

# Cloud Migration and the Role of In-Memory Technologies

White Paper





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The movement of applications and IT infrastructure to the cloud is well underway, motivated by potential costs savings, improved scalability and increased flexibility in deploying and managing a business and technical solution. For many companies, the immediate goal is delivering the same IT and applications capabilities they have today, but at a lower cost and far more quickly – and migrating to the cloud is merely the next generation infrastructure upgrade. What these companies may not realize is they are getting a whole lot more.

## Digital transformation requires flexibility

The drive to digital transformation is creating the need for flexible applications to support all aspects of business operations, from sales and customer service to supply chains and IT. Because of this need for flexibility, **cloud-based systems are rapidly becoming the technology fabric of the modern business**. One lesson that companies are learning from digital transformation initiatives is that applications alone are not sufficient to achieve the ambitious business outcomes company leaders envision and the marketplace demands. This can include capabilities such as instantaneous user interactions, real-time application integration or artificial intelligence capabilities fueled by streaming data. These outcomes and experiences require taking a whole systems approach and modernizing the entire technology ecosystem to make digital business processes more agile and productive.

**Cloud environments are unlocking a new set of capabilities for architecting and developing applications and user experiences that were just not possible in the past.** Cloud-based solutions can be developed and deployed quickly, they can be distributed around the globe to provide better performance to users, and they can even be scaled up and down dynamically to meet changing business demands. Modern cloud applications offer the flexibility to deliver against current business expectations.

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# Modernization requires looking beyond applications

Cloud migration of applications is only one step along the path to IT modernization and it isn't the final one. **As companies look at other parts of the IT ecosystem, they are finding subsystems such as data storage and processing, system integration platforms and workflow orchestration capabilities also need to be migrated to the cloud to enable maximum flexibility and peak performance.** This is the future that businesses are moving towards – one where solutions assemble in the cloud from the best available components and a variety of suppliers. Switching costs are low and swapping out parts is nearly as easy as installing apps on a mobile device.

**Unfortunately, transitioning to an ideal solution isn't feasible for most companies immediately due to the technical debt and justification of past decisions and investments.** Migrating and modernizing the entire IT technology stack is not only challenging and time-consuming, but also costly. As a result, companies make trade-offs and prioritization decisions about what to move to the cloud, what to modernize and when to keep using legacy components. Often, this leads to a conscious decision to use hybrid solutions that include legacy and modern cloud components.

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## Managed services are changing the cloud discussion

One of the most exciting and promising developments for the IT industry is the viability and cost performance of a wide variety of managed cloud service offerings from third parties. **It isn't the cloud itself that is changing IT, but the ability for IT organizations to stop having to build and manage everything themselves.** They can instead shift to the role of service broker – bringing together components and services from an extensive network of suppliers to deliver solutions to users that are both feature-rich and cost-effective.



Managed service offerings are not only changing the cloud discussion; they are changing the fundamental role IT plays within the company. **With IT staff no longer needed to create all components from scratch, they now have more time to focus on higher value issues of integration, governance, security and developing compelling and efficient user experiences.** They can also spend more time with the information portion of their charter as stewards of the company's data – helping to develop new and more valuable insights. By moving to a managed service model, IT can focus on strategic enablement, rather than being the function that “keeps the lights on.” As companies leverage managed services more within their IT ecosystem, these benefits will continue to expand.

# Modern data processing with in-memory computing

In-memory computing, which includes both data grids and stream processing, is an essential piece of the modernization puzzle and one of the critical components that companies must evaluate as a part of digital transformation strategies. **In-memory computing solutions, like Hazelcast' In-Memory Data Grid (IMDG) and Jet, enable companies to significantly accelerate application performance by moving data processing off disk,** out of the database and into RAM-based object-oriented data models optimized for peak processing performance.

**Cloud-based applications may be fast and scalable, but they can often be held back by the performance constraints of traditional relational databases.** Even in the cloud, these apps still need the performance boost an in-memory solution provides. Emerging technologies like artificial intelligence need access to a large and diverse set of data to provide accurate, informative analysis and responses, as well as the ability to process large volumes of data almost instantaneously to enable real-time user interaction. The challenge is how to enable these capabilities while simultaneously balancing cloud migration requirements.

Companies that aren't yet ready to leap into AI may still need high-performance applications to support other goals, such as modern customer experiences and digital business processes. In these situations, operational performance is directly tied to the performance of IT systems. A latency of even milliseconds in system processing of data can impact customer satisfaction and staff productivity, leading to increased cycle times – which is not acceptable for a digital business.

Modern companies are also deeply concerned about information security and the risks associated with malicious behavior by external players, employees, partners and customers. The capabilities exist to perform robust validation on transactional processes; however, companies need the ability to do this validation without impacting user experience and transaction processing. **E-commerce is an excellent example of where in-memory computing is leading to tremendous improvements in security enhancements.**

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# The power of In-Memory computing as a managed service

In-memory computing power coupled with the benefits of a managed service deployed in the cloud provides an ideal platform for developing modern IT systems. **Until recently, high powered in-memory computing capabilities weren't available as managed cloud services and a company's IT team had to make long-term investments to acquire the software, train operational staff and endure the overhead of maintenance.** The investment required meant in-memory computing was only cost-feasible for applications that had a long-term usage arc or a pervasive effect across the organization. Modern companies with digitally-transformed business processes need more flexibility, which is why they gravitate towards managed cloud services that don't have high upfront costs or the ongoing overhead.

**Fortunately, the situation has changed - companies can now get the speed and scalability of an in-memory computing solution with a range of cloud deployment models.** This approach can not only replace existing in-memory implementations for large scale, mission-critical systems, but also provide a tremendous opportunity for smaller applications and projects. A cloud-based in-memory solution can be ideal for pre-production environments to provide the benefits and features of a data grid or stream-processing engine within the application, without the costs or effort to configure, manage and maintain the solution. This also provides a low-effort framework for limited purpose and short lifespan applications like PoCs and prototypes. There are also, of course, significant opportunities at the enterprise end of the scale. Anything that can run on-premises can also run in the cloud, and with the expansion of **in-memory technologies such as Hazelcast to a cloud deployment model, the benefits associated with cloud (cost-efficiencies, elasticity), combined with the speed and scalability of in-memory provides a very compelling business and competitive opportunity.** With a cloud-based in-memory solution, environments can be spun up as needed and scaled back when not – a highly flexible model that fits well with the needs of modern IT organizations.



# Pre-production environments

Most companies struggle with provisioning non-production environments. They either provide bare minimums for functionality to work or they overspend on capacity and performance that ends up being underutilized. Since neither of these is a good alternative, **companies are responding by moving pre-production environments to the cloud – saving on infrastructure costs and enabling developers to have the tools to accurately simulate and test how their solutions will work in production environments.** If these solutions include in-memory technology as a component in production, developers will need to be able to configure and test for both features and performance with an IMDG or stream-processing engine in place in a pre-production environment as well.

**Hazelcast Cloud provides a full-featured in-memory computing solution ideal for supporting pre-production environments, without the administrative overhead of maintaining an IMDG or stream-processing engine. In this model, developers focus on creating feature-rich applications by having Hazelcast manage the service behind the scenes.**

## Temporary or limited-purpose applications

There are two scenarios where companies need to develop applications for temporary use, with no intention of keeping them long-term. The first is to experiment, develop new services and/or learn new techniques or capabilities. While agility is about adapting quickly, it is also about learning fast and in a digitally transformed business that means trying out IT capabilities and seeing how they impact business performance, preferably with a short execution cycle. Once the experiment is over, the application goes away. The second scenario is developing applications to support short-term business needs. Typical examples include events, transitional states related to acquisitions and product launches. These are production applications which may only have an expected useful life of a few days to a few months.



**A cloud-based in-memory computing platform is ideal for apps that need high performance and capacity for a limited period.** This approach allows scaling up data grid or stream processing engine capacity for peak demand scenarios, which are traditionally challenging for IT organizations because securing large-scale infrastructure for temporary use is costly. There isn't a need to trade off between excess costs and sub-standard performance capacity – with a cloud-based solution, the capabilities are there when needed and can then be released to save costs once the need has passed.



# Stepping stone to a cloud environment

**For companies that are taking a phased approach to cloud migration and application modernization, implementing an in-memory managed service can make a lot of sense.** As legacy apps are migrated and updated, the timing to leverage the capabilities of in-memory computing can work well. **With a comprehensive solution, such as Hazelcast Cloud, the components will be available when the time comes to move forward with migration.**

## Full production cloud environment

For those companies who are fully committed to the cloud, once the migration to the cloud is complete, a cloud-based in-memory solution offers a broad range of options in terms of deployment models and use cases. Cloud's support for a distributed architecture is ideally suited for edge and fog computing use cases; **Hazelcast's lightweight and embeddable footprint is ideal for IoT and remote device deployments, speeding up processing for edge devices while removing strain on back-end infrastructure.**

## Enable business agility

Cloud solutions enable business to capture market opportunities with the fast deployment of apps that are scalable and reliable. Often small applications have big value propositions; with the move to cloud services and use of 3rd party components, business users have higher expectations than ever for speed, scalability and stability, backed by a rich feature set.

Most companies already have platforms like ERP, CRM, ITSM and SFA in place. These systems provide the basic parity features that companies need to survive – they aren't the source of competitive differentiation. This is where specialized apps come in, including e-Commerce systems, customer engagement portals, marketing insights dashboards and many others. These apps are what can provide a competitive edge, and real-time data is an integral part of what makes them so compelling.

**A cloud-based in-memory solution can deliver the capacity and performance needed to achieve maximum results.**



## Enabling global reach

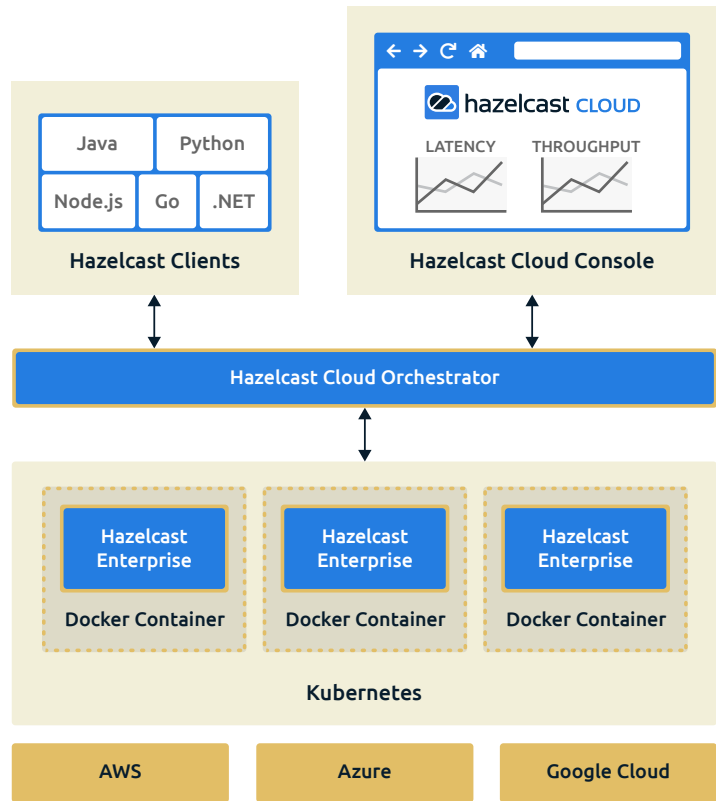
**A company can extend its global reach by moving data closer to users or remote devices for increased speed and performance.** If company offices are in one place and customers or operational infrastructure is remote, the need for an edge-processing solution (which can work particularly well in the cloud) can become more compelling. Leveraging the cloud enables companies to extend the reach of infrastructure and deliver outstanding customer experiences, regardless of where the need is physically.

# About Hazelcast Cloud

Hazelcast Cloud is architected to enable maximum scalability by replicating data across multiple machines, similar to how the Hazelcast IMDG provides both speed and scale. **Hazelcast Cloud marries industry-leading in-memory computing capabilities with the global footprint of major commercial cloud providers to enable the distribution of apps and the data they use to cloud data centers around the globe, providing users with the best application experiences possible.**

## A fully managed cloud solution

A cloud-based in-memory solution enables developers to focus on building the features business users and customers need through a fully managed service. **Hazelcast will install, configure, maintain, monitor and update the solution so employees can focus on building high-performance applications.** This delivers the benefits of low ownership and maintenance costs, without the need for trained support staff to run the system.

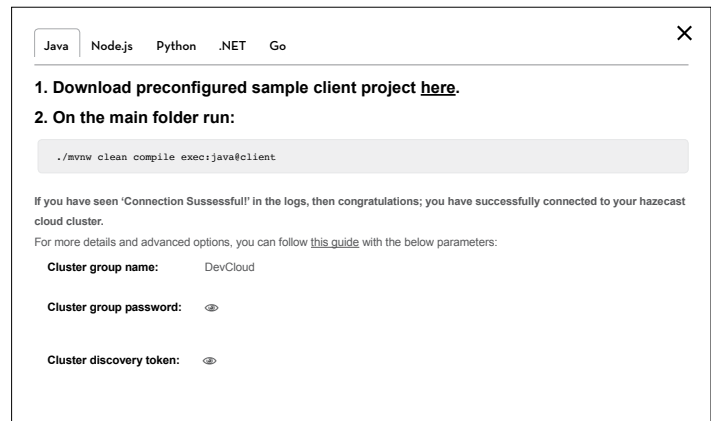


*Hazelcast Cloud Architecture*



## Easy to implement, easy to use

**Hazelcast Cloud has a low-friction on-ramp experience for a feature-rich solution.** A few basic pieces of information and Hazelcast Cloud will automatically generate a configuration that is ready to implement for an application or operational project. This means developers don't need to spend days or weeks setting up back-end components and can instead move directly to creating the features that add value. Once the application is built, developers can scale capacity up and down using a simple slider, press launch and see results immediately.





## Cloud subscription model suited to modern IT organizations

**Most feature rich solutions aren't designed for small apps and small projects. Hazelcast Cloud is different;** whether the focus is a small Proof-of-Concept to test or a critical app that needs maximum scale and global performance, Hazelcast Cloud is designed to fit the most demanding organization's needs, including:

- Low implementation cost
- Pay for what is used
- OpEx, rather than CapEx
- Elasticity of scaling

## Deliver today and prepare for tomorrow

A cloud-based in-memory solution is a critical IT component that can achieve company goals quickly and at a lower price point. **Hazelcast can support simple and complex cloud implementations today and keep pace as strategies evolve. As cloud technologies change, Hazelcast will continue to offer cloud alternatives designed to maximize value-add to IT initiatives,** including:

- Free Public Cloud
- Private Cloud
- Dedicated Cloud
- On-premises Cloud
- Multi-Cloud
- Cloud portability
- Hybrid Cloud solutions
- Cloud-native solutions

**Companies are moving to the cloud looking for speed, scalability and stability.** Hazelcast Cloud provides the features and performance needed by modern apps, with an easy-to-use and fully managed cloud solution. Migration to the cloud is only one of many steps in the business modernization journey. Digital transformation is bringing people, processes, data and systems closer together and emerging technologies, like AI and machine learning, are reinventing how we interact with technology. **Hazelcast Cloud is the solution designed to support, embrace and accelerate these modernization trends with high-performance apps, massive scalability and unlimited flexibility.**

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350 Cambridge Ave, Suite 100, Palo Alto, CA 94306 USA  
Email: [sales@hazelcast.com](mailto:sales@hazelcast.com) Phone: +1 (650) 521-5453  
Visit us at [www.hazelcast.com](http://www.hazelcast.com)

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