

America Makes Transforms the Additive Manufacturing Industry and Saves Millions on AWS



“Had I tried, on premises, to do what we’re doing with Teamcenter on AWS, I would have needed at least 10 additional people on my team. Using Teamcenter on AWS has enabled us to keep our internal team small and focused on new value-added projects.”

— Joe Veranese, business systems director at NCDMM

Bringing the Private and Public Sectors Together to Drive Additive Manufacturing

By taking advantage of additive manufacturing (AM), a process that creates a physical object layer by layer from a digital design, products are created with greater specification and more efficiently compared to traditional methods. Bringing organizations together to take advantage of AM increases the possibilities for innovation and problem solving across industries. America Makes helps a growing group of public- and private-sector stakeholders collaborate and connect the dots to solve problems and discover new opportunities by driving additive manufacturing into the US manufacturing base.

“Our mission is to help manufacturers solve material specification and design specification problems using advanced manufacturing, specifically through design for additive manufacturing practices. The America Makes member community forms our core,” says Joe Veranese, business systems director at NCDMM. “We solve problems by bringing together stakeholders from academia, private industry, maker community, and government to help them structure a project team to craft a solution, solve a problem, build, and deliver a finished component to meet broader manufacturing needs.”

The organization’s formal [Additive Manufacturing Technology Development Roadmap](#), developed to identify measurable and meaningful challenges that, when met, promote inquiry, knowledge-sharing, and technical advancements across the industry, is driven by its 230-member-strong community and \$180 million resource portfolio. Each member connects and consumes data through the America Makes Digital Storefront. Using the Digital Storefront, members can identify, access, and consume intellectual capital assets and connect to America Makes’ Technology Development Roadmap.

Given the expansive Roadmap and list of projects undertaken, abundant amounts of data are collected, connected, secured, shared, and accessed across project participants and the broader member community. As the organization and its member community grew, scaling to meet its data needs became a hurdle.

“We originally stored our data for the Digital Storefront in a raw, hard-to-consume form with a backend login to a website, hosted with a small hosting company,” says Veranese. “This approach quickly became unmanageable and inefficient. We knew we needed a better short- and long-term solution.”

About America Makes

As the national accelerator for additive manufacturing (AM) and 3D printing (3DP), [America Makes](#)—driven by NCDMM—is a collaborative partner in AM and 3DP technology research, discovery, creation, and innovation.

Challenge

America Makes brings stakeholders together to advance the additive manufacturing industry through its Digital Storefront. As the organization grew, scalability and data management became unmanageable in the organization’s on-premises hosting environment.

Solution

The organization chose to build its new Digital Storefront environment on AWS. America Makes also decided to implement the Siemens project lifecycle management (PLM) Teamcenter solution to enable its users’ easy access to data management, collaboration, and visibility throughout a project’s lifecycle.

Benefit

Using Teamcenter on AWS, America Makes estimates it has saved around \$30 million compared to if it had built a similar on-premises solution or implemented another PLM solution in-house. The team has been able to stay small and agile and focus its efforts on value-added projects that continue to transform the additive manufacturing industry.



Addressing Data Security and Scalability

[Siemens PLM Software](#) is a member of the America Makes community, and the America Makes team interfaces regularly with the Siemens PLM business unit, a division of Siemens and an AWS Partner Network (APN) Advanced Technology Partner and Industrial Software Competency Partner. The Siemens PLM team understood the mission of the organization and the role technology could play in optimizing the project management and Digital Storefront user experiences. The company began to work with Veranese to envision a new solution for the America Makes Digital Storefront. Siemens PLM recommended America Makes evaluate its product lifecycle management (PLM) Teamcenter software solution and AWS.

“We evaluated the Teamcenter solution and felt it could work for our organization, but we knew we needed to create an easy way for it to interact with users. We needed to use a web interface,” says Veranese. “Luckily, Siemens PLM had just launched its Active Workspace Client, a web interface for its Teamcenter environment that gave us the means to connect all of our data, along with easy-to-use access to all the connected pieces for a project and viewing in a manner that made sense.”

After deciding to move forward with Teamcenter and use the Active Workspace Client, Veranese and team then made a choice to host the Digital Storefront on AWS. “We weighed on-premise solutions and the cloud, and in the end, the cloud was the obvious choice. Being a government-sponsored organization, the AWS GovCloud (US) Region was the only environment that could meet our strict hosting security requirements.”

Starting from Scratch to Build and Deploy Siemens Teamcenter

America Makes chose to start fresh on AWS and worked with the Siemens team to build and deploy the new system and environment. “The system was configured in six to eight weeks,” says Deanna Thomas, solutions architect for Siemens PLM Software. “We began by completing a requirements-gathering workshop to understand use cases and requirements for America Makes, and development and production environments were then set up on AWS.”

“Siemens PLM was invaluable in helping my team get up-to-speed with setting up and using the Teamcenter application instances on AWS and making it as automated as possible,” says Veranese. “Siemens has and continues to be a great partner to us from a sales, education, support, and services perspective.”

Security is crucial to the success of the Digital Storefront and was top-of-mind for all parties during the build and deployment. The Teamcenter software is certified on AWS and adheres to the AWS Well-Architected Framework, with AWS security best practices at its core. For example, Teamcenter encrypts America Makes' information both at-rest and in-transit. “From a hosting perspective, AWS meets and, in many cases, exceeds our security and compliance requirements,” says Veranese. The company is currently using 11 Amazon Elastic Compute Cloud (Amazon EC2) Instances, specifically m3.xlarge, m1, and t1 Instances as well as Amazon Simple Storage Service (Amazon S3) to store millions of project artifacts and assets.



Saving Millions of Dollars and Employee Time

Since the Teamcenter implementation in 2014, Veranese estimates that America Makes has saved around \$30 million compared to building an in-house solution or using another PLM-like system running in an on-premises environment.

“Had I tried, on premises, to do what we’re doing with Teamcenter on AWS, I would have needed at least 10 additional people on my team,” says Veranese. “Using Teamcenter on AWS has enabled us to keep our internal team small and focused on new value-added projects.”

Using Teamcenter on AWS, data has become far more consumable by stakeholders within the America Makes organization and its member community. “Being able to quickly connect the data using Teamcenter, make the data consumable through the UI, and make it easily available and managed in Active Workspace is the definition of success for us,” says Veranese. “We can do all of the great work in the world, but, if we can’t get the information available to be consumed by our stakeholders, then it becomes somewhat useless. We are empowered using Teamcenter on AWS.”

America Makes continues to work closely with the Siemens PLM team and has built a strong ongoing relationship with teams at AWS. “The support team at AWS is the best support team I’ve ever dealt with,” says Veranese. “The response time has been amazing. We get easy-to-follow answers quickly. I believe AWS Support and the broader AWS solutions are market leading.”

The organization continues to break new ground with AWS and has begun to run training classes for design for additive manufacturing across Europe and the US for both government and commercial members, using Amazon Workspaces to provide a seamless bring-your-own-device option for attendees.

Planning for a Data-Driven Future

The Teamcenter implementation has worked so well for America Makes that other governmental organizations are beginning to explore how they can take advantage of a similar solution. “Through the successful development of the Digital Storefront on AWS, the government has looked to move and implement our solution across all 15 Department of Defense (DoD) organizations,” says Veranese.

For the next phase of the Digital Storefront enhancement, Veranese is working with Siemens on setting up a new instance in AWS to host a Tableau server and pull insights and visualizations from its database. America Makes is also beginning to explore how it can use predictive analytics tooling to drive efficiencies and opportunities for members as they connect to the Technology Development Roadmap. “The potential impact predictive analytics could have on our Technology Development Roadmap is really exciting,” says Veranese.

SIEMENS
Ingenuity for life

Siemens PLM Software, a business unit of the Siemens Digital Factory Division, is a leading global provider of software solutions to drive the digital transformation of industry, creating new opportunities for manufacturers to realize innovation. With over 140,000 customers worldwide, Siemens PLM Software works with companies of all sizes to transform the way ideas come to life, the way products are realized, and the way products and assets in operation are used and understood. For more information on Siemens PLM Software products and services, visit www.siemens.com/plm.

aws partner
network

Advanced
Technology
Partner

Learn more at <https://aws.amazon.com/partners/>