Upchain Connects the Value Chain to Accelerate New Product Introduction

CIMdata Commentary

Key takeaways:

- *Increasingly, engineering designs comprise procured-in components and whole sub-modules from external companies.*
- *Today, final manufactured products are designed and built by a diverse distributed network of individuals and teams.*
- *Development of products involves a diverse Product Stakeholder Network of people who collaborate on ideas and content, and who make decisions that influence the final product.*
- *The Product Stakeholder Network determines final product definition, including procured-in content, and is especially prevalent in industries such as traditional manufacturing, consumer goods, and mechatronics.*
- *In this new age of global collaboration, organizations face internal impediments due to the way they're structured by departments which evolved over decades without consideration for inter-departmental and company-to-company collaboration.*
- *The market needs a solution that supports informal P2P collaboration across these boundaries, yet also maintains a persistent record of **Why**, **How**, **What**, and by **Whom** decisions were made.*

Introduction

Conventional thinking has us believe that products are conceived, developed, and made by the product brand owner's engineering teams. Yet increasingly, final manufactured products are designed and built by a diverse distributed network of individuals and teams—the Product Stakeholder Network. It is estimated that most industrial and consumer products contain procured-in content ranging from 40% to 70%.[1] This means that the engineer who designs the final product must design-in other companies' components, parts, and sub-modules. They must research, evaluate, and select the products that meet the design specification then bring in, or recreate, referenceable geometry and metadata so that the complete design can be engineered and documented for downstream processes like quality inspection, procurement, and manufacturing.

Interactions between people using tools, processes, and IT systems commences early during product development starting with requirements gathering and continuing throughout the product design, development, procurement, manufacture, and maintenance phases. Increasingly, people use tools from their private lives like text, chat, and email to make critical business decisions across a disparate Product Stakeholder Network. But these person-to-person (P2P) collaboration tools are incongruous with enterprise governance that demands strict, documented, processed, and baked-in rules. This informal P2P collaboration risks breaching formal process guidelines by capturing **what** was decided, but not **why** or **how**. The failure to create and preserve a master data record of this information can lead to an inability to trace history, and risks mistakes being repeated again and again.

[1] CIMdata estimate, 2017.

Once a product is designed and approved for release to manufacture as an MBOM, procurement derive a Procurement BOM which includes all components and parts to be bought-in, and then start the procurement process. Procurement's challenge is they are usually under tight time constraints because they get purchasing requests from many places, including engineering design, maintenance, R&D, project teams, operations, and knowledge workers using IT systems such as ERP. Procurement might be asked to buy different components with very similar or identical specifications; for instance, 100 5 mm screws from source A and 10 5 mm screws from source B. Merely buying components specified by engineering becomes inefficient and expensive, and creates a cost burden downstream in field maintenance by inflating inventory with unique product specifications. To mitigate this, procurement negotiates with engineering about their choices and seeks to converge on fewer suppliers and models of procured-in content. This takes time which, by the time purchasing gets involved, is no longer available.

Upchain's Value Proposition

An engineer in a leading Hi-Tech manufacturing company in the Bay Area, CA said: "90% of design is shopping." He meant that much of his time is spent exploring standard components and sub-modules to incorporate into new designs. He must consider performance specs, price, availability, and physical dimensions before asking procurement to purchase. But many of the people in the Product Stakeholder Network are not engineers and don't use CAD systems. Procurement for example. So, when procurement asks engineering to change the brand of a pneumatic cylinder or change the cylinder stroke to be 10 mm longer to allow a volume purchase, engineering needs to go back and validate that the change will work. This causes delay and possibly errors, neither of which are tolerable at this late stage in the process. By this point, shipping timelines, marketing deliverables, and launch dates are set; orders are pending; and downstream customers have dependencies set around receiving the product on time. Sometimes, procurement must override engineering's choice if they believe their substitution matches the defined spec. Engineering may never find out about the change until later, if they find out at all.

The traditional enterprise systems that manage these end-to-end data and process workflows like ERP, PLM, and Supply Chain Management (SCM) each have their core functionality rooted in separate domains such as enterprise resource planning, engineering product management, and catalogue component procurement. Data flows between these domains through API integrations and is mapped between each system, yet people working on product information need a seamless solution which transcends these boundaries. Upchain is designed to support this workflow for people—independent to their role, experience, and department.

Upchain is designed by business people who understand CAD, PLM, ERP, and SCM systems as well as end-to-end product development workflow processes. Upchain is specifically designed to automate, not disrupt, existing tools and systems that manage product development today, and bring visibility of engineering data to all departments and roles throughout the Product Stakeholder Network. Upchain offers capability drawn from ERP, CAD, PLM, and informal P2P collaboration tools to meet the needs of both enterprise systems governance and ad-hoc P2P collaboration while automating workflows between engineering, procurement, suppliers, and manufacturing. This both fills the cracks between the various tools and system silos and completes disjointed workflows, to reduce production time and errors caused by gaps, re-work loops, duplicated effort, manual touch, and organizational span-of-control issues. Furthermore, although Upchain is an enterprise

system, it also caters to the individual needs of Product Stakeholder Network members. Often, enterprise systems are optimized for corporate governance rather than to support the needs of individuals who want to collaborate. Conversely, P2P collaboration tools like email and chat fail to provide the governance corporations require. Upchain blends both, providing the best of both worlds to every organization in the value chain.

Usually, implementing a new enterprise system requires a great deal of business process re-engineering, data loading and reformatting, personnel retraining, and new integrations to legacy tools. This work is typical when implementing a new enterprise system, because it involves replacing some legacy systems. Upchain doesn't replace any existing tool or enterprise system. Rather, it augments them by doing a better job of connecting the disparate tools, systems, and processes, and serving the ad-hoc collaboration needs of the Product Stakeholder Network. Upchain may be implemented either as a multi-tenant cloud instance, or hybrid on-premise/cloud solution. This offers flexibility to access and manage files inside or outside the firewall, preserves existing integrations to installed on-premise systems, and minimizes forced migration to new architectures.

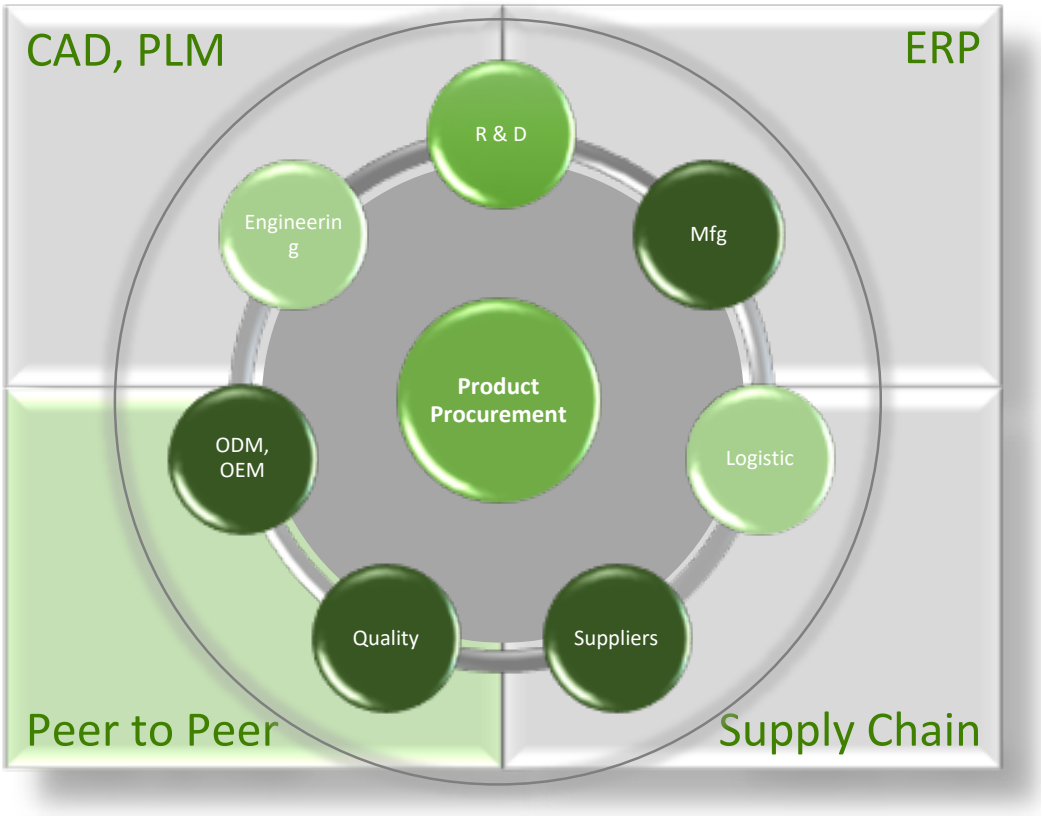
The Best of Both Worlds: P2P Collaboration with Enterprise Governance

To support the need for enterprise governance and record a single view of truth, Upchain provides powerful project management and visual workflow capabilities. This helps communicate things like time, resource status, and dependencies, so that the full project status can easily be seen by the entire Product Stakeholder Network. The workflow capability supports PLM-like "states" such as Development, Pending, Promoted, Released, or Obsolete. Irrespective of a person's role or department, they receive an informed understanding of project health regardless of which system or department they belong to.

To support the need for ad-hoc P2P collaboration, Upchain provides:

- Email capability from within the Upchain system to allow salient documents to be sent and tracked. Unlike regular email though, Upchain preserves an "in context" record of the sender, receiver, and any attachments. Filters allow views of hashtags, documents, and people associated with the project of interest.
- Access and integration with familiar business tools like the Microsoft Office Suite.
- Personalized dashboards provide real time status of an individual's tasks within the overall project.

Upchain offers a CAD-neutral visual 3D CAD-like experience but one that doesn't require a traditional CAD license, is easy for non-engineers to use, uses lighter weight data, and integrates with other mainstream systems of record. Users can bring standard 3D library items into an assembly and, leveraging CAD-like model intelligence, align geometric parts precisely (e.g. shafts aligned to holes; machined coplanar faces mated to each other). Procurement might use this easily accessed 3D experience to collaborate with engineering about a chosen pneumatic cylinder. As a team, they could zoom or pan, and perform tasks such as hide, isolate, and explode the 3D assembly to facilitate exploration of the project. The joint engineering and procurement team might converge on a better choice of pneumatic cylinder which meets both the needs of engineering, and the business preference of procurement.



Product Stakeholder Network Revolves Around Product Procurement

Concluding Remarks

Upchain maintains a persistent record of **Why**, **How**, and **What** decisions were made, and by **Whom**. Usually enterprise systems that maintain the single view of truth record **What** decisions were made and by **Whom**, but not **Why** and **How**. The **Why** and **How** remain tribal knowledge among those who participated, which is a risk for the company. Upchain blends enterprise governance with P2P collaboration to seamlessly capture and store the **How**, **What**, and **Whom** of complex product innovation. Some major benefits accrued from using Upchain include:

- Low disruption—users don't need to replace anything, Upchain connects capabilities across the value chain.
- Enterprise governance to preserve a single view of truth.
- Easy ad-hoc P2P collaboration for all Product Stakeholder Network members.
- Little reeducation required to use Upchain's CAD and PLM like capabilities without specialized skills or extensive training.

Products are made by a diverse group of individuals within a Product Stakeholder Network that exist within organizations which are members of a larger industrial value chain. Upchain connects the entire product development value chain. You may learn more about Upchain's products at https://www.upchain.com/.

About CIMdata

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