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Tacking to Win: Connecting Teams with a Collaboration Hub in the Cloud

Executive summary

Tightly knit collaboration amongst development teams, co-workers, and partners has become necessary for bringing a successful product to market. The cloud offers a new transformative option for heterogeneous teams wanting a hub for collaboration that enhances the power of the desktop environment for electronic systems design.

Matt Walsh, Product Marketing Manager, Siemens Digital Industries Software

Introduction

The headwinds electronic systems companies face when bringing a product to market are heightened by the product, process, and organizational complexities associated with next-generation designs. The high pressure to deliver on time and on budget compels these companies to seek innovative, digitally transformative solutions that turn these challenges in their favor and propel them to first time success.

As a baseline, the investment in traditional on-premises desktop tools used for electronic systems design is protected. These tools are not going away. They will continue to provide a robust "designer's desktop" workstation for ideation, analysis, and implementation of designs. However, bringing a successful electronic product to market is not the result of a few broad strokes by a single individual, it's the result of thousands of specific and specialized activities carried out by broader teams. If these teams are not fully synchronized and coordinated, the product creation process will be blown off course, leading to delays or, worse, product respins and cancellations.

Given the complexities inherent in both next-generation products and the underlying components used, effective collaboration is fundamental to successfully navigating the product creation journey. This includes collaboration within the engineering and design organization, collaboration across organizational boundaries — including co-workers in procurement and support— and, as necessary, collaboration that extends to partners both on the frontend during ideation and on the backend during the NPI process. Teams that are better synchronized and aligned are far more likely to deliver a successful product to market on time and on budget.

Siemens EDA, a part of Siemens Digital Industries Software, is dedicated to delivering a continuum of cloud-enabled solutions that unlock the full potential of a digital transformation for our customers, in their way and at their pace. Our strategy is founded upon four pillars:

- Cloud Ready
- Managed Services
- Cloud Connected
- Software as a Service

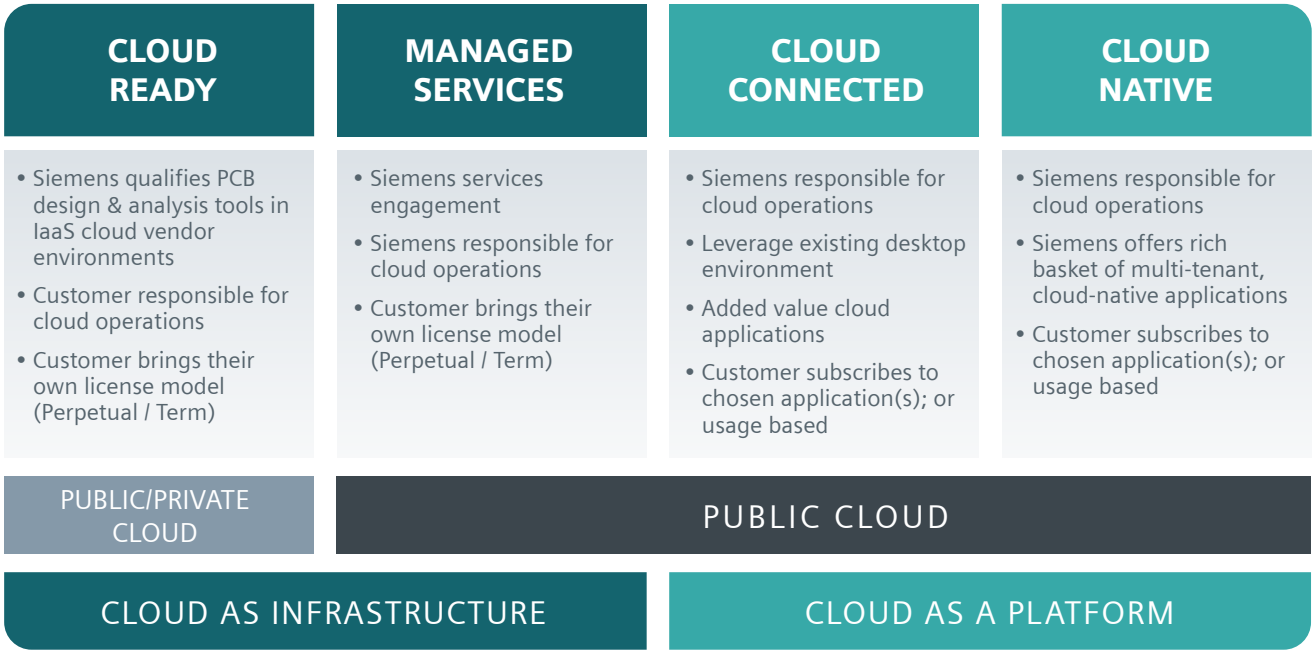

Figure 1. The four pillars of the Siemens EDA cloud enabled solutions for electronic systems design.

The four pillars are introduced in the Siemens whitepaper, Lost in the Cloud? Siemens Shows the Way. This paper focuses on the Cloud Connected pillar, specifically how the cloud will transform the way teams collaborate. By extending the power of desktop authoring tools with fully integrated cloud-connected capabilities, teams will remain tightly aligned, be far more productive, and stay on course at all times as they navigate the obstacles and rewards of next-generation electronic systems design.

Overcoming barriers to collaboration

In a recent Aberdeen study, 32% of companies cited collaboration across disciplines as their top engineering challenge.

The way many teams collaborate today is entirely ad hoc, or nearly so. Engineers wanting to share design data use combinations of email, Excel files, network drives, and cloud file sharing applications. Even with the best intentions, these ad hoc approaches don't always work well. In another Aberdeen study, an inordinate share of an organization's time (29%) is spent searching for PCB related information due to a lack of systemic data management. What companies need is a more cohesive solution.

The basis for improved collaboration is a single source of design data that contains schematics, simulations, PCB layouts, BOMs, manufacturing files, and so on. Teams have been sharing these files for decades; however, as mentioned, the traditional way of sharing of information is ad hoc, disjointed, and multi-sourced, and therefore susceptible to persistent inefficiencies. Accumulating throughout the product creation process, these inefficiencies—in the form of time delays from process or human error—lead to respins and negative impacts on development budgets, revenue, and gross margins.

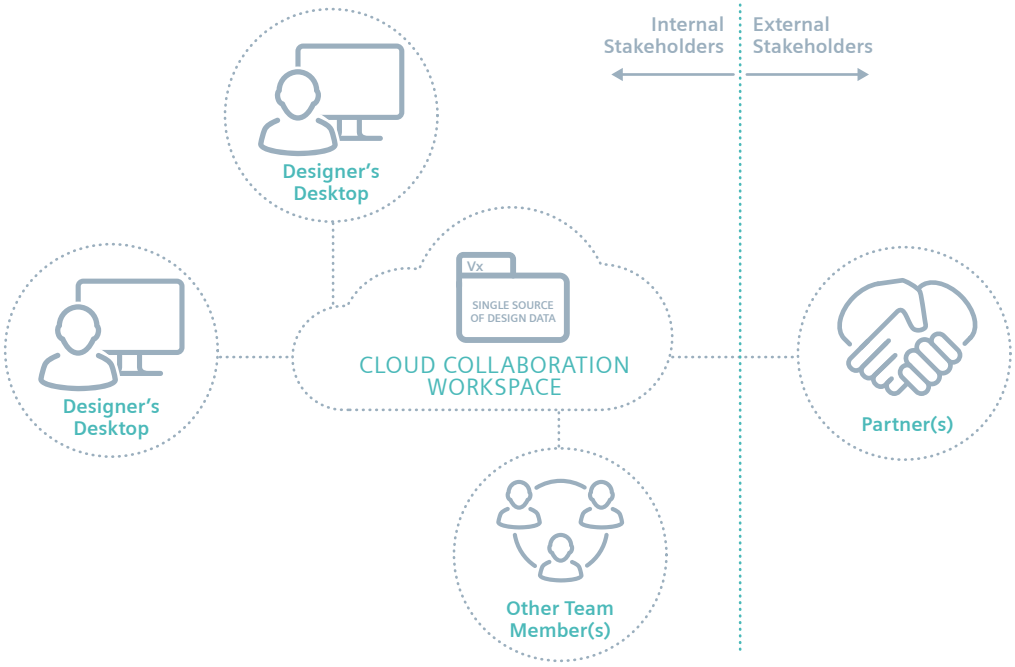

Figure 2: The cloud is the hub for storing, organizing, managing, and sharing design data.

Conversely, the cloud represents the perfect hub for organizing and managing design data. Anywhere, anytime, team members have access to the latest design revision.

With the single source of design data in a designated cloud workspace, it's much easier for extended teams to collaborate, whether they work remotely or not. There are many ways a team might choose to collaborate in the cloud; we will summarize three real-world scenarios that best-in-class collaboration hubs need to support in order to prevail over product, process, and organization complexity:

1. Design Collaboration
2. Team Collaboration
3. Partner Collaboration

Design collaboration

It's very common for hardware development teams to include individuals with differing skills sets and expertise working on different aspects of a single design. Whether the design work is divided among a small number of engineers charged with multiple tasks or across a large group of dedicated specialists, the team must develop and share data about digital circuitry, analog mixed signal components, power management architectures, and if applicable, the RF section of the design. Many design teams may also have an individual who specializes in PCB layout. Regardless of how the design aspects are divvied up, the various team members need to work together as a whole during design integration and PCB implementation. The cloud workspace acts as a hub to facilitate this collaboration process and must possess the flexibility to scale to the size and needs of any company —from small-to-medium business to global enterprises.

Figure 3 depicts a simplified scenario: a team made up of two members, Jennifer and Bob. In reality, Jennifer and Bob both represent many engineers or specialties.

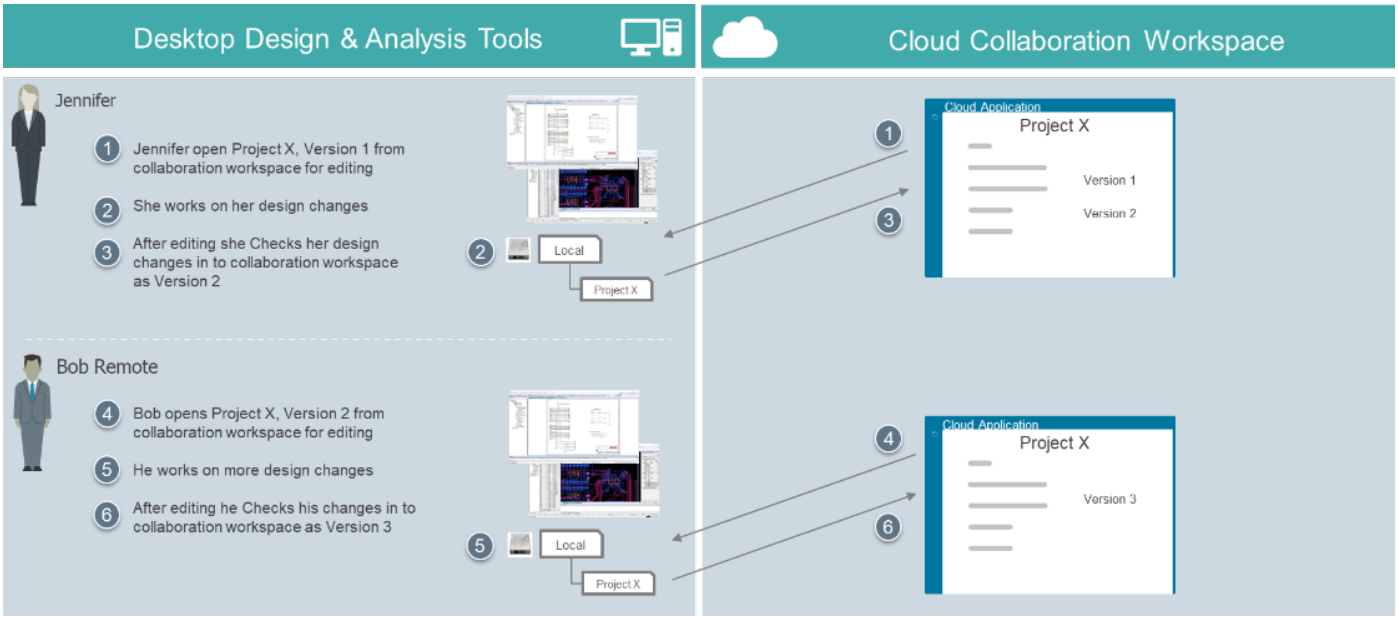

Figure 3: Design collaboration.

As Jennifer makes changes to the design utilizing her desktop tools, she can check the updated design back into the collaboration workspace with a new version. Bob then checks out the design to work on more design changes, then checks it back in as a new version. There are no files to email, no searching for the latest design revision. The important thing is, no matter what the division of labor across the design team, Jenifer and Bob always have access to the right data at the right time.

Team collaboration

Design teams don't work in isolation. Team collaboration in this context designates collaboration that spans across teams within a company.

Many functional stakeholders within an organization bring a single product to market. Unfortunately, often invisible silos exist that impact efficiency. An effective collaboration workspace needs to account for the broader team and remove the silos that impede forward progress.

In Figure 4, Jennifer represents the design team, but there can be any number of "collaborators" in an organization that Jennifer needs to work with before a product is released. One of those collaborators, for example, may be in procurement. With the single source of design data in the cloud, Jennifer can easily add the procurement person to the collaboration workspace and then share, for example, the BOM to give the procurement team member the ability to get an early start on pricing, availability, and BOM health. Another collaborator might be from the mechanical team working on the enclosure. Again, Jennifer can easily share the latest version of the design with the mechanical engineer so there is consistent eCAD-mCAD collaboration. The power lies in the whole team having access to the single source of design data and utilizing the cloud workspace as their collaboration hub.

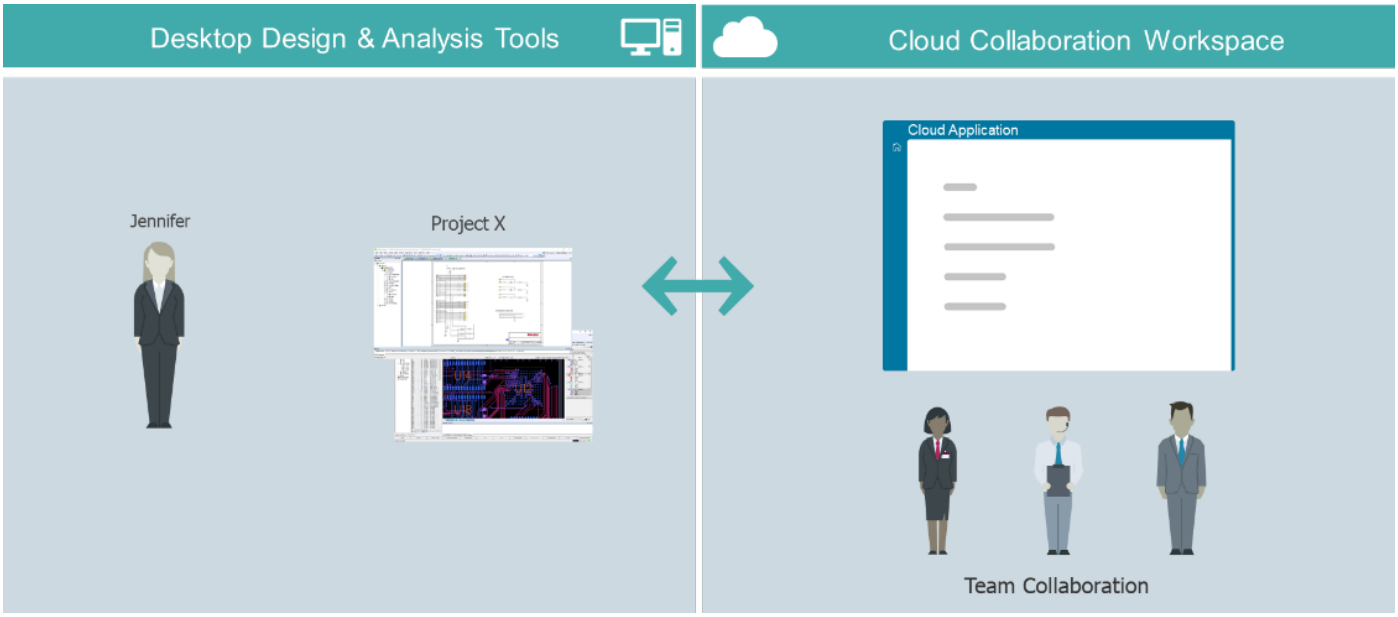

Figure 4: Team collaboration.

Partner collaboration

Partner collaboration extends the hub out to the inter-company level, spanning across collaborating companies. The same collaboration workspace that worked so well intra-company for team collaboration can be extended to support third-party partners. The circuit design phase of the product's development may be completed in-house, but maybe the PCB layout is outsourced to a service bureau partner. Or if the PCB design is complete, the final assembly may be done by an EMS partner. The ability to eliminate handshake errors in these interfaces with external partners is critical to meeting product release dates and market windows for any electronic product. By utilizing a common collaboration workspace, everyone is on the same page at the same time. There is nothing lost in transmission.

Qualities of a best-in-class cloud based collaboration hub

So what should you look for in a cloud based hub for design, team, and partner collaboration?

Role-Based User Management

Clearly, with potentially many individuals connecting to the collaboration workspace, controls need to be available to protect design IP from a mistaken use case. Said a different way, not all collaborators may be equal. For example, although a procurement person may have an engineering degree, you may not want them to have privileges allowing them to edit the PCB design posted in the collaboration workspace. And an owner/author of multiple designs may want to share separate, independent designs with different sets of collaborators. This is why role-based access control is a crucial capability for completely safeguarding secure access to design data. The owner of a design can invite any number of individuals as collaborators to a given project and assign each individual a role. For example, some may be assigned an "edit" role, others may be assigned "view only."

More Work, More Joules

Simple project data management is a fundamental expectation for any collaboration workspace. Design authors publish the latest design data to the cloud and make it accessible to other stakeholders on the team, both internal and external. On its own, this baseline capability has tremendous utility by reducing the common inefficiencies and process or human error that delay projects; for example: the PCB layout was done on the wrong version of the design, or the latest FPGA section of the design is missing from the network share drive for the project—and design review is in one hour!

The more work that can be done on a single source of design data, the more potential energy, in the form of team productivity, can be derived from the collaboration workspace. For example:

Adding visualization and markup capabilities to the collaboration workspace makes the design review process much more productive. The broader design team can easily view the schematic and 2D layout simultaneously within the collaboration hub. The ability to cross-probe helps anyone on the collaboration team identify and hone in on sections of the design under review. The ability to add annotations and markups further documents the collective feedback, thus archiving design review guidance and next steps.

Consistent and inclusive communication among team members is crucial to keeping everyone on the same page. Doing this effectively, though, takes time and you have to remember to include everyone on the team. Have you ever forgotten to include someone on an email thread or meeting invitation? Happens all the time. This is why most companies have invested in productivity tools like Microsoft Teams or Slack to keep organizations synchronized, especially when working remotely.

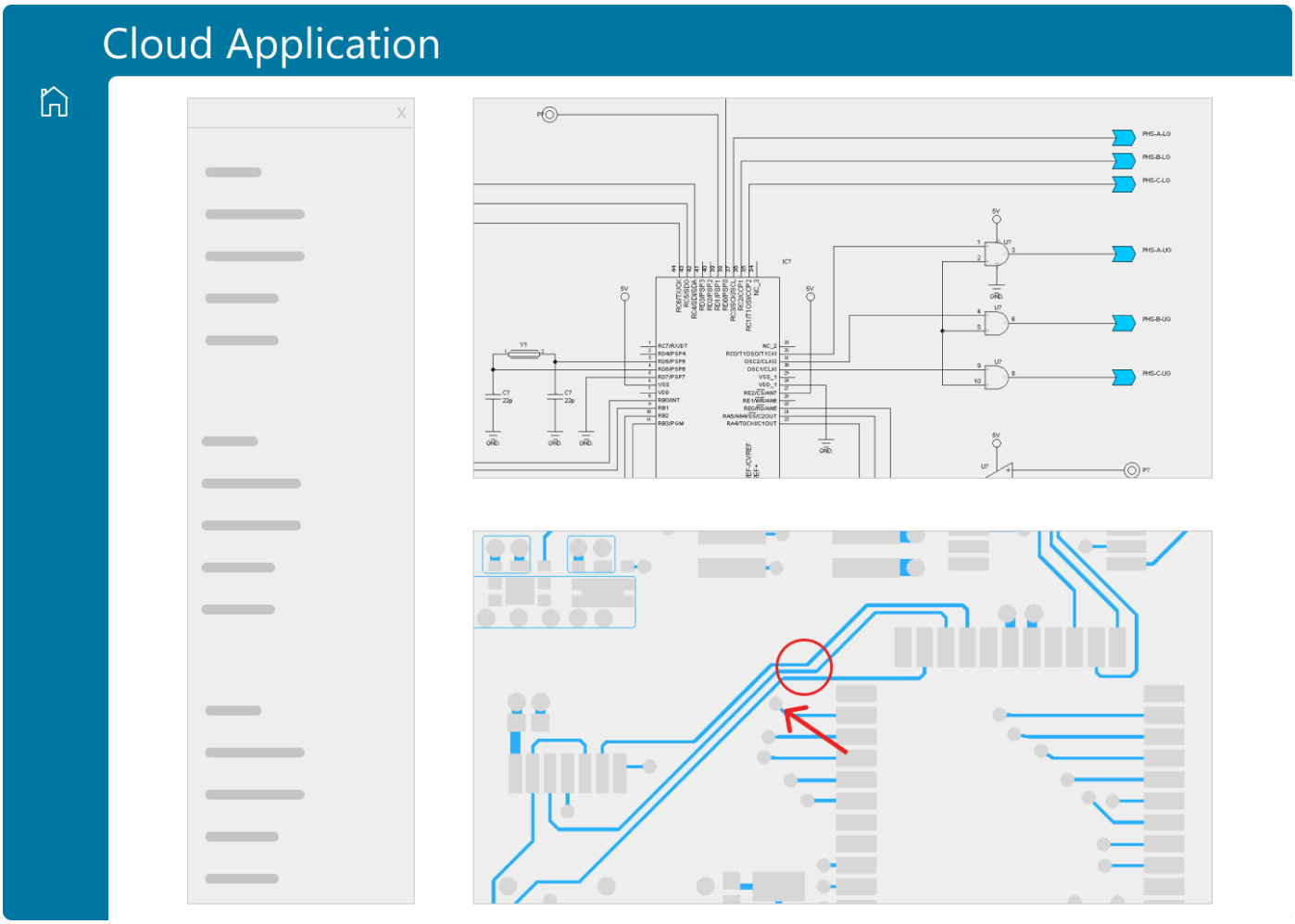

Figure 5: Visualization and markup log.

An effective collaboration workspace for electronics design should seamlessly integrate with these popular tools to take full advantage of all modes of team communication. For example, when Jennifer uploads a new design revision to the collaboration workspace, email alerts should be sent to the team participants listed as collaborators on the project. Likewise, alerts should also automatically be sent to the Teams or Slack channels inclusive of the same list of collaborators on that project.

Collaboration workspaces are indispensable for all the reasons stated above, yet the entire team can benefit from other important utilities if the collaboration hub supports additional value-added services. These are services that allow more work to be done on the single source of design data without ever leaving the collaboration workspace. These services are meant to complement the connected desktop environment by adding productivity elements. For example, the ability to manage a shared library amongst the team within the collaboration workspace keeps the team focused on designing great products rather than tracking down needed components.

In addition, the following services build confidence (without risk) in the underlying design's readiness for successful production release:

- BOM optimization: cost analysis and assessment of BOM risk
- DRC: running a design rule checker on the design gives confidence in electrical integrity
- Automated schematic integrity analysis: eliminates schematic design errors not visible during a manual check
- DFM: bringing forward manufacturing knowledge into the design domain highlights errors before they become problems

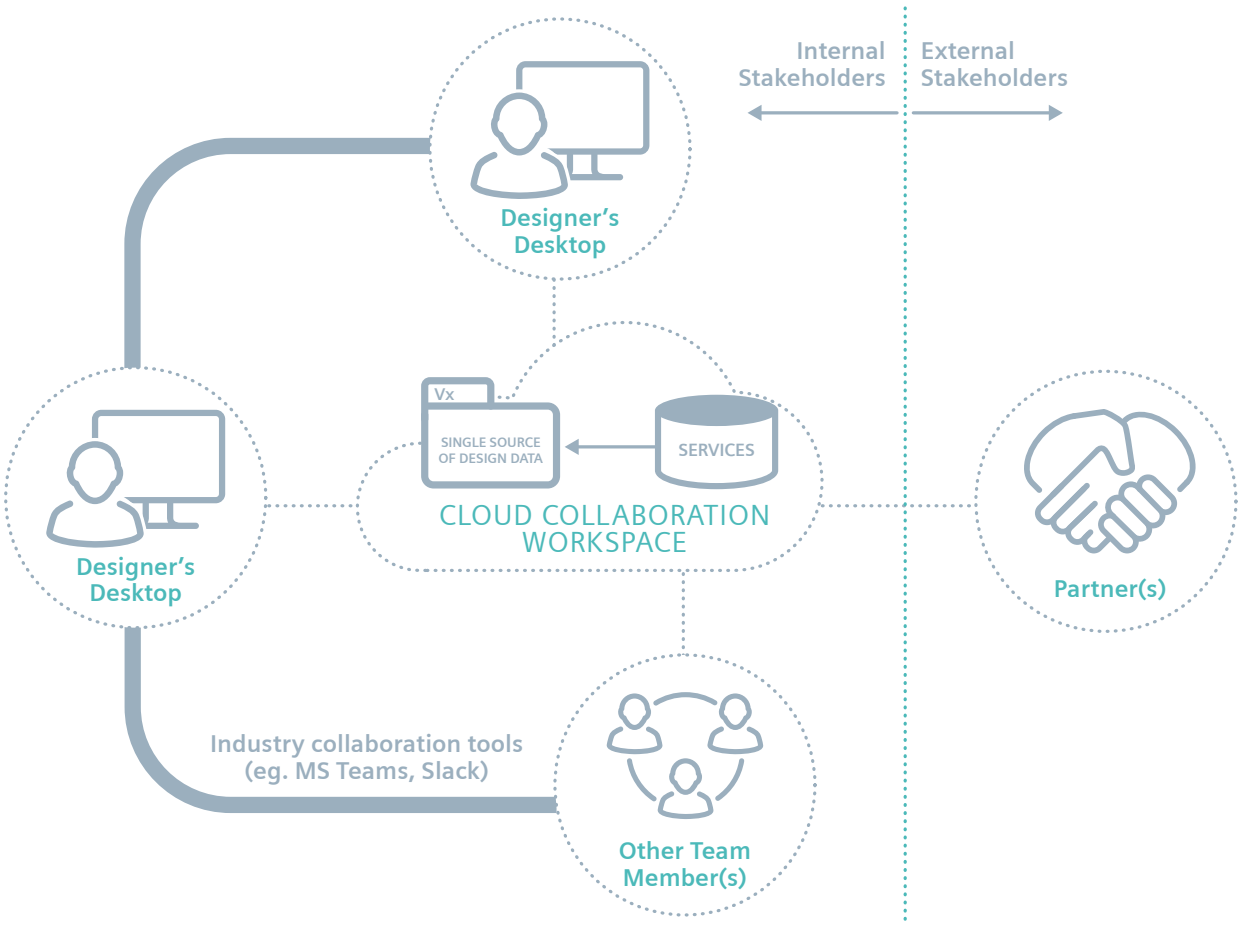

Figure 6: Additional value-added services allow more work to be done on the single source of data without leaving the collaboration workspace.

Succeeding in a complex world

Today, Siemens EDA, a part of Siemens Digital Industries Software, delivers industry-best electronic systems design solutions for companies of all sizes—from engineering professionals and small design teams all the way to global enterprises. No matter the flow, a collaboration layer that connects teams in a common productivity environment based on a single source of design data is critical. Together with our enterprise solution, the cloud offers a new transformative option for teams wanting a hub for collaboration that enhances the power of the on-premises desktop environment.

Expectations for design teams to deliver tomorrow's products today demand collaboration tools that go beyond makeshift or ad hoc approaches by delivering solutions geared to the challenges extended teams face. Siemens EDA envisions a collaboration hub that heterogeneous teams (including internal and external stakeholders) can depend on to collectively innovate and take successful products to market on time and on budget. Further, such a collaboration solution must be an integral element to a fully integrated ecosystem solution that focuses on electronics design acceleration.

Nobody knows where the currents of time will take electronic systems design; our goal is to get you there fast, with smooth sailing along the way.

References

1. M. Walsh,"Lost in cloud? Siemens shows the way" https://resources.sw.siemens.com/en-US/white-paper-lost-in-the-cloud

Siemens Digital Industries Software

Headquarters
Granite Park One
5800 Granite Parkway
Suite 600
Plano, TX 75024
USA
+1 972 987 3000

Americas
Granite Park One
5800 Granite Parkway
Suite 600
Plano, TX 75024
USA
+1 314 264 8499

Europe
Stephenson House
Sir William Siemens Square
Frimley, Camberley
Surrey, GU16 8QD
+44 (0) 1276 413200

Asia-Pacific
Unit 901-902, 9/F
Tower B, Manulife Financial Centre
223-231 Wai Yip Street, Kwun Tong
Kowloon, Hong Kong
+852 2230 3333

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