

KALIX



White Paper

Executive Briefing

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KALIX

Executive Summary

The demands on technology teams to support their businesses in an increasingly software-driven world grow daily. Developers are increasingly tasked with building applications to support digital transformation initiatives that enable enterprises to quickly introduce new business concepts, create optimized and personalized experiences that keep customers happy, and the business, as a whole, ahead of the competition.

Requirements may be for the modernization of a portfolio of core services or to build a completely new greenfield system to support new business streams. Examples include IoT platforms, real-time financial services, modern eCommerce systems, streaming media, internet-based gaming, factory automation, telemedicine, SaaS applications, and others.

Time to market is critical. Yet designing, building and running this class of applications is extremely challenging from both the degree of technical difficulty and skills availability standpoints.

Critical to success is for developers to be able to build back-end services and APIs that are:

- ✓ Data-centric, capable of handling large volumes of data
- ✓ High-performance, with low latency
- ✓ Scalable, both up and down

Cloud native infrastructure holds the promise of supporting this level of performance and scalability, but many of the complexity challenges remain in building the applications themselves. Historically, building these types of systems has meant using a sophisticated, complicated architecture and a variety of technologies—such as enterprise application infrastructure software, distributed databases, caches—that can also come with hefty costs.

Equally importantly, finding both the engineering and DevOps skills to successfully build and run these applications has become an ongoing headache for even the most well-funded of teams.

Kalix is a Platform-as-a-Service (PaaS) designed specifically to address these challenges.

**Out-of-the-Box
Cloud-Native Stack**

**200% Increase
in Developer Velocity**

**No Operations
Required**

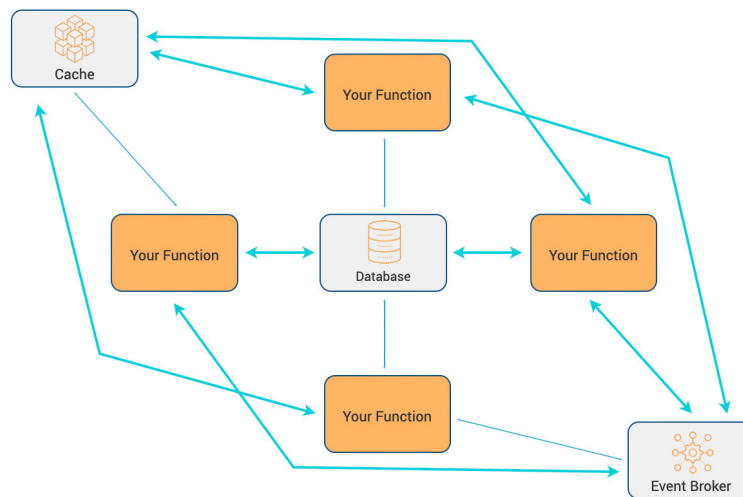
**High Performance
& Ready to Scale**

Kalix is the first and only developer platform that extracts the complexity of the backend enabling teams to easily build high-performance microservices and APIs with almost no operations required.

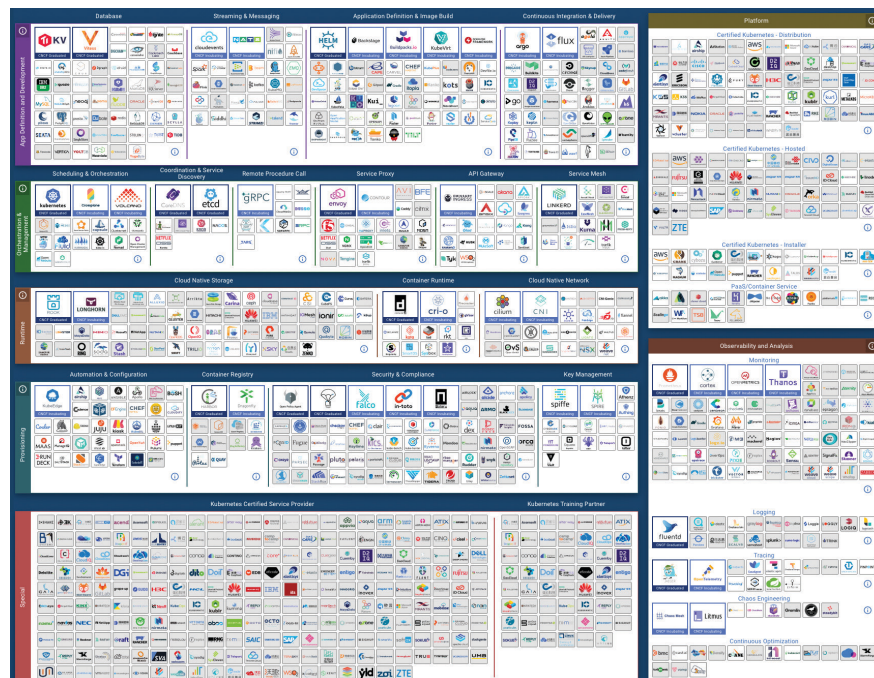
Kalix: High Level View

As enterprises look to move more and more of their business-critical workloads to the cloud, delivering high-performance, cloud-native systems becomes an imperative. Kalix abstracts the complexities of the back end. It's simpler than other approaches and therefore, delivers enormous value.

The cloud infrastructure delivered by the hyperscalers provides an incredibly scalable, resilient foundation. And the services they provide are designed to make it easier to build and deploy applications and, for many use cases, Function-as-a-Service (FaaS) serverless offerings can deliver significant value. The more operational concerns that are managed by the cloud service, the more time developers can spend focusing on business requirements. Addressing a number of the challenges of the more "traditional" approaches to application development for the cloud.



However, use cases that have scalable, high-performance, low latency requirements means more complex implementations with many, many choices to be made, software/services to license, and skills to be found as reflected in the CNCF's cloud native landscape:

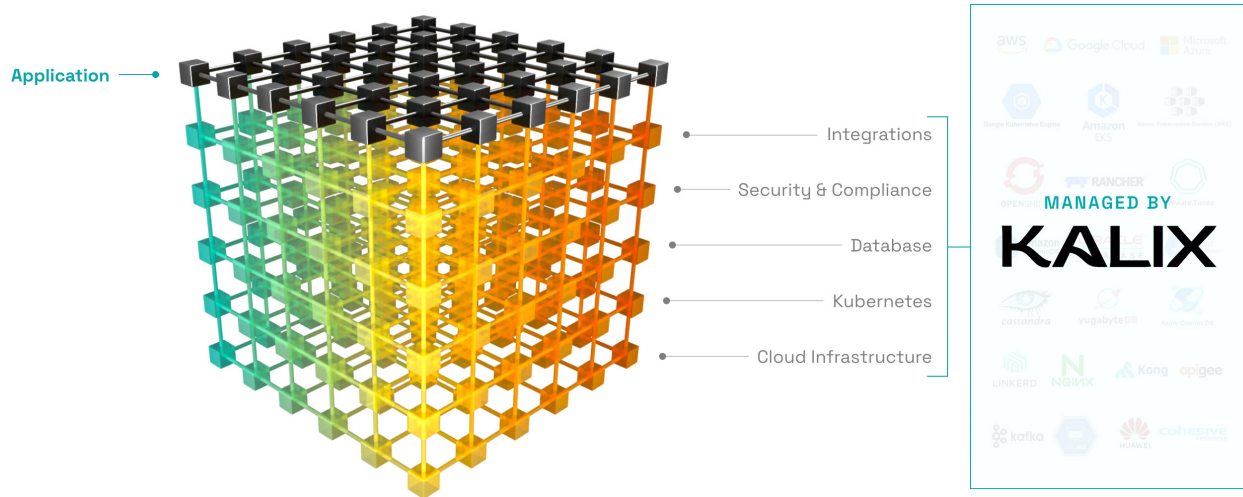


CNCF: Cloud Native Landscape <https://landscape.cncf.io>

Kalix raises the abstraction level for enterprise architects and developers, entirely removing the challenges of architectural complexity concerns, as well as databases, data caching, service meshes and anything operational.

Kalix fully utilizes hyper-scaler infrastructure under the covers maximizing the power of the cloud, thus, enterprise architects and developers get all the benefits of the cloud without the stress of architecting and building large-scale distributed systems.

Kalix removes the complexities of the back end by inferring infrastructure needs from your code, so teams can focus on just one thing—the business logic of your application:



Kalix is built on an optimized cloud-native architecture and is delivered as a fully managed service. Kalix takes care of all of the challenging aspects of scalable, data-centric microservices and APIs from the application architecture, data management and cloud infrastructure perspectives. This means that development teams can focus solely on the most important part of their role: creating the business logic of their applications.

The result?

Dramatically increased velocity with which technology teams can deliver business-changing software while reducing the costs associated with doing so.

Kalix Fundamentals

Kalix is an Internal Developer Platform (IDE) delivered as a service for easily building and deploying microservices and APIs:

- High performance and very low latency
- Developer languages of choice
- Declarative programming models
- State managed automatically
- No database required
- No DevOps required
- Extremely cost-efficient
- Flexible deployment options
- Best practices applied automatically

Why these capabilities matter

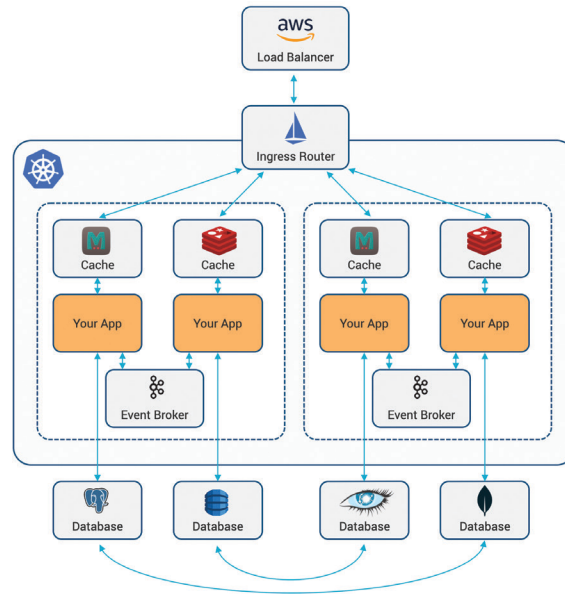
High performance, very low latency	<p>Kalix is built on a distributed computing platform that has been proven to support massively scalable high-performance systems for many of the world's leading brands.</p> <p>The architecture optimizes available cloud resources to make data available for processing in memory automatically at the right place at the right time, eliminating the need for reads from a database that cost valuable time.</p>
Languages of choice	<p>Developers use the programming languages that they are most comfortable with.</p> <p>Languages and frameworks fully supported include JavaScript, TypeScript, Java, Spring and Scala.</p> <p>Languages and frameworks with community support which will be fully supported in time include Python, Go, Rust, Kotlin, and C#.</p>
Declarative programming models	<p>One of the keys to building modern cloud native applications is to be able to take advantage of the underlying distributed systems architecture with appropriate state models for different classes of application.</p> <p>Kalix fully supports the traditional Key Value state model but also makes it extremely easy for developers to employ more sophisticated state models which are vital to large-scale, high-performance application development such as Event Sourcing and Conflict Free Replicated Data types (CRDTs).</p>

State management	<p>Kalix manages distributed state at scale and delivers the state in memory to the function automatically at runtime.</p> <p>This removes the management of data from being a developer concern, and enables general purpose, high-performance stateful applications to be built using a serverless paradigm.</p>
No database required	<p>Kalix manages data stored in its distributed databases automatically without the requirement for any developer or operations intervention.</p> <p>There is no requirement for the developer to have any knowledge of database schemas, data caching software and techniques, or techniques for distributed data management.</p> <p>Additionally, there is no requirement for any database administrators or operations to be involved.</p>
No DevOps required	<p>Applications deployed on Kalix are running on a full cloud-native, Kubernetes-based infrastructure but Kalix automatically provisions all of the integrated foundational elements required so that they are available to developers without any boilerplate or plumbing code.</p>
Cost-efficiency	<p>Kalix is offered as a Platform-as-a-Service, with both pay-as-you-go and committed infrastructure cost models.</p> <p>The underlying distributed computing platform makes optimal use of CPUs and RAM to keep cloud costs minimized.</p> <p>No incremental investment in application middleware is required.</p> <p>Data-related costs are hugely reduced by not needing additional databases, data caching or database administration.</p> <p>Since any back-end or full stack developer can successfully use Kalix, no incremental cost in specialized engineering skills is required. No DevOps means no SRE or other operations people need to be engaged.</p>
Flexible deployment options	<p>Developers can get started quickly and easily with a free trial of Kalix and then start building their services on our low-cost, pay-as-you-go service.</p> <p>Since many services and APIs built with Kalix are business-critical, enterprises often require more predictability around both costs and performance than a by-definition variable, pay-as-you-go model.</p> <p>Therefore, Kalix is also available with deployment options for:</p> <ul style="list-style-type: none">• Enterprise: predictable costs and multi-cloud options• Dedicated: predictable costs, multi-cloud options, PoP choice, isolated, single-tenant environment

Value to Developers

High-performance, low-latency microservices-based systems that scale automatically up and down on-demand. That's the promise of cloud-native architecture.

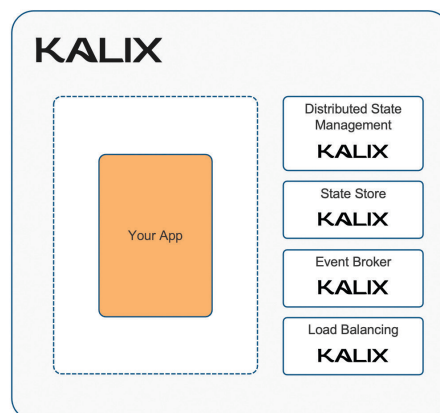
But building applications that are truly cloud-native can be extremely complex. Getting it done in the first place is hard enough; getting it done *right* is an enormous challenge. A typical microservice architecture running in a Kubernetes environment might look something like this:



Kalix PaaS approach solves the architectural complexity challenges of modern, data-centric microservices and APIs. Kalix raises the abstraction level by taking care of the most challenging aspects of cloud-native systems so developers only focus on creating business logic

Developers no longer need to worry about distributed state, databases, container management, data caching, service meshes, messaging, load balancing or any of the complexities of deploying and scaling. Integrated foundational elements are automatically provisioned and available to developers without any boilerplate or plumbing code.

An equivalent Kalix-based microservice would look something like this:



Teams can collaborate using the languages and frameworks of each teams' choice. Additionally, Kalix includes support for rich programming models such as event sourcing and CRDTs, making the platform applicable for a broad range of use cases.

Developers place full focus on business logic, while still delivering powerful, business-critical software rapidly and with zero operational complexity.

Value to Your Business

Projects get funded for their potential to deliver business results. There are three main areas where Kalix helps business owners realize massive value with Kalix-based projects:

- ✓ time to market
- ✓ Lower cloud costs
- ✓ Skills availability

Time to Market

Time is money. Whether building a greenfield system or embarking on an application modernization project, getting to market fast is a must.

But to successfully develop and deploy new solutions into production is often extraordinarily challenging due to the complexity of designing, building and running high-performance, low latency APIs and microservices. And then there's the ongoing roll out of new features, enhancements and bug fixes.

With Kalix, it's fast and simple for your development teams to build their services using the development tools and programming languages of choice, no matter how complex the underlying system requirements are. Kalix eliminates the need to spend time and money hiring developers with those hard-to-find specialized skills – existing teams, or consultants at your favorite Systems Integrator, can start building cloud native applications on Kalix in a matter of hours.

Kalix takes care of databases, messaging, data caching and all DevOps, so services go into production as soon as they are ready. Operations are automated, all but eliminating operational risk.

Kalix enables sophisticated, business-changing projects to get to market faster... much faster.

Lowering Cloud Costs

Moving to the cloud is not achieved by lifting and shifting legacy applications. That does not take advantage of the incredible infrastructure that the cloud brings. To do so, you need true cloud-native applications that are optimized for cloud deployment.

Because Kalix is built on a cloud-native framework designed specifically to support large-scale, high-performance distributed computing, it optimizes the use of CPUs and RAM automatically so services will always have the lowest possible infrastructure footprint and cost to your business.

There are no incremental costs associated with application middleware or data persistence – no requirement for database administrators or data caches.

But one of the biggest advantages of Kalix is there is almost no ops required. Eliminating the cost of employing hard-to-find distributed computing experts and DevOps teams.

Kalix-based services deliver the highest possible performance with the lowest possible cost.

Solving Skills Availability

Digital transformation. Application modernization. Business-changing potential. If only you could find the people. Why compete for the same specialized developers everyone else is when your existing teams can learn to build cloud-native applications in a matter of hours?

Kalix does all the heavy lifting so developers no longer have to worry about the underlying cloud-native computing capabilities such as distributed state management, data caching, service meshes or messaging. Plus, Kalix automatically manages containers and the Kubernetes infrastructure.

Developers focus on the business logic of their services and nothing more. Your DevOps team can go work on other high priority projects. Your existing team just became much, much more productive.

Existing development teams. No specialized engineers.
No database administrators. No DevOps.

In Conclusion...

The economics of decreasing time to market for digital transformation and application modernization projects are compelling. Enterprises are undertaking such projects and committing to move to the cloud to deliver new services, increase customer engagement, enhance their business agility and keep ahead of their competition. Kalix helps make this happen in an extremely fast and cost-efficient manner.

<p>Out-of-the-box cloud-native stack</p> <p>Massive developer productivity increase</p> <p>Ready to scale</p>	<p>No SREs, DevOps, Database admins</p> <p>No incremental software costs</p> <p>Optimized cloud infrastructure</p>
<p>FASTER TIME TO MARKET</p>	<p>LOWEST POSSIBLE COST</p>

How Do I Justify Investment in Kalix?

The value of Kalix is tied directly to the ability to **get your business-changing applications to market faster**.

If you have budget for new application development, there's budget for Kalix:

- **Software spend** – reallocate funding for databases, data caches, middleware PaaS (such as Cloud Foundry), Kubernetes, service meshes, etc.
- **Engineering/consulting spend** – your existing team can deliver without the requirement to hire / contract for additional specialized skills
- **Operations spend** – reallocate funding for DevOps, SREs, database administrators
- **Cloud spend** – Kalix-based services have smaller infrastructure footprints than services and APIs developed using “traditional” middleware such as Quarkus or Spring, leading to lower cloud costs

Kalix delivers the new high-performance microservices and APIs your business needs and at a decisively lower total cost than any other approach.

Lightbend will be happy to help you build a more detailed business case. Contact us [here](#).

KALIX

Kalix (@kalix_io) is a Platform-as-a-Service developed by Lightbend (@Lightbend). Kalix is the first and only platform that enables any back-end full stack developer to easily build large-scale, high performance microservices and APIs with no operations required. The most admired brands around the globe use Lightbend product offerings to transform their businesses and engage billions of users every day through software that is changing the world.

For more information, visit kalix.io.