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## **Delivering Performance, Scalability and Availability**

On the Celonis Intelligent Business Cloud



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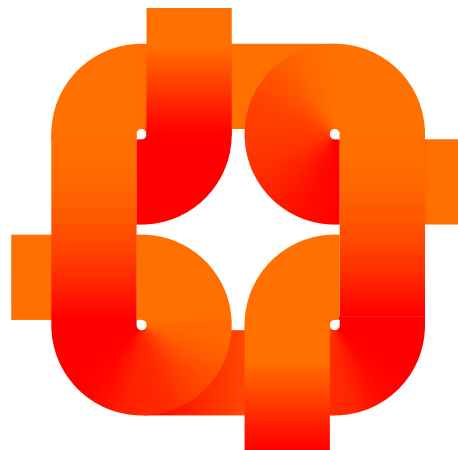
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# Overview

The Celonis Intelligent Business Cloud (IBC) provides organizations with the capability to sense process friction and prescribe intelligent action to improve business outcomes. Our customers rely upon access to IT, business data, and services within the IBC for their continued operation and success.

Celonis works to ensure that our backend technical infrastructure supports the amazing front-end experience that our customers know and love. Our team is passionate about making infrastructure investments that support our customers and we want to provide you with the opportunity to understand our technical architecture.

This whitepaper provides an overview of Celonis' High Availability architecture—a key element in delivering a true enterprise-grade cloud, the Intelligent Business Cloud. Our multi-instance architecture meets and exceeds stringent requirements surrounding data security, availability, and performance.



# Global Regions

To support our global customer base, Celonis is available in data centers around the globe. Customers can select to host their Celonis tenant in the United States, Germany, Russia, or Japan. The IBC is only hosted on best-in-class data centers. We partner with Microsoft Azure and Amazon Web Services (AWS), the market leaders in cloud computing services. They provide best-in-class enterprise security, scalability and availability. Additional information on these topics can be found in the Appendix of this paper.

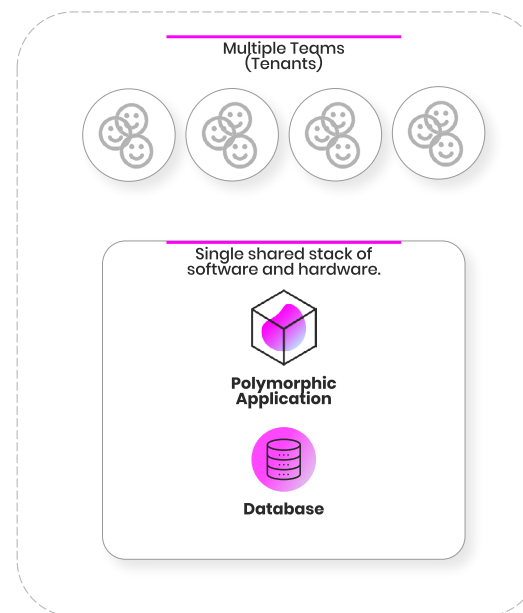


# Multi-tenant Architecture

The IBC is a cloud-native platform built as a highly available, performant system. A multi-tenant architecture was chosen to achieve this goal. Multi-tenant applications share a single stack of resources to meet the needs of multiple tenants. There are various benefits of multi-tenancy including simple and smooth upgrades for both customer and vendor, flexibility, scalability, high performance, and low operational costs.

One instance of the IBC is hosted in each data center location, which we refer to as an IBC realm. Within each IBC realm, there are multiple customer tenants and those tenants are separated following a metadata-driven approach. Each tenant is a private customer space in which a customer's application and analytical data is separated from other tenants. To find out more about our platform security, please review our platform security whitepaper.

Our multi-tenant architecture also allows the Celonis Engineering team to collect and aggregate telemetry data across the full customer base, which facilitates frequent, incremental improvements that benefit the entire user community.



**Figure 1:** A multi-tenant application shares a single stack of resources to meet the needs of multiple tenants.

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# Scalability

The IBC is an integral part of our customers' daily work life, therefore a highly available, performant system is crucial. The IBC deployment architecture was built to optimize scalability and performance.

Each customer has access to the application landscape, shown in Diagram 1. The application landscape of each IBC realm includes three layers of capabilities: Boards, Process AI, and Data. These capabilities are customized and packaged into applications to meet the needs of our customers.

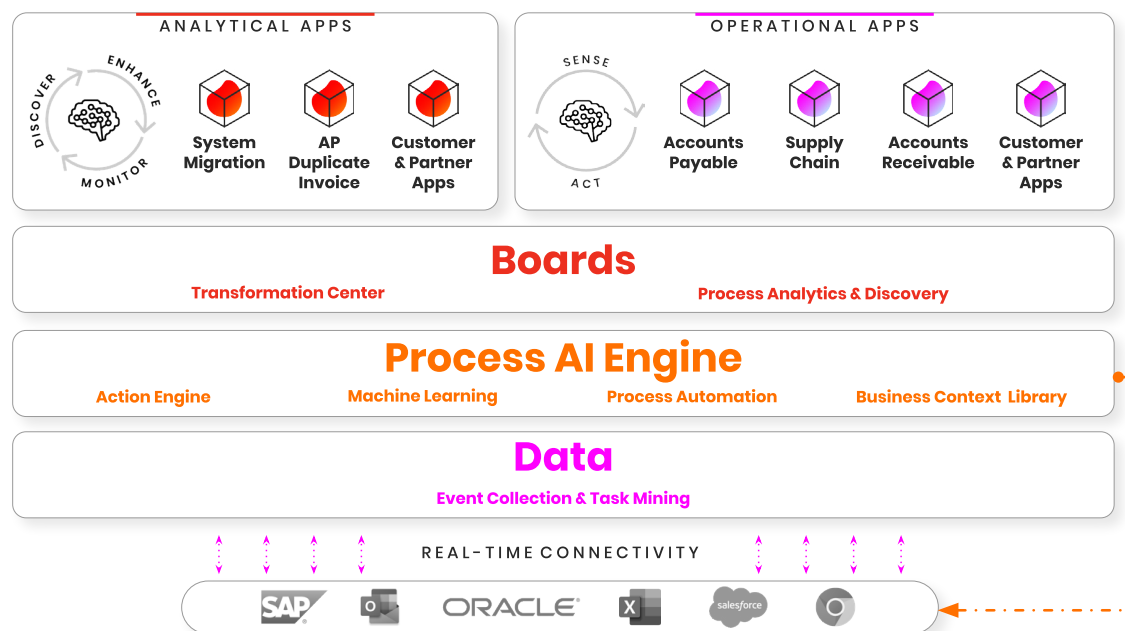


Figure 2: IBC application landscape

The IBC is based on a distributed microservice architecture and its cloud-native applications are deployed in Kubernetes, an industry-standard container-based architecture used by Google, IBM, and others. A high level overview of these services can be seen in Diagram 2. These infrastructure choices allow us to add more nodes to all areas of the platform without downtime and serve our customers with the availability, scalability, and performance described in the following sections.

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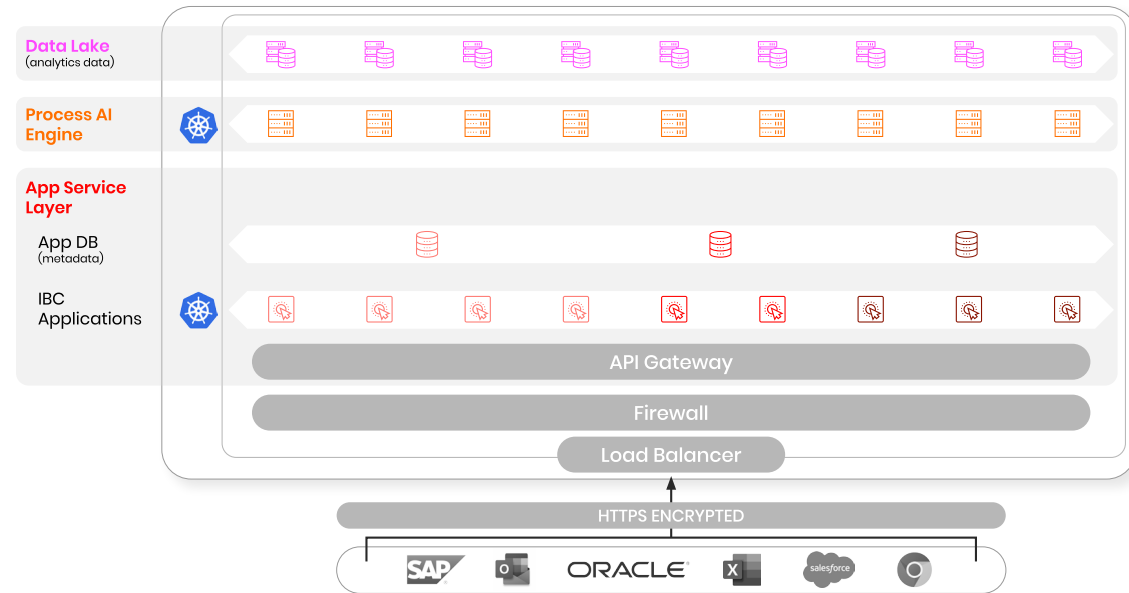
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**Figure 3:** The deployment architecture of the IBC

Our Kubernetes architecture allows for application replication and load balancing across the platform, enabling horizontal scaling across all IBC applications. Each application has its own database, further ensuring platform failure and reducing the risk of a single point of failure.

Overall, this approach allows us to handle load on the platform elastically for large-scale deployments and organizations with ease.

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# Performance

Performance is essential to deliver the best user experience. The IBC was designed to deliver best-in-class performance and to continuously deliver performance optimization improvements. Delivering a high performance system for our customers has several dimensions, including: data ingestion, data preprocessing, data analytics, and application performance.

Our extractor and data lake technologies handle data ingestion into the IBC and the preprocessing required for our operational and process mining use cases. Our extractors process large volumes of data by splitting a workload in micro-batches for high-speed data transfers. Micro-batches ensure that 1) the system load is kept at a minimum, and 2) processing steps, such as pseudonymization can be completed during the data transfer process. Operational applications require near real-time data extraction and processing. Our data lake, which is a cluster-based database, makes near real-time data preprocessing a reality as it is specifically designed to handle the workloads of big data processing.

All applications built upon the IBC platform perform data analytics using the Process AI Engine. The Process AI Engine is a proprietary in-memory database which serves many customers in parallel, each using data models with hundreds of millions of events and in some cases even more than one billion events. The Process AI Engine is a core component of the IBC platform, allowing our customers and partners to easily build applications without needing to worry about scaling compute capacity.

Customer requirements and data volumes constantly grow, therefore our platform needs to keep up. We continuously work to improve our platform performance by rolling out improvements to our entire customer base.

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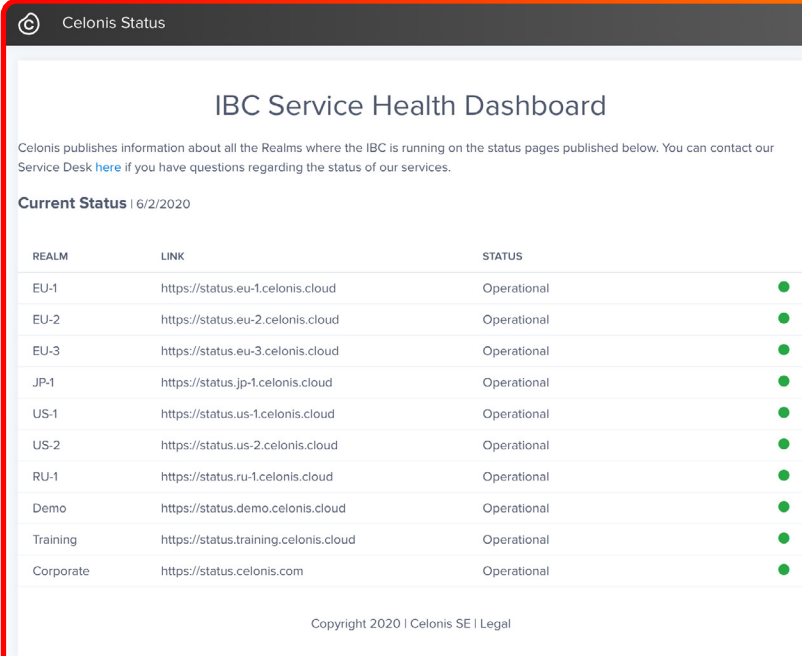
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# Availability

We aim to ensure that the IBC is always operational for our customers. No vacation, no extended upgrade or maintenance windows, no single points of failure. We focus on near-perfect availability and have built redundancies into every layer of our cloud platform. This means that even standard IBC platform upgrades do not require downtime. When deploying a new version of a service we gradually add more and more replicas of the new version while slowly reducing the number of replicas of the old version. During termination, open connections to the service are allowed to complete. Our cloud-native architecture allows us to scale services on-demand and upsize our infrastructure without downtime to ensure that even in peak-load scenarios, the platform is still available for our customers.

To ensure smooth operations, Celonis has a dedicated operations team with on-call duties to coordinate quick issue resolution and mitigation. The Celonis Service desk can be reached 24/7 and following every incident, the operations team ensures that each incident is logged to identify its root cause and prevent it from reoccurring in the future.

The live availability status of all IBC realms can be checked on the [Celonis Trust Center](#)



Celonis Status

### IBC Service Health Dashboard

Celonis publishes information about all the Realms where the IBC is running on the status pages published below. You can contact our Service Desk [here](#) if you have questions regarding the status of our services.

**Current Status** | 6/2/2020

REALM	LINK	STATUS
EU-1	<a href="https://status.eu-1.celonis.cloud">https://status.eu-1.celonis.cloud</a>	Operational
EU-2	<a href="https://status.eu-2.celonis.cloud">https://status.eu-2.celonis.cloud</a>	Operational
EU-3	<a href="https://status.eu-3.celonis.cloud">https://status.eu-3.celonis.cloud</a>	Operational
JP-1	<a href="https://status.jp-1.celonis.cloud">https://status.jp-1.celonis.cloud</a>	Operational
US-1	<a href="https://status.us-1.celonis.cloud">https://status.us-1.celonis.cloud</a>	Operational
US-2	<a href="https://status.us-2.celonis.cloud">https://status.us-2.celonis.cloud</a>	Operational
RU-1	<a href="https://status.ru-1.celonis.cloud">https://status.ru-1.celonis.cloud</a>	Operational
Demo	<a href="https://status.demo.celonis.cloud">https://status.demo.celonis.cloud</a>	Operational
Training	<a href="https://status.training.celonis.cloud">https://status.training.celonis.cloud</a>	Operational
Corporate	<a href="https://status.celonis.com">https://status.celonis.com</a>	Operational

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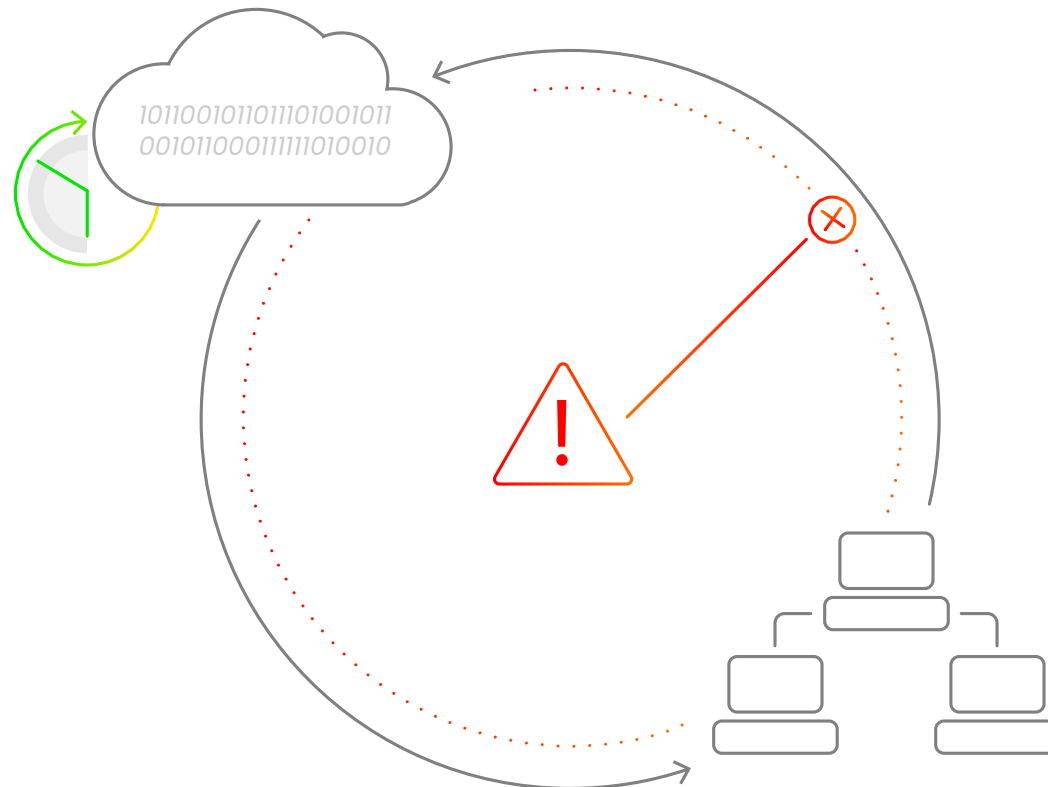
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# Backup and Recovery

While High Availability is the primary means to restore service in the case of disruption, the IBC also leverages backups of its application and analytics data. All data has a backup retention of 30 days and data is backed up daily, providing point-in-time recovery.

Regular disaster recovery exercises are performed to ensure that each IBC realm can be recovered as quickly as possible in case of disaster events, such as hardware malfunction or other large infrastructure outages.



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[AWS Infrastructure Security](#)

[Microsoft Azure Infrastructure Security](#)

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**Horizontal Scaling** provides the ability to scale out in order to accommodate larger workloads. Data is logically distributed (sharded) across multiple servers.

**Vertical Scaling** provides the ability to scale up in order to accommodate larger workloads on the same machine. Vertical scaling is limited by the maximum server size.

**Kubernetes** is an open-source system for automating deployment, scaling and management of containerized applications.

*Additional information and updates on Celonis' platform infrastructure and security can be found at [www.celonis.com/trust-center](https://www.celonis.com/trust-center)*

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