



## Solution Brief

# NetApp for Internet of Things

Extending your Data Fabric from edge to core to cloud

### Key Benefits

#### Increase Operational Efficiency

- Connect field and plant operations to the enterprise
- Reduce unplanned downtime
- Increase production throughput
- Improve product quality
- Monitor conditions and use predictive maintenance

#### Reduce Complexity

- Increase automation
- Use virtualization to reduce IT footprint
- Improve software manageability

#### Enhance Security and Safety

- Leverage encryption, backup, and disaster recovery for better data protection
- Increase cyber-threat resilience
- Focus on environmental health and safety

### The Challenge

**The Internet of Things (IoT) offers the potential to realize significant business benefits, but it requires a fresh approach to data architecture**

The IoT is a network of connected devices and sensors to help build systems that can monitor, collect, and exchange data about the behavior of “things” such as industrial machines. Significant operational benefits can be achieved from the new insights derived from analysis of the data, either to guide real-time actions or to make accurate decisions based on historical data.

As the number of connected devices and sensors and the resulting data volume explodes, the landscape is shifting from a centralized model of client to cloud to a distributed compute model and the emergence of the intelligent edge within an edge to core to cloud architecture.

The IoT has potential across a wide range of markets, but the customers that might see the greatest benefits are in the industrial, surveillance, and autonomous vehicles market segments, and specifically in the following use cases.

#### Industrial IoT

- Real-time plant and field condition monitoring
- Data analytics to determine enterprise best practices
- Data and plant security, backup and recovery

#### Video Surveillance

- The camera as an object gateway with intelligent analytics
- Next-generation cloud virtual machine server (VMS)

#### Autonomous Vehicles

- Simulation and testing (including data mule)
- B2B vehicle data marketplace

These industries are going through major transitions, precipitated by an increased emphasis on efficiency, the need for integration of data, the digitization of processes. Their customers see the benefits in smart maintenance, better product design, improved customer satisfaction, increased revenues, and operational efficiencies. Although every customer’s situation is unique, there are some common themes to the challenges that they face:

- Rapid expansion of datasets – volume, velocity, and variety.
- The need for just-in-time analytics to inform real-time decisions and also to develop insights to guide broader operational and design decisions. This need extends to learning and adaptive autonomous algorithms.

- Complex data management – vast data footprint, data governance, and security, constrained by network bandwidth and costs.
- Balancing capital expenditures and operational expenditures, requiring a blend of on-premises and cloud-based approaches.

## The Solution

### **NetApp's approach to data storage and management maps extremely well to the emerging models of data architecture and processing in IoT**

NetApp® ONTAP® is a data management solution that spans the edge, core, and cloud and provides consistent overarching benefits:

- Data storage and movement, ensuring the right data in the right place at the right time
- Software-defined
- Data protection – backup, disaster recovery, archiving
- Data governance
- Security

NetApp has a range of products that can be combined to develop a solution for the customer, recognizing that the IoT workloads and desired outcomes can vary widely by customer and use case.

- At the edge, ONTAP and ONTAP Select help collect and aggregate data. A number of partners have certified their ruggedized compute platforms for use with ONTAP Select, providing an edge data solution that is capable of operating in harsh environments.
- At the core, in addition to ONTAP products, NetApp offers converged and hyperconverged products that provide both compute and storage capabilities to perform early analytics and compute on IoT datasets. NetApp Private Storage (NPS) allows you to maintain control over your data, while enabling fast access to cloud resources. Core offerings are designed to interact with the cloud, while meeting data sovereignty and company data privacy requirements.
- In the cloud, NetApp has partnerships with the major hyperscale providers such as Azure, AWS, and Google and offers solutions for NFS stores such as Cloud Volumes and management products such as OnCommand® Insight.
- NetApp Cloud Backup, StorageGRID® Webscale, and SnapMirror® offer backup and disaster recovery solutions.

All this constitutes a single, integrated platform with:

- Reliable compute and storage performance
- Data integrity, reliability, and availability
- Storage and transfer efficiency
- End-to-end data security

### **It is imperative for businesses of all types to embrace the potential of data and analytics**

Companies of all types are faced with a revolution in driving their businesses. Those that can collect, manage, and harness massive amounts of data have a huge advantage over their competitors. The IoT drives important business enhancements, such as:

- Improved service revenues and customer satisfaction through monitoring equipment in the field
- Better maintenance through predictive, prescriptive, and condition-based approaches
- Improved product design and customer satisfaction through feedback about needs
- Improved customer engagement and business development through analysis of the data on customer projects and competitors

However, these objectives can be achieved only with a well-defined data architecture and flexible infrastructure that can accommodate the velocity, volume, and variety of data. Much of the data growth is from unstructured sources such as images and documents. Millions of sensors drive data volumes at high speed. The data architecture must seamlessly encompass both on-premises and cloud environment. NetApp is the leader in this movement.

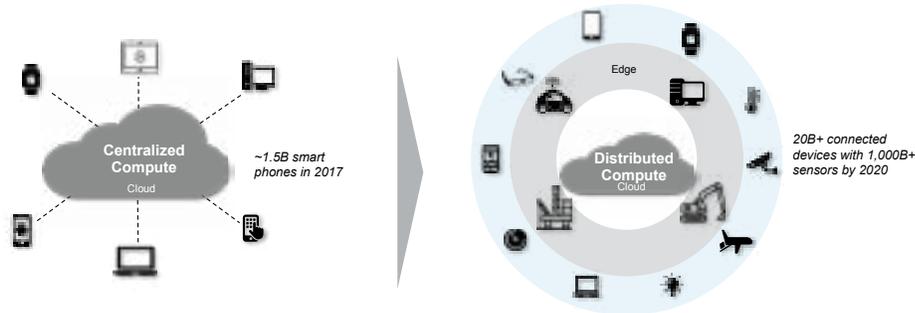
### **Leading companies in similar environments are making large investments in developing a data architecture to enable IoT**

Companies that develop data expertise can substantially outpace their competitors. The most valuable companies today are data-driven companies, such as Amazon, Google, Facebook, and Microsoft.

However, the availability of data affects the business models for established companies in the industrial world also. Companies such as Siemens, Honeywell, Pratt & Whitney, and others have notably commented on the new model for improved revenues and margins coming from services, which are demonstrably better than those for large equipment sales.

Markets like autonomous vehicles and surveillance are newly enabled by the large amount of “big data” that is available.

In all of these cases, leading companies are investing large amounts of resources in developing data architectures to help them realize the promise of a digitalization transformation and IoT. NetApp is uniquely positioned to provide important blocks of infrastructure and data management to help our customers implement their vision.



Centralized compute model has traditionally supported the mobile-cloud architecture (data flows between edge and cloud)...

... as the number of connected devices/sensors and data volume explodes, the landscape is shifting to a distributed compute model (intelligent edge)

Figure 1) The emergence of IoT data is forcing organizations to rethink their approach to enterprise data management. The remote operations environment requires a digitalization transformation roadmap that considers the unique requirements of the edge.

Source: PwC research, TechCrunch, Andreessen Horowitz, Gartner, Mary Meeker Tech Trends

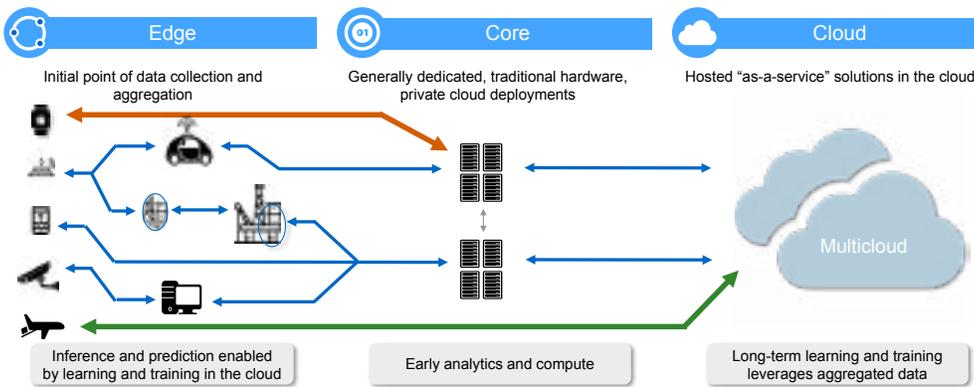


Figure 2) Emerging IoT data is being aggregated more and more at the edge, requiring new approaches for managing, analyzing, securing, and mobilizing this data as it makes its way through the corporate enterprise to all levels of decision makers.

Source: PwC research, TechCrunch, Andreessen Horowitz, Gartner, Mary Meeker Tech Trends

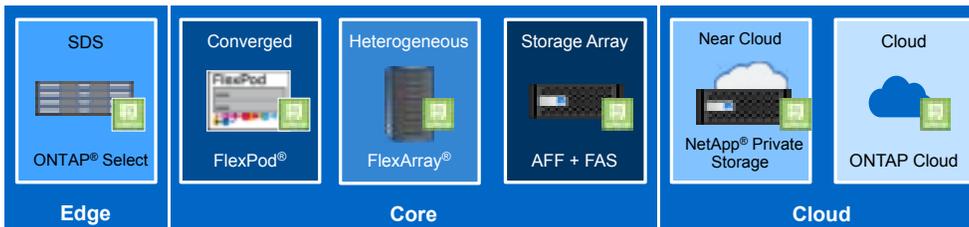


Figure 3) The desired operational efficiency gains can be realized only by taking a consistent approach to enterprise data management. ONTAP is the only available edge to core to cloud Data Fabric platform.

### About NetApp

NetApp is the data authority for hybrid cloud. We provide a full range of hybrid cloud data services that simplify management of applications and data across cloud and on-premises environments to accelerate digital transformation. Together with our partners, we empower global organizations to unleash the full potential of their data to expand customer touchpoints, foster greater innovation and optimize their operations. For more information, visit [www.netapp.com](http://www.netapp.com). #DataDriven