

JARVICE™ and Nimbix Cloud accelerate Maja Systems' launch of the world's first surface-mount millimeter-wave antenna



“We needed to get as many gigabits of data transport as possible per square millimeter of planar area for the antenna. We needed HPC cloud infrastructure to run simulations that eliminated the need for millions of dollars’ worth of test equipment. Nimbix had us up and running in three days. We were able to develop our new antenna faster, and we already have interest from multiple customers.”

John Sevic
VP of Engineering,
Maja Systems

INTRODUCTION

Silicon Valley startup Maja Systems is made up of experts in microwave and wireless technologies, many of whom worked together before starting the company. Much of the work is electromagnetic simulation of millimeter-wave (mmW) antennas, designing mmW interconnect and radiating systems for automotive and data-center gigabit transport applications.

This year, Maja launched the world's first surface-mount mmW antenna, which offers several advantages over the conventional planar antenna. This product will allow the company to be a serious competitor in the field, with tier-one customers already evaluating samples for automotive and data center applications.

But accomplishing that feat in the span of a year had its challenges. The complex data simulations required for millimeter-wave design often have a mesh cell count in the tens of millions, which require the power and speed hundreds of cores to complete in a timely fashion. That's why Maja Systems needed the resources of an HPC partner like Nimbix.

CHALLENGES

As a technology startup, Maja Systems needed to maximize its return on investment, and using simulation software was a more cost-effective and rapid method of designing its mmW antenna technology than purchases extensive test equipment which would have to be maintained by its staff. However, to provide optimal design, Maja needed results with higher resolution than was possible with traditional in-house computers, and it needed to run simulations within hours, not days. That meant Maja needed a HPC computing infrastructure—yet another thing its staff hadn't the time nor expertise to manage.

John Sevic, VP of Engineering at Maja Systems, says to get the largest incremental return, it's critical his engineers focus their time and resources on doing what they do best: designing products that will bring in revenue. Sevic needed a partner that could maintain the HPC servers, install hardware and software upgrades, manage the software licenses, and provide fast technical support—so his engineers could focus on designing.

TECHNOLOGY USED

Maja's workflow consists of on-site software front-end visualization based on the results of simulations done using the HPC resources of the Nimbix Cloud. The engineers employed both FEM and FDTD formulations, using both CPU-centric and GPU-centric processing, typically requiring several hundred gigabytes of memory. Nimbix had the dual K80 GPUs Maja needed for mmW antenna simulation and data visualization.

While designing its mmW antenna, Maja engineers used Nimbix's HPC cloud infrastructure to accelerate CST EM field simulations, decreasing its cycle time and reducing the number of iterations required to deliver product. It also ran enterprise-class applications specifically for electromagnetics which computationally solve Maxwell's equations. The JARVICE dashboard enabled them to upload files to the cloud, run the simulations with a single click, then download files and perform data digitalization locally. As a result, engineers could test and evaluate designs quickly and move on to the next one.

ENGINEERING SOLUTION

After outsourcing HPC computing infrastructure to Nimbix, the Maja engineers significantly reduced turnaround time on the EM simulations and analyses necessary in determining the optimal configuration for the mmW antenna. The world's first surface-mount mmW antenna, Maja's design utilizes a smaller surface area to get the same electrical performance as a larger planar antenna. The mmW antenna has these additional advantages over a standard, larger planar antenna:

- Higher gain in smaller area for equivalent planar antenna.
- Circular polarization with wideband axial ratio.
- These and other properties make the antenna applicable to a wide range of purposes, among them self-driving vehicles and data center gigabit communications.

BENEFITS

Nimbix hosts Maja's enterprise class EM software and licenses, and the Nimbix support team handles maintenance and upgrades, as well as managing licenses. Nimbix also provides Maja responsive tech support, often within minutes, and even anticipating software support and license management before it's requested. This lets Maja's engineers spend their time and resources on product design and testing, rather than infrastructure management.

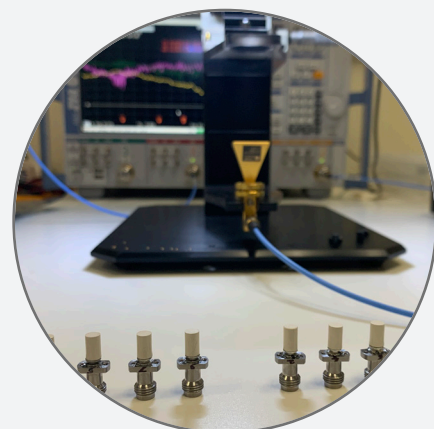
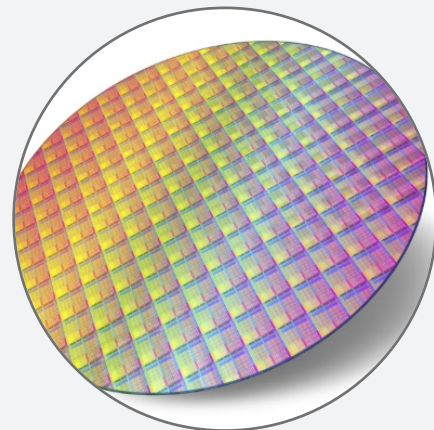
As a result, Maja has seen a higher level of confidence and technical credibility from their customers. "Engineers are generally very skeptical, so when you can show them the CST simulation results quickly, they love it," says Sevic. With Nimbix, the team has been able to meet customers' tight deadlines and delivery schedules, get samples into their customers' hands sooner, and deliver a better product in less time.

"Nimbix's HPC resources have created a monumental shift in terms of how we can compute and the products we can design," says Sevic. "The platform's cost-effectiveness, ease-of-use, and sheer speed have accelerated the development of our all-new mmW antenna, which makes us a serious contender in the marketplace."

COMPANY DESCRIPTION

Maja Systems is a Silicon Valley start-up that designs mmW interconnect and radiating systems for automotive and data-center gigabit transport applications. Maja delivers gigabit wireless interconnectivity systems to enable new applications of mmW technology for untethering the conventional interconnect. Maja's goal is to open up new markets where such advanced technology has not been accessible before. With a fundamentally different approach to millimeter-wave design, Maja's goal is to make this technology manufacturable, cost effective, and accessible to new markets.

This year, Maja launched the world's first surface-mount mmW antenna, offering several advantages over conventional planar antenna. The company has received positive feedback from tier-one customers evaluating samples for automotive and data center applications and expects growth in 2020.



Maja Systems used JARVICE and the Nimbix Cloud to design the world's first surface-mount millimeter wave antenna.