TOYOTA MAPMASTER INTEGRATES DIGITAL MAP PRODUCTION SYSTEM AND ACCELERATES HIGHLY PRECISE, DATA INTENSIVE MAP INFORMATION

HPE 3PAR StoreServ all-flash array adopted with HPE GreenLake monthly IT consumption model

Toyota Mapmaster, who builds advanced map database used for Toyota brand car navigation system and other road traffic systems, has refreshed and integrated IT infrastructure of their “Map Production Core System” and “Differential Map Production System” that play the key role in digital map production. The integrated storage environment based on HPE 3PAR StoreServ all-flash array realizes high-speed online batch processing contributing to increased productivity in map development, and supports highly precise large volume map information. Noteworthy is the monthly fixed rate for IT infrastructure equipment realized by adopting HPE GreenLake.
“Batch process that required about five hours can now be done in just one hour, and the time needed to replicate map data for delivery has been reduced to about 1/3”

– Masayuki Yurimoto, Director, TOYOTA MAPMASTER INCORPORATED

**Toyota Mapmaster**

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**CHALLENGE**

**Rapidly advancing map database to the mobility information infrastructure supporting autonomous driving**

Toyota Mapmaster is a mobility information infrastructure provider that structures advanced map database utilized in Toyota brand car navigation system and road traffic systems. In pursuit for accuracy and freshness of the map information service, Toyota Mapmaster conducts detailed investigation of about 530,000 intersections, buildings, facilities, topographical changes, and immediately reflects the changes in the map database.

“As CASE (Connected, Autonomous, Shared, and Electric) attributes, the automotive industry is facing once-in-a-century changes,” says Masayuki Yurimoto, Director at Toyota Mapmaster. “Our challenge is to create new customer value by adopting advanced technologies such as AI and Big Data analysis expanding on our know-how in developing high-quality, high-precision, and highly-fresh map database.”

Role of the map database is not limited to displaying position and route guidance but is expanding to “Mobility Information Infrastructure” to realize safe driving support, autonomous driving, and MaaS (Mobility as a Service). The evolution to a business model providing services by collecting, analyzing, and integrating various information and contents real time is the core of Toyota Mapmaster growth strategy.

“In addition to static information, a large volume of constantly-changing dynamic information needs to be handled. In ensuring both precision and freshness at maximum level, the importance of the system supporting the map database will increase further,” says Yurimoto.

In 2018, Toyota Mapmaster updated the infrastructure of two systems, “Map Production Core System” and “Differential Map Production System,” that support the map database. The objective is to secure system performance and storage capacity required over the next five years, and to maximize return on investment.
Case study
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Industry
Map Information Service

SOLUTION

Mission-critical system supporting map data editing and updating services
Mission-critical system supporting map data editing and updating services

The map database of Toyota Mapmaster manages vast amount of data in hundreds of variations including over one million kilometers of road data, millions of regulatory data, and tens of millions of facility data. The “Map Production Core System” manages the entire production and updating processes of the map database, such as associating information on roads and peripheral facilities (landmarks, buildings, and tenants) collected through on-site investigation with location information. The “Differential Map Production System” supports online updating services of map data for the Toyota brand car navigation systems.

“As the world’s first map updating service, we started providing ‘Map On Demand’ differential maps for Toyota Motors in 2007,” says Tomoaki Kato, Senior Manager, Technical Development Dept., Toyota Mapmaster. “Our customers have been very satisfied with the ability to use the latest route search and guidance. A little while ago in March 2018, when Shin-Meishin Expressway opened between Kawanishi Interchange and Kobe Junction we delivered the new map data on the same day,” says Kato.

HPE, who built the system and manages operation of both the “Map Production Core System” and “Differential Map Production System,” set the following project themes in modernizing the infrastructure.

1. Integrate storage of both systems by adopting the high-performance all-flash array
2. Realize infrastructure cost leveling and streamlined accounting through the consumption model
3. Safe and reliable migration to the new system by HPE Pointnext Services most familiar with the system environment

“Integration of storage environment for the Map Production Core System and Differential Map Production System to simplify and compact the whole system was the big challenge we decided to take,” says Koji Takeo, Group Manager, Technical Development Dept., Toyota Mapmaster. “We aimed to achieve stability of the mission-critical environment, the core of our digital map business and further strengthen data protection.”

The primary storage newly adopted is “HPE 3PAR StoreServ 8400 all-flash array” equipped with four controllers and realizes 99.9999% continuous operation. The HPE Pointnext Services engineer team fully supported the infrastructure development and migration.

Adoption of high-performance HPE 3PAR StoreServ 8400 all-flash array

HPE 3PAR StoreServ 8400 all-flash array is the top-end of HPE midrange storage. Equipped with high-performance Intel® Xeon® Scalable processor. It has realized high IOPS performance and low latency unique to all-flash by connecting four controllers in a mesh state and actively operating them all.

“We ran performance and load tests with actual data at HPE validation center,” says Takeo. “The performance result of HPE 3PAR StoreServ after 2 weeks of validation is exactly what we get in the production environment. Batch processing which required about 5 hours completed in 1 hour, time required to replicate map data for delivery was reduced to about 1/3.”

The Map Production Core System integrates various databases including nationwide map survey information, map edit data, database to manage content from external sources, and database to manage data for delivery. In an environment where updates are repeated daily, reduction in time to replicate and remove data directly affects business efficiency and workload alleviation.

“Great achievement was seen right before completion of our large-scale revamping of the ‘Toyota brand navigation map software,’ which is conducted bi-annual,” explains Kato. “In preparation for deliverable data, batch processes for inspections and format conversions are executed in parallel at multiple departments. Acceleration of these processes, resulted in increased speed of the entire navigation map software production process.”

Integration of the infrastructure environment for the Map Production Core System and Differential Map Production System, has driven simplified and compact equipment configuration.

“In the new environment, servers, storage, and backup devices are stored in four racks quite spacious,” added Takeo. “The data center cost has been reduced to about 2/3, with reduction of the number of racks and power consumption.”

Data protection was also re-examined rigorously.
Customer at a glance

Hardware
- HPE 3PAR StoreServ 8400 all-flash array
- HPE 3PAR StoreServ 8200 hybrid array
- HPE StoreOnce 5100
- HPE BladeSystem

HPE Pointnext Services
- HPE GreenLake
- Professional & Support Services

Case study

TOYOTA MAPMASTER INCORPORATED

Industry
Map Information Service

“We aspire to maximize on our strength and expertise in map databases to advance as an authentic provider of mobility information infrastructure in this age of CASE. Advancement of autonomous driving technology has been remarkable. And we’re also seeing IT infrastructure operation greatly evolving towards autonomy.”

— Masayuki Yurimoto, Director, TOYOTA MAPMASTER INCORPORATED

“Snapshot is taken inside the housing of primary HPE 3PAR StoreServ 8400, and it is backed up to the secondary HPE 3PAR StoreServ 8200 using the remote copy feature,” explains Teppei Kasuya, Assistant Manager, Technical Development Dept., Toyota Mapmaster. “We also streamlined environment for the secondary backup to HPE StoreOnce. Now freed from tape media, backup operation has relaxed significantly.”

BENEFIT

Adoption of consumption model
Realizes cost leveling and streamlined accounting

Toyota Mapmaster adopted HPE GreenLake, a pay-as-you-go consumption-based IT solution for this infra revamp.

“Being able to go by monthly flat fee for consumption of IT infrastructure equipment allows us to curve initial implementation cost and level cost. The Resulting streamlined accounting has a significant meaning for us,” Kato praises. “The benefits of being able to optimize infrastructure investment according to business growth while maintaining the security of our data center is equivalent to the benefits of the public cloud.”

With HPE GreenLake, hardware assets such as storages and servers are owned by HPE, and user companies can install them in their own data center applying their own security policy. The pay-as-you-go consumption model allows mitigation of IT investment risks and reduction of TCO in an environment difficult to predict future resource requirements.

“We want to avoid spending so much time on disposal procedures of fixed assets,” says Takeo. “With migration to HPE GreenLake, the time and efforts can be eliminated.”

HPE Datacenter Care included in HPE GreenLake, has an HPE account support manager—an expert of the system environment, direct and provide proactive and reactive maintenance services.

“Now that the system configuration and operational status is shared, we are able to get support without spending hours analyzing failure logs,” says Kasuya.

“In addition to quick problem solving, the ability to address issues before it occurs is extensive. I’m looking forward to the advanced predictive analytics technology provided in HPE InfoSight for HPE 3PAR StoreServ, the servers and VM environment.”

HPE InfoSight available for HPE 3PAR realizes AI-driven operations. It analyzes and correlates millions of sensors from all of HPE globally deployed systems. HPE InfoSight continuously learns as it analyzes this data, predicts problems, resolves the issue and prevents other systems from experiencing the same problem. IT infrastructure management can become autonomous.

“We aspire to maximize on our strength and expertise in map databases to advance as an authentic provider of mobility information infrastructure in this age of CASE. Advancement of autonomous driving technology has been remarkable. And we’re also seeing IT infrastructure operation greatly evolving towards autonomy,” concludes Yurimoto. “I expect HPE to support our IT infrastructure with state-of-the-art technology like HPE InfoSight and high quality technology.”

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