



## OVERVIEW



<https://www.d-matrix.ai/>

d-Matrix, a start-up with a mission to build and deploy the world's first brain-inspired AI compute engine for a broad class of inferencing workloads, was preparing to prototype a first-of-its-kind semiconductor from the ground up. The team wanted to hit the ground running and get their first chip taped out without the hindrance of designing an on-prem IT environment. The company decided that it wanted to use Azure as the backbone of its IT environment and approached Six Nines about creating an interface layer to access its resources efficiently, reliably, and in a way that would scale with it as the business grew. Together, the partners got to work, and d-Matrix taped out its first chip entirely on the Azure cloud.

## CHALLENGES

The purpose of d-Matrix's new Azure environment would be to build their first silicon – a challenge that becomes very data and compute-intensive, especially towards the end as the design matures. d-Matrix wanted to make their suite of Cadence design tools available across their company with scalable computing and storage resources available as needed and without any downtime. Additionally, the company was concerned about unforeseen and surprise costs by engineers who may lose control of cloud spending – having seen this issue create problems in the past. With these challenges in mind, d-Matrix was interested in finding a partner who could architect and configure an environment that would get them working on their prototype in the fastest, most efficient way possible.

## SOLUTION

Six Nines conducted a consultation with d-Matrix, making a full discovery of needs using the Six Nines Cloud Adoption Framework (CAF) to map out the extent of what would be needed to get the project up and running. With a deep background in cloud implementations that require processing at the High Performance Computing (HPC) level, Six Nines has considerable expertise in developing scalable environments for compute-intensive workloads, including EDA and CAE solutions like those from Cadence Design.

Six Nines used its broad-based cloud expertise, including extensive experience with Azure, to implement a best-in-class solution for creating a design and testing workflow in Azure, empowering d-Matrix to access all of the Cadence and TSMC libraries. With limited resources and a desire to stretch the budget as far as possible, the environment employed 20 terabytes of storage built using ZFS, where everything was stored, including snapshots and back-ups of all their critical files. By leveraging the low latency and high I/O premium SSD disks, a high-performant file server was also created using the latest VM instances available, giving the company plenty of performance storage to grow into.

Six Nines incorporated Azure's CycleCloud, an enterprise friendly HPC cluster and workload management tool for orchestrating and managing Azure HPC environments. With CycleCloud, d-Matrix can efficiently and intuitively administrate its environment, creating, managing, and scaling HPC clusters, scheduling jobs, and more. The company is able to use CycleCloud to launch multiple worker nodes via Azure ScaleSets providing increased capacity with minimal waiting time.

Surprises are eliminated by providing role-based access to its users and provisioning its resources to keep costs under control with cost alerting, cost controls, and performance monitoring.

*“We have been executing a very aggressive schedule and it was clear very early that Six Nines had the expertise to get us up and running very quickly. The project managers we worked with were thorough and diligent, providing us with a headlights view of the build and responding very quickly to any issues that cropped up. Our compute requirements are elastic and at the tape-out stage requires a massive amount of compute, but with the help of Six Nines and Azure, we were able to get a rock solid, scalable environment up and running and taped out our first chip within 14 months of being founded.”*

**- Sudeep Bhoja, Co-founder and CTO, d-Matrix**

#### AZURE SERVICES USED

- Azure
- Azure CycleCloud
- Azure ScaleSets
- Azure Shared Image Gallery
- Azure Active Directory
- Azure Spot Instances
- High performant ZFS Filer using many Azure Premium Disks

#### SIX NINES EXPERTISE

- High Performance Computing (HPC)
- Electronic Design Automation (EDA)
- AI/ML
- DevOps
- Security
- Security, Cost Optimization and Governance

### RESULTS

Ultimately, it took less than three months to implement the objectives outlined in the initial CAF plan. With the environment up and running, d-Matrix was able to make strides very quickly, getting their chip taped out in 14 months and providing the start-up with a platform for developing with the full host of tools for its AI inferencing accelerated computing platform (including the semiconductor and subsystems).

The company was able to provide their engineers access to all the data needed at any time, without interruption. What’s more, using CycleCloud, they optimized their usage as they scaled up and down to meet the requirements of each job. The company says that it has experienced no downtime and is impressed with its ability to add more resources to its system within minutes with a ‘few clicks.’

*“Azure provides a performant, scalable, reliable and cost-efficient platform for chip design. We have worked closely with Six Nines to strengthen their ability to support the unique needs of silicon customers. Together, we are pleased to enable the mission critical needs of d-Matrix for their full chip design on Azure and congratulate them on a successful first tape-out!”*

**- Mujtaba Hamid, Head of Silicon and Electronics Industry, Microsoft**

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### WHY SIX NINES?

Six Nines is a Microsoft Partner Network (MPN) consulting partner and has undertaken a rigorous and auditable approval process to earn the Silver Competency, held by only the top Microsoft partners worldwide. Six Nines is recognized for their deep technical cloud excellence, solidifying customer relationships, and offering innovative and effective business solutions. Six Nines has successfully migrated hundreds of customers across multiple industries to the cloud and offers an unparalleled combination of speed, agility, experience, and proprietary solutions to deliver rapid time to value.

