

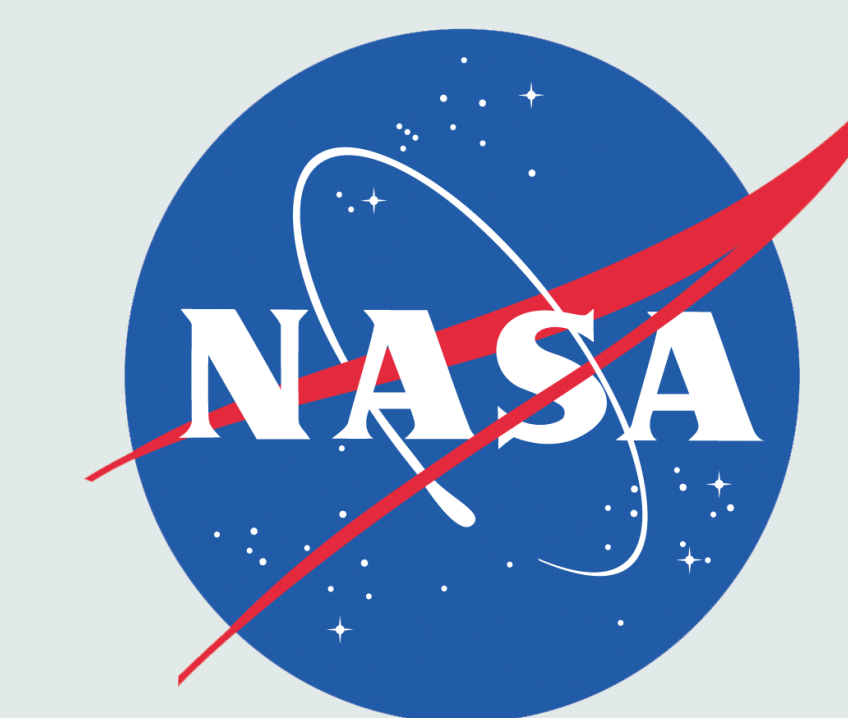
CMR Doing One Thing Well

Leveraging Microservices for NASA Earth Science Discovery and Access Across Heterogeneous Data Sources

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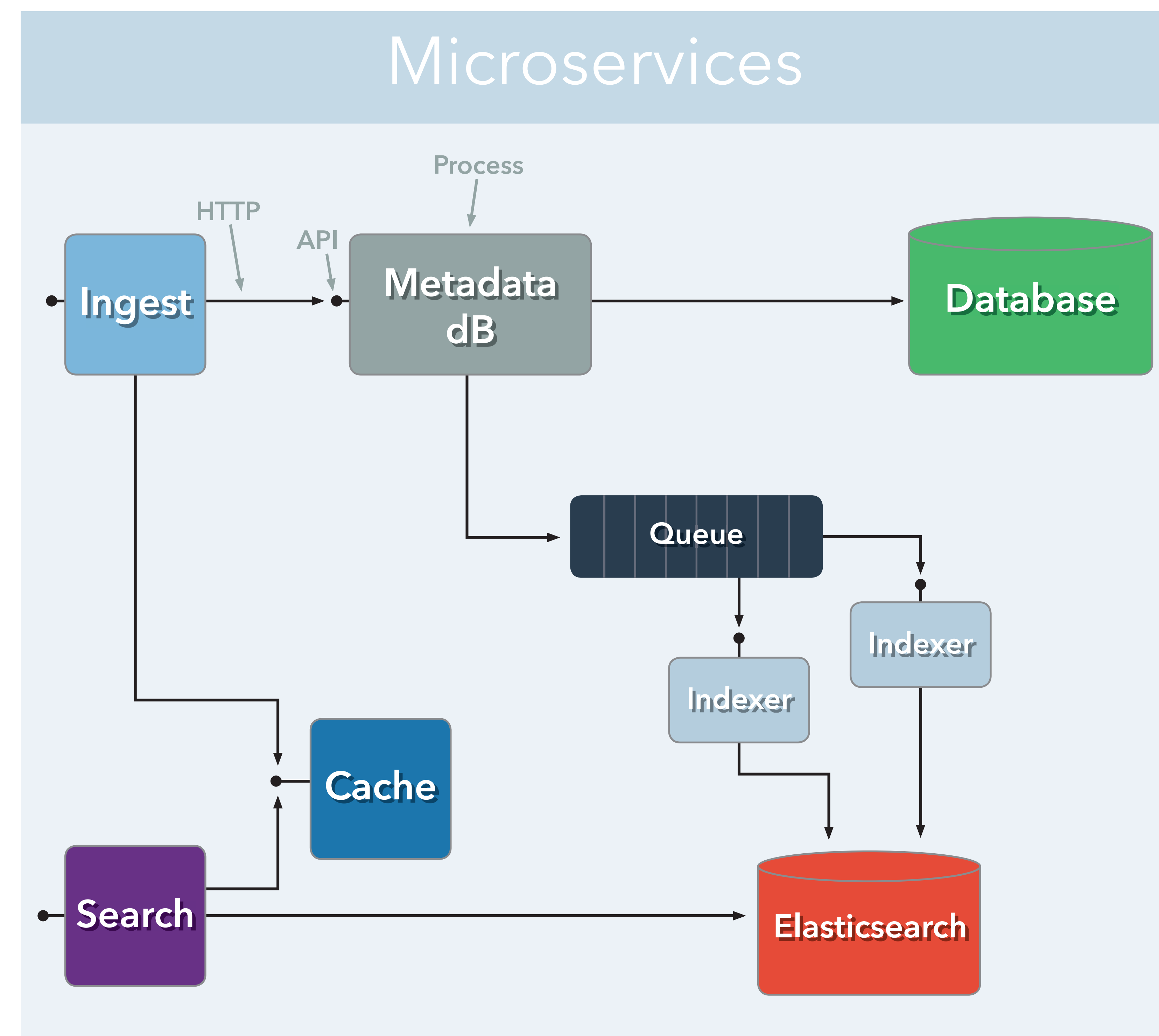


IN23D-1754

Common Metadata Repository

The Common Metadata Repository (CMR) builds on the work done by ECHO and the GCMD to provide a unified, authoritative repository for Earth Science metadata.

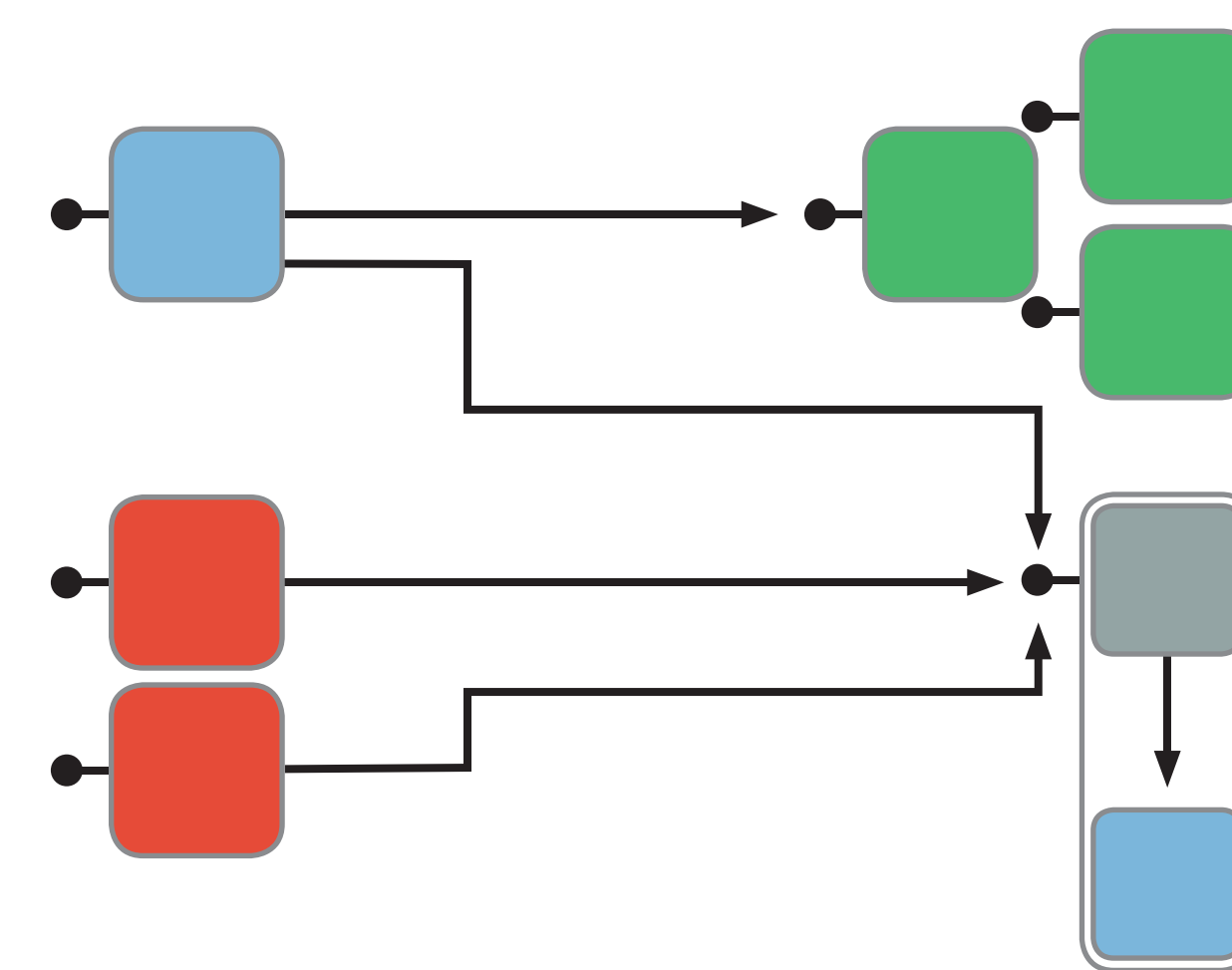
The CMR enables Earth Science applications to provide end users with nearly immediate access and interactivity across massive stores of Earth Science data by providing high performance, standards compliant, temporal, spatial, and faceted search of the associated metadata. As the range of applications grow and more and more information moves from the underlying science data to metadata the challenge of navigating that metadata increases. The CMR is designed to scale with this growing volume of metadata and increasing number of users while maintaining the flexibility to add features to support increasingly sophisticated applications.



The key to the CMR's capabilities is its microservice architecture. The CMR consists of multiple microservices running as independent processes. These services are small in scope, focusing on a single task. They are loosely coupled, communicating synchronously through HTTP APIs and asynchronously via a distributed queue.

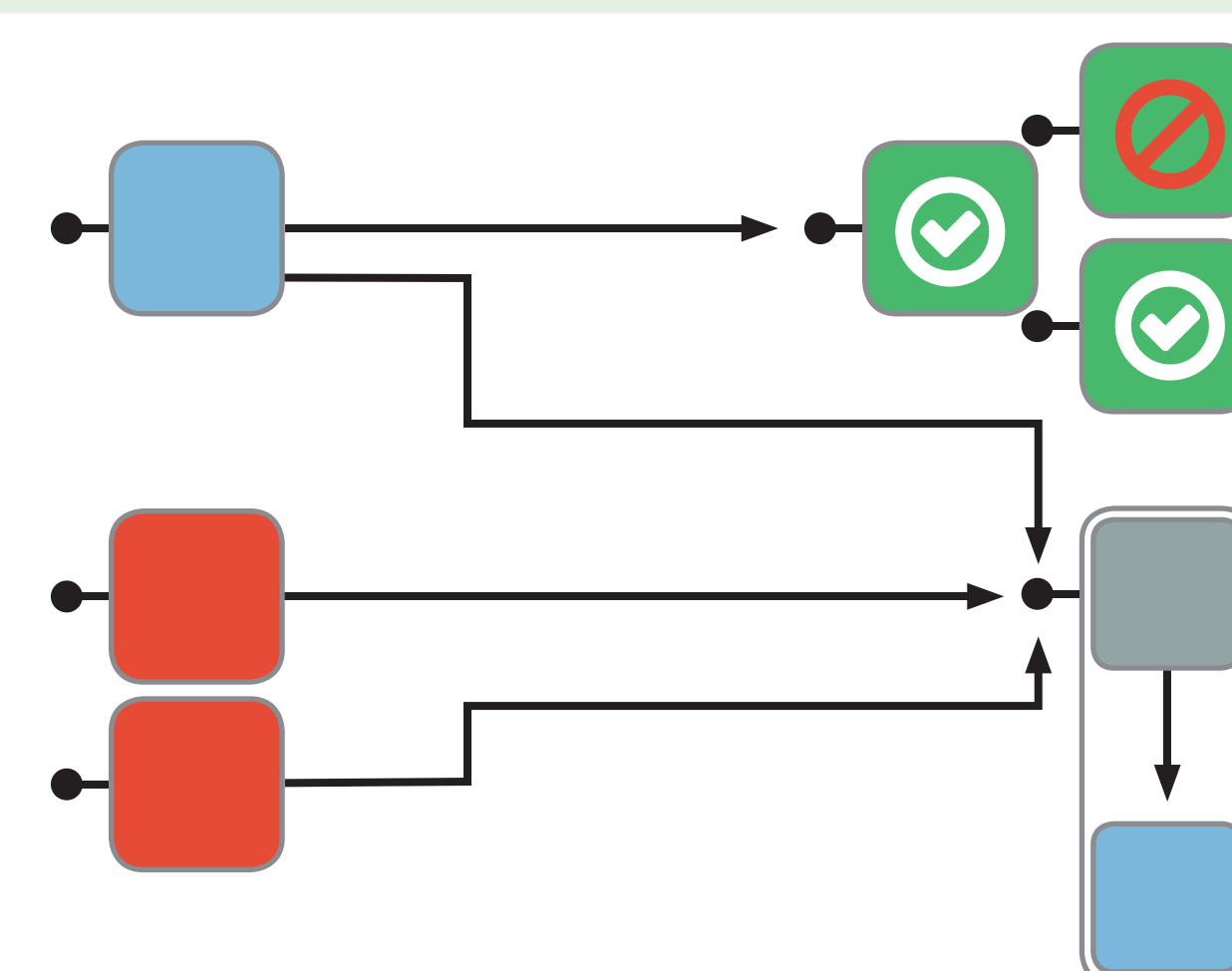
Benefits to Users

Scalability



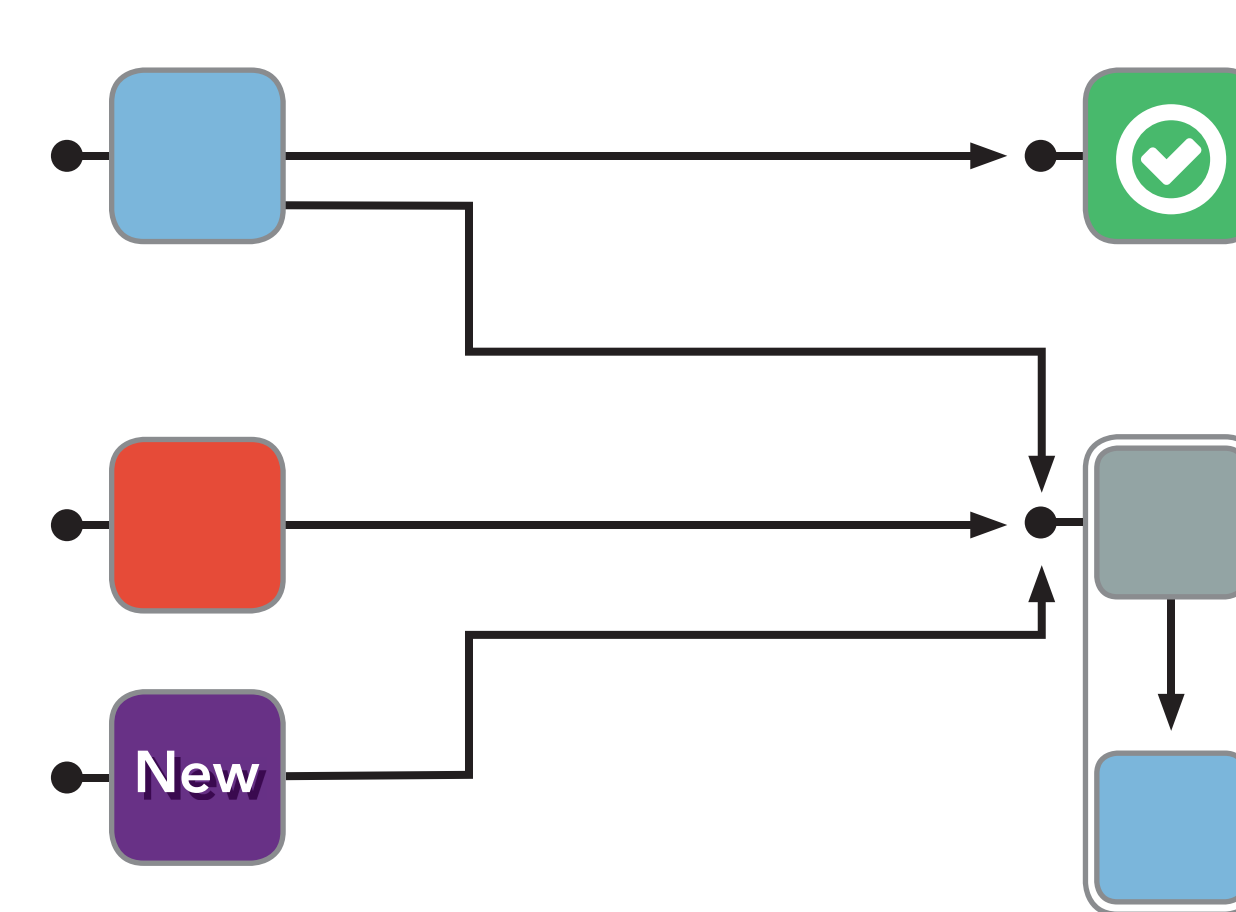
The CMR was designed from the ground up to support high volumes of concurrent users accessing large sets of metadata. The microservice architecture provides horizontal scalability allowing individual services to be spun up to meet increasing demand.

Reliability



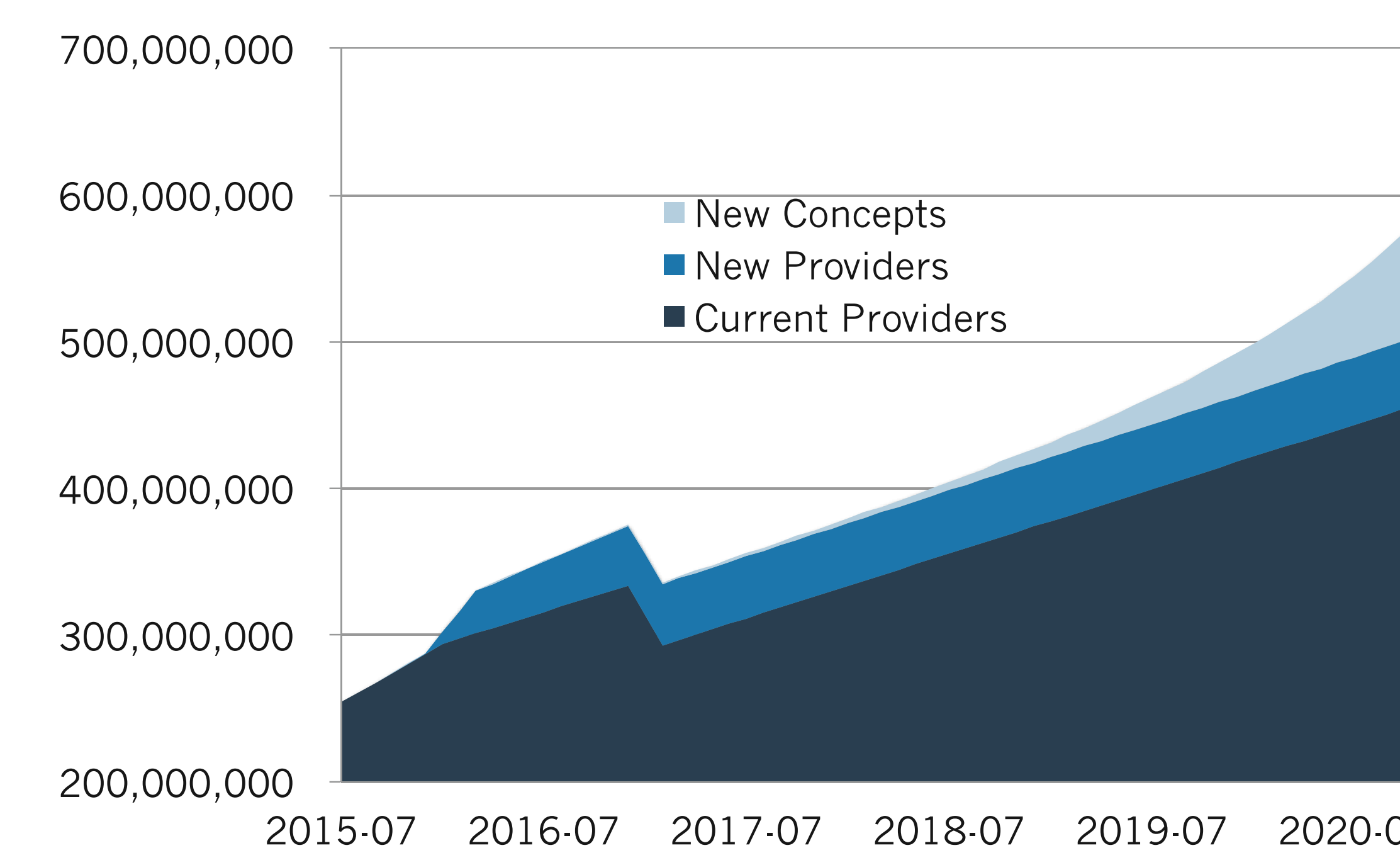
In a monolithic architecture, the failure of a single component can bring down an entire instance resulting from the tight coupling between components. With microservices the failure of a single service instance is less consequential as the other services continue to run.

Extensibility

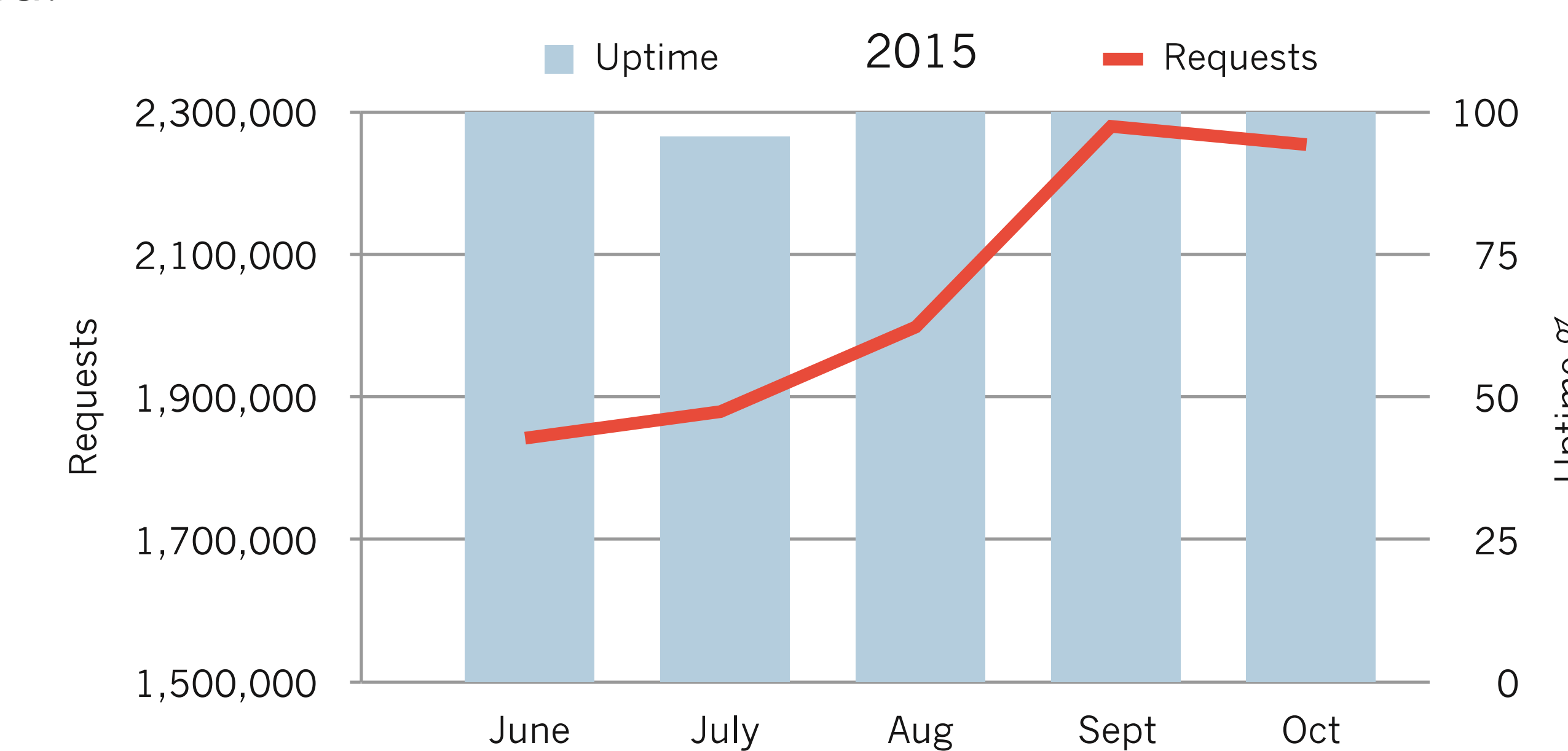


The loosely coupled nature of microservices makes it easy to add new services without changing existing ones. This allows faster development of new features and no downtime during deployments.

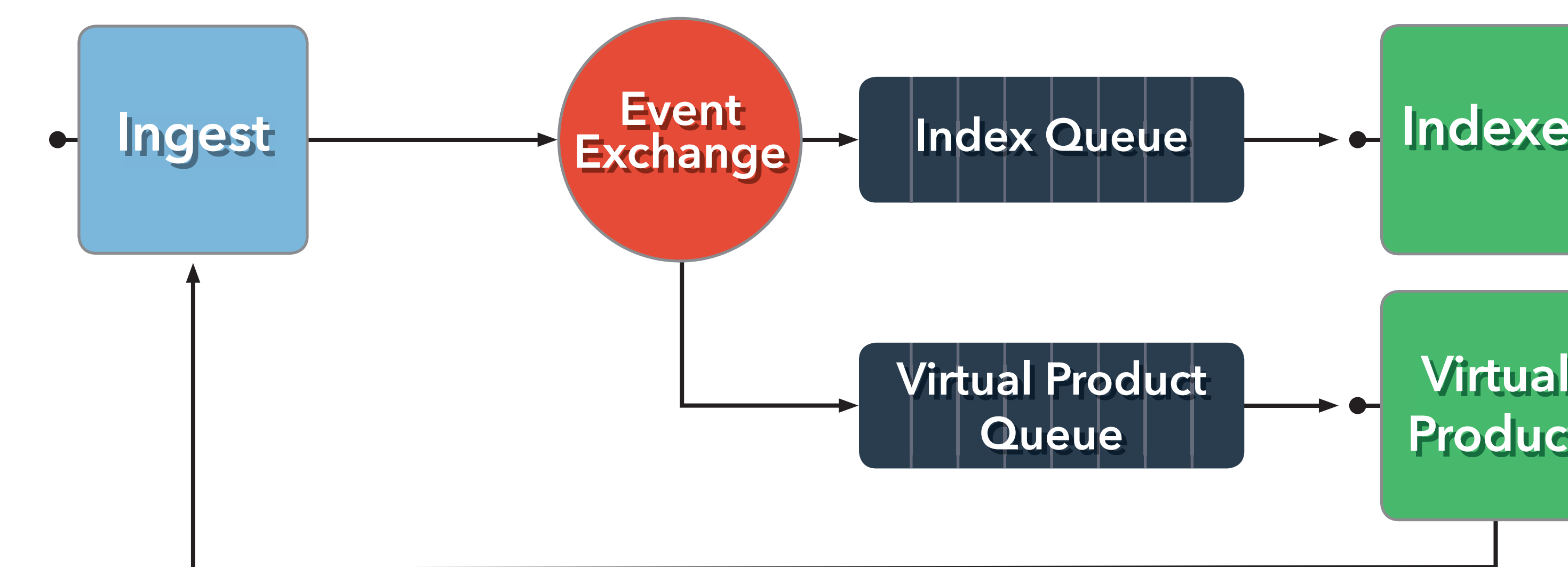
Meeting Future Demands



CMR holdings are expected to more than double to over 600 million records by 2020 with the addition of new providers, missions, and metadata concept types. The CMR microservices will scale to meet this demand.



Since going operational in January 2015 the CMR has exhibited 99% uptime despite increased user and ingest load.



Microservices allow the CMR team to quickly add new features like virtual products and to incorporate new metadata concepts like visualizations and tags to meet the growing needs of a steadily widening user base.

