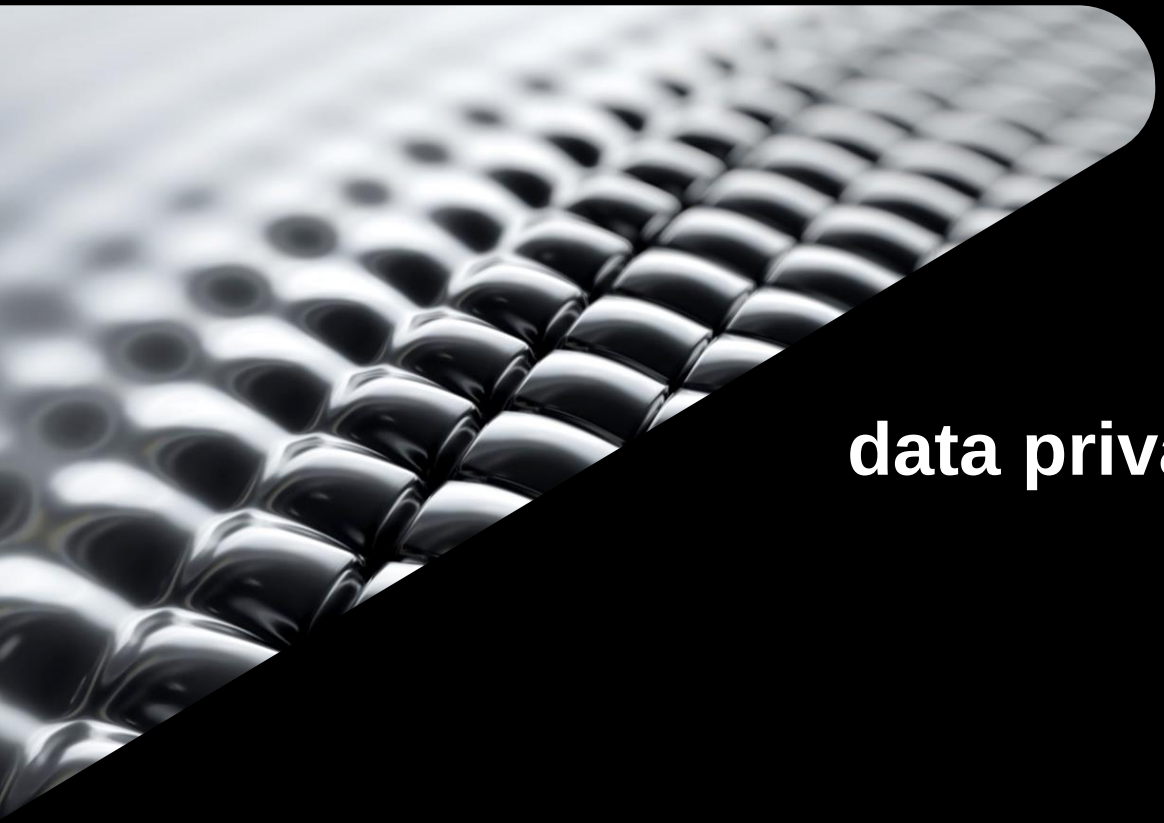

What is your impression of GraphQL vs. REST API?
Advantages/Disadvantages
of each?

As more and more data is collected by web sites and apps, it has become increasingly important for data privacy policies to be in place.

The European Union's General Data Protection Regulation (GDPR) is one of the most strict and comprehensive laws in effect. Typically, these laws pertain to consumers and how retailers collect data and how they deal with it.

Autodesk has embraced data privacy at a consumer level, but what about authoring and sharing design data? Already with Forge services we also ensure this privacy, but let's consider a Fusion 360 or Revit design and its data?

Through Forge core services, there are authentication requirements and administration tools to provide access to only those who need, but this will be more and more important as data exits the "file" and becomes centralized in a cloud model. Does this increase data privacy concerns?



How important is data privacy to design data?

Autodesk is already working on AEC and Media & Entertainment information models.

These will become like Fusion Data is today, “real-time” and the “source-of-truth” from an authoring perspective.

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Thank You!