VIEW POINT

DIGITAL BACKBONE

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Digital Backbone, an Infosys framework, can significantly standardize how organizations navigate digital transformation initiatives. The first paper in this two-part series presented the structuring of the Digital Backbone. Part II is loaded with insights on how enterprises can implement it.

Approaching Digital Backbone

Digital Backbone is certainly not limited to a product or a set of capabilities. Instead, it is an evolving ecosystem that allows an enterprise to discover and innovate business capabilities to evolve. In the absence of a Digital Backbone, application and initiative teams develop solutions leading to inconsistency and duplication, inability to generate high-quality data needed for AI/ML, and shortsighted decisions leading to greater cost over the long term.

A four-pronged framework is recommended for implementing Digital Backbone

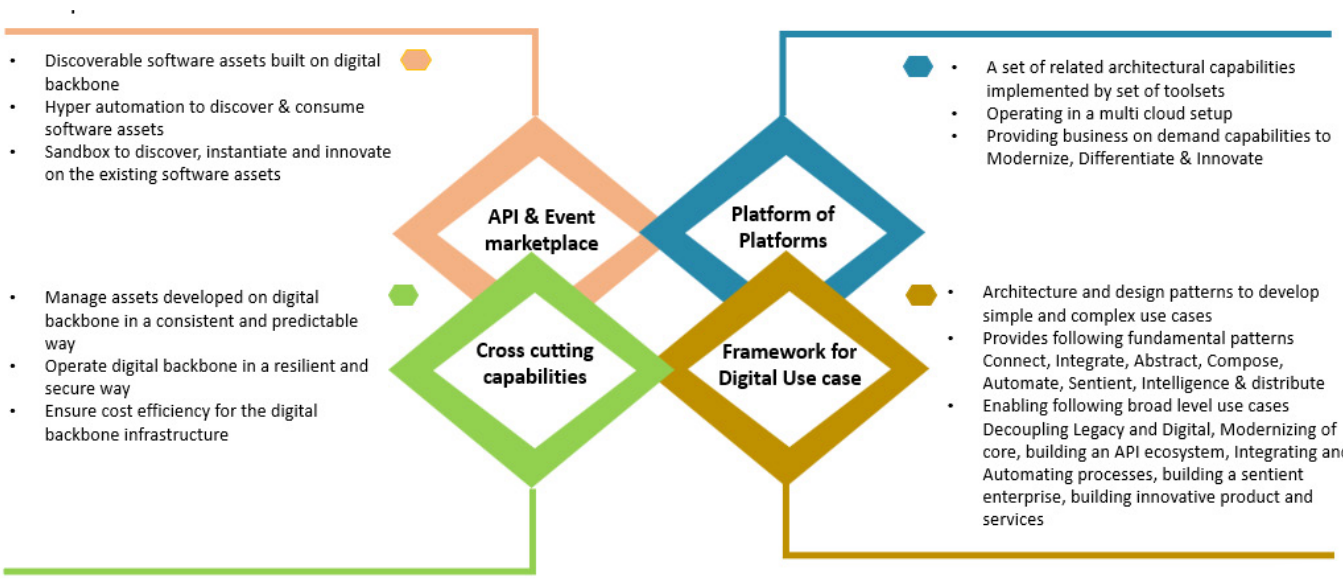


Figure 2 A four pronged framework to implement a Digital Backbone

Understanding the four pronged Framework

1. Platform of platform

While hyperscalers are disrupting the traditional IT organization however, there are fundamental challenges -

- Through the as-a-service model, hyperscalers have made available IT capabilities easily. However, uncontrolled usage of these capabilities is likely to result in a support nightmare and increased operating costs.
- Aligning with one hyperscaler is not always advantageous and can lead to tight coupling or over reliance.
- Enterprises must pay attention to traditional product players who are also innovating by utilizing hyperscalers or independently. These products perform very well for certain use cases that enterprises capitalize on.

Hence building a platform strategy for Digital Backbone becomes extremely critical. Organizations must balance the appropriate use of hyperscalers, adopting best-of-breed and open source to harness these capabilities more easily. The critical rules while crafting a platform strategy include:

- Ensure hyperscalers services remain easy to use in a controlled environment
- Adopt best of breed platforms to differentiate
- Use a combination of open source and hyperscaler services for a standard set of use cases
- Ensure productivity, resilience, and security are uncompromised for building a Digital Backbone

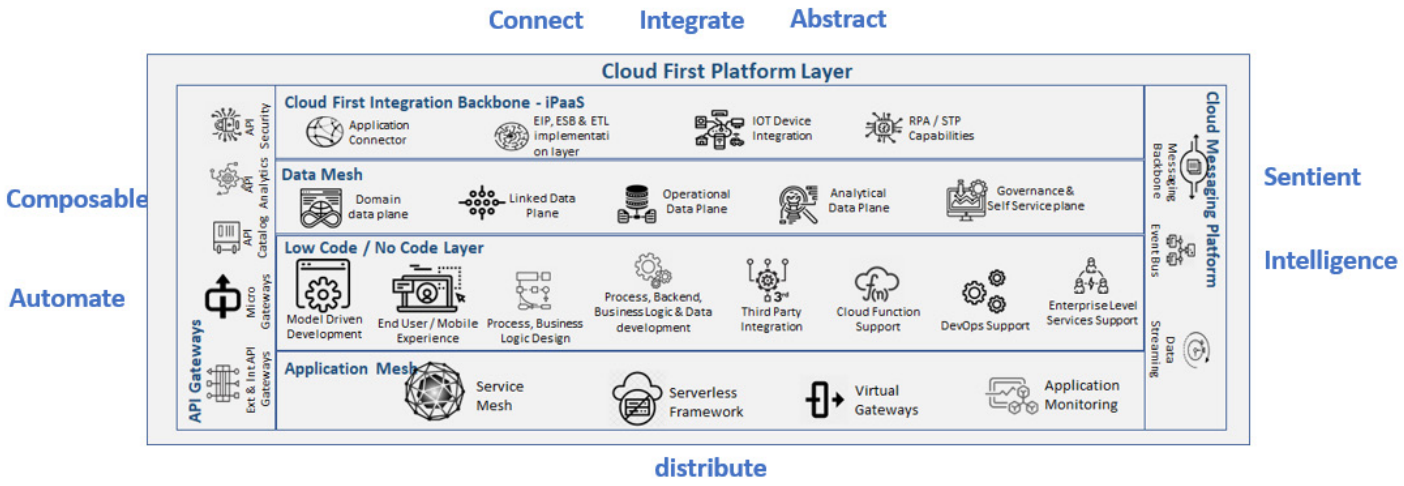


Figure 3 Core layers in a platform

- The core platform layer of any Digital Backbone comprises six fundamental layers specifically designed to support a base framework for Connect, Integrate, Abstract, Compose, Automate, Sentient, Intelligence and Distribute. The core platform layers include:

  - **Cloud based messaging platform** – enables a communication network across the Digital Backbone and enterprise application landscape. A combination of cloud native messaging capabilities and a messaging platform such as Solace, Kafka should be evaluated for setting up a cloud-based messaging platform.

  - **API Gateways** – While hyperscalers today provide API gateways, platforms like the MuleSoft Anypoint platform, APIGEE and Kong offer more comprehensive capabilities. In the current setup, where a hyperscaler-specific strategy is inevitable, creating an enterprise API strategy that includes the best cloud-based API platforms and micro-API gateways is vital. However, organizations need to create a common control and management plane for all API gateways to drive the API with a product mindset.

  - **Cloud First Integration Backbone (iPaaS)** - provides the capability to integrate data and context across legacy, modernized applications on cloud and SaaS applications within an enterprise. This layer acts as a glue for any enterprise. The organization must adopt a strategy where the best hyperscaler based and open source based options can coexist to operate the integration layer in a more optimized way. For example, it may choose a cloud based integration layer for specific use cases like IoT integration or data lake integration. On the other hand, the application integration strategy may choose a superior product as it offers better connectivity to enterprise applications.

  - **LC/NC Platform** – enables the composition of different applications required for building digital apps. This layer focuses on productivity improvement necessary to launch digital initiatives quickly. Both hyperscalers and strong traditional players are focusing on LC/NC capabilities. However, it is important to choose a platform that enables different use cases such as process apps, experience apps and analytics apps, and consider features enabling cloud deployment.

  - **APP Mesh** – a critical application infrastructure capability that warrants careful consideration. With Kubernetes ecosystem developing and serverless Framework gaining ground, organizations must choose an application mesh that supports both. Furthermore, they must create an abstraction layer that can manage deployment across different Kubernetes ecosystems and serverless frameworks.

  - **Data Mesh** – an evolving area that enables domain apps development data highway creation for digital use cases and facilitates analytical use cases as part of Digital Backbone.

Digital Backbone in action

A large pharma company benefited from Infosys' comprehensive Digital Backbone platform. Infosys combined top-of-the-line packages, creating an API and Event mesh around an S4 ecosystem and other cloud applications. As a result, composable applications for various digital use cases became possible.

Infosys partnered with a large computer hardware company to create a next-gen digital platform. We combined an application mesh and LC/NC setup to develop digital applications across a multi-cloud ecosystem, helping the business deliver digital apps within three weeks.

2. Digital use cases

Digital Backbone involves building a digital ecosystem using building blocks of enterprise capabilities to ensure plug and play. Any Digital Backbone requires three fundamental framework layers that sustainably create digital apps. They will drive reuse and harness enterprise capability for differentiation and innovation.

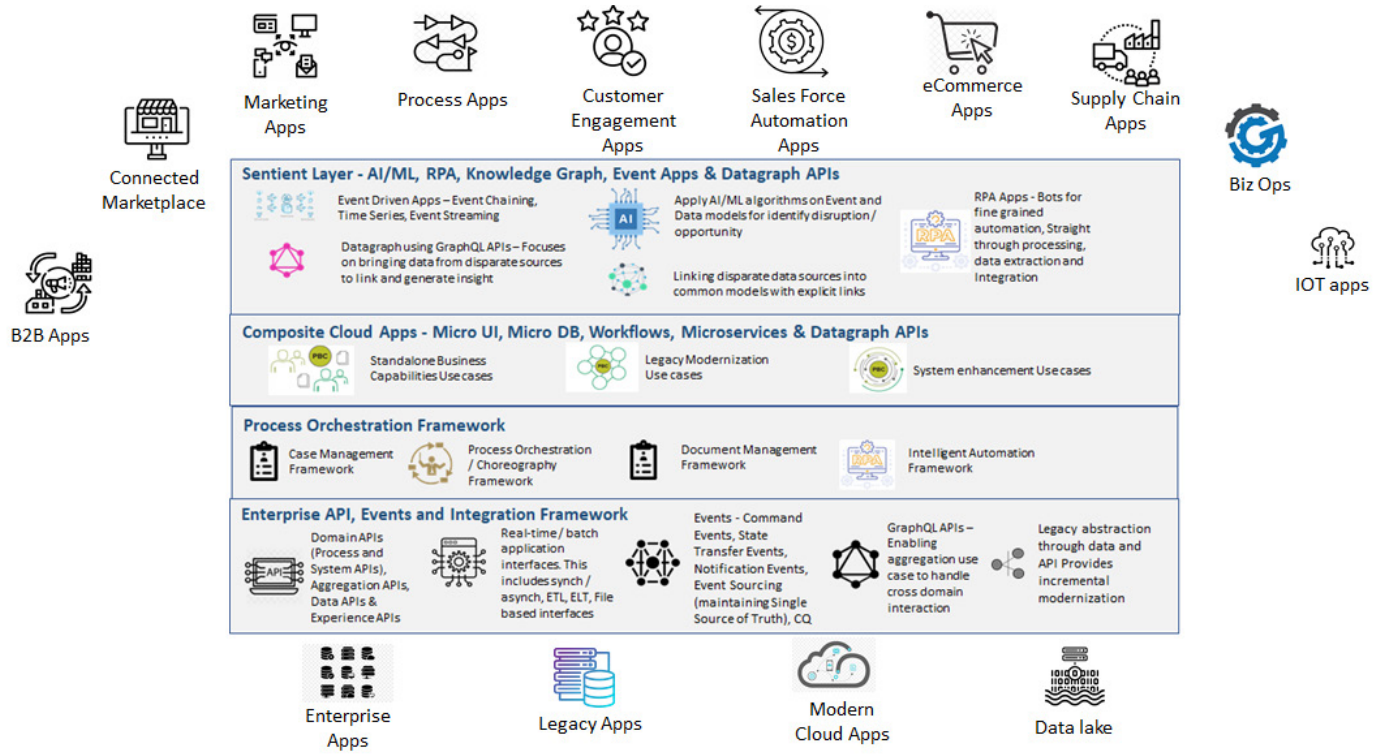


Figure 4 Developing Digital Use Cases

- **Enterprise API, Events, and Integration Asset layer** – implements a set of API, Events and Integration assets which allows organizations to make available existing application and business capabilities in a consumable manner for the digital ecosystem evolution. The core building blocks of this layer are:
  - **Connect** – Ability to provide connectivity to a host of custom packages and cloud apps ecosystem. IoT integration will be a key differentiator for connectivity use cases.
  - **Integrate** – Ensures seamless data flow across applications either in batch or real-time. With the cloud apps ecosystem evolving, smooth integration between on premise and off premise applications will be essential.
  - **Abstract** – Capability to abstract applications legacy or cloud apps as APIs and events representing a business function or services will be key.
  - **Aggregate** – Provides the ability to combine a set of APIs to consolidate APIs. GraphQL API is an essential capability for this layer to create composite APIs.
- **Composite Cloud Apps** - Micro UI, Micro DB, Workflows, Microservices and Datagraph APIs – helps create various digital applications on top of existing application ecosystems, whose services are made available through APIs and Events. Using this layer, organizations can compose diverse digital apps to differentiate. This layer implements the following types of use cases -

- **Composable use case** – either modernize legacy applications or extend existing application capabilities to differentiate
    - **Legacy modernization** – when a capability must be replaced, or functionality upgraded in a larger legacy system. For example, in a core banking modernization engagement, we implemented a payer processer PBC to better control payment pre-processing rules based on regulatory needs.
    - **System enhancement** - specific business capabilities get extended in response to market needs. For example, we implemented a pricing PBC during core banking modernization to control pricing rules based on country and product combination.
- **Automate use case** – automate or improve existing business processes using workflow capabilities or using a better process experience for end users
    - Standalone implementation focusing on plugging a gap in business capability, for example, automating paper based processes
- **Sentient Layer** – essential to building an organizational response system where a combination of Event Apps AI/ML, Knowledge Graph & AI/ML, and Data graph & AI/ML helps create a series of applications that can introspect events, linked data, and failures to identify potential opportunities.
    - **Event Apps & AI/ML** – link events from different related or unrelated sources, apply time series-based processing to identify a potential opportunity or failure. For example, a credit card giant employed this capability to correlate events across the web channel, POS events and geolocation events to identify fraud and, at the same time, push offers
    - **Knowledge Graph & AI/ML** – link data intuitively and utilize AI/ML to identify anomalies or predict outcomes. For example, a large confectioner client benefited from the Knowledge Graph technique to track products across warehouses and pallets. As a result, it improved the hold and release process.
    - **Datagraph & AI/ML** – This technique employs GraphQL APIs to source data from disparate systems and links them on demand. It then applies AI/ML to identify opportunities. For example, a typical use case in the supply chain function involves pulling data from the warehouse and supply chain planning systems for the supply chain control tower.
    - **RPA** - provides the necessary automation capabilities to respond to an opportunity or threat.

Digital Backbone in action

Infosys utilized a composable enterprise construct to deliver an SME banking application for a large global bank. Thanks to Digital Backbone, the time to open an account and ensure credit was drastically reduced to under 30 minutes from the earlier 14 days.

3. API & Event Marketplace for composable enterprise

As enterprises adopt distributed business models, APIs and Events become the core fabric for digital bonding. Here, organizations aim to break down application silos into consumable business capabilities, forming the building blocks to compose newer capabilities.

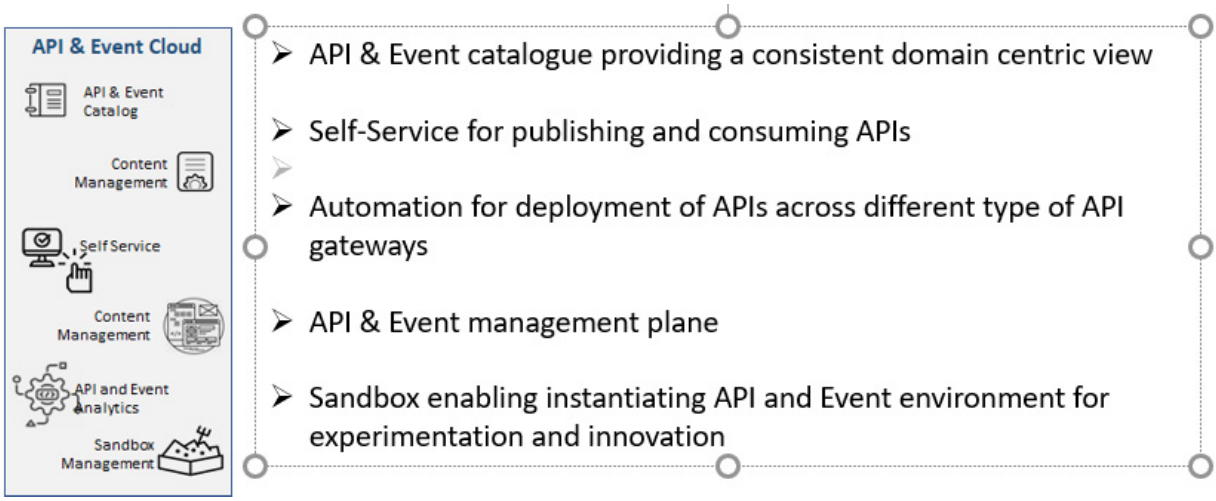


Figure 5 API & Event Marketplace

Digital Backbone in action

Infosys worked with a global pharma company to create an API and Event marketplace creating an API and Event mesh for a composable enterprise.

For a manufacturer in the US, Infosys created an API marketplace for partner collaboration to build newer digital use cases

4. Cross-cutting capabilities

The Digital Backbone evolves continuously as organizations remain steadfast in their digital transformation journey. Cross-cutting capabilities gain focus as they hold the Digital Backbone together for an enterprise. The key principles for cross-cutting capabilities are

- Shared secure infrastructure – provides a common plane for managing the underlying infrastructure for Digital Backbone
- Shared layer to realize a polycloud architecture to provide a common backplane that abstracts public and private cloud
- Security by design which ensures Digital Backbone complies with security and data policies
- Privacy by design for both external and internal users
- Adopt PAAS model supporting multi-tenancy
- Layered architecture with well-defined layers for scalability and resilience
- Design for internet scale - adopt microservices architecture for scalability
- Adopt cloud native design principles such as stateless, design for resilience with each component having a micro perimeter, adopt a polyglot architecture, make components immutable and design for automation
- Unbundled capabilities, where services drive interaction
- Even driven architecture, where events drive the flow
- Configuration driven to enable reuse and agility to change
- Observability - A meta observer for platforms that collects events for all interactions, not just transactions but complex interactions involving the behavior of people
- Feedback and data gathering inflows via events
- Utilize knowledge graph and digital brain to drive insights from events
- DevSecOps to enable automation and reuse
- Configuration driven to enable automation and release
- Infrastructure as a code to enable cross cloud deployment and create environment instances
- Ensure application analysis such as software composition analysis, static and dynamic application security testing
- Integrated identify and access management to ensure authentication and authorization control
- Services network control and segmentation utilizing service mesh
- Ensure auditing, monitoring, and alerting is built into the DevSecOps process

A reference model for the Digital Backbone

As hyperscalers continue to deliver digital services and product vendors push multi-cloud agendas, Digital Backbone also keeps pace by evolving. While customers use the cloud increasingly, it will remain a hybrid landscape for the near future. As a result, Digital Backbone will increasingly be included in microservices, APIs and iPaaS.

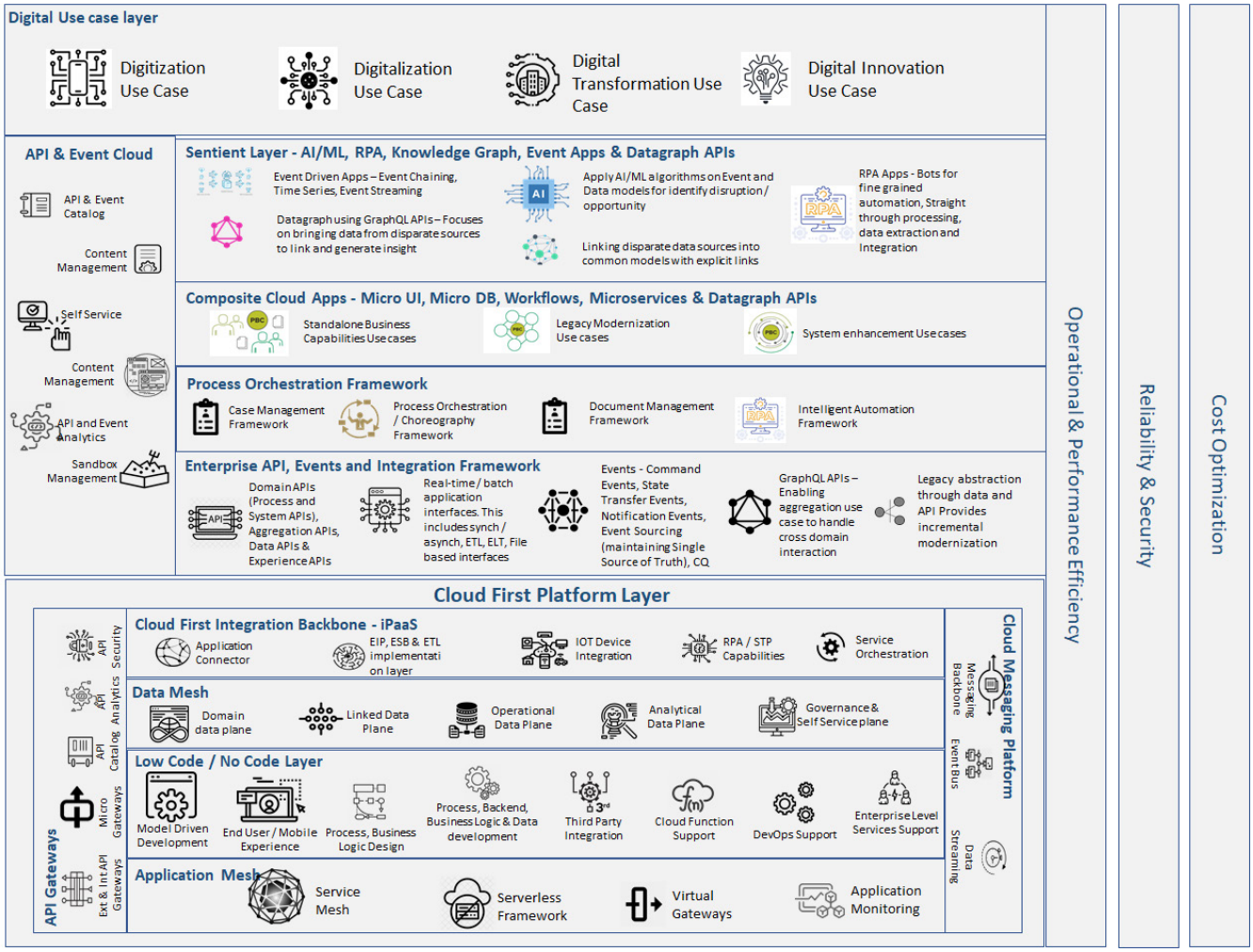
We expect these trends to emerge –

- Enhanced understanding of the users becomes critical. Questions such as whether all employees are experts or a specific set of people (e.g., business analysts) who are deemed experts will become common.
- Customers will see APIs, microservices, and integration merge into a unified platform.
- Companies will increasingly desire to utilize these services as subscriptions based on usage.

However, Digital Backbone must be built with an evolving mindset. Figure 6 provides a complete reference model for Digital Backbone.

The supporting core architectural principles for platforms include:

- Cloud native architecture where services are designed and organized as microservices, thus supporting a 12 factor apps framework
- Serverless architecture for certain types of applications within digital transformation
- Support containerized architecture to ensure multicloud deployment



Organization Model for delivering Digital Backbone

Four key aspects are vital for managing Digital Backbone well.

Business First – Simply put, this means better alignment of strategy to deliver tangible business benefits. These can be through financial benefits realized from simplified operations or bringing speed and agility for new revenue generating business innovation. This is typically addressed through a dedicated Digital Backbone Business Office.

Frictionless Governance - As hyperscalers and cloud software vendors innovate rapidly, it becomes essential for enterprises to allow controlled adoption of such services and at the same time not slacken innovation. A robust cloud architecture and technology office can help by deciding the right platform strategy, architecture and security management with necessary compliance to organizational policies.

Simplified Consumption - Cloud lends itself to a simple consumption experience for independent and autonomous teams. An enterprise should ensure that simplicity is not compromised despite its governance practices and policies. A strong digital platform engineering discipline in the enterprise would enable projects or products to utilize cloud at scale. It will simplify the provisioning of cloud landing zones, services, and software and improve developer productivity by bringing consistent tools sets while complying with agreed best practices and patterns.

Always Ahead - Cloud has become the preferred medium for software vendors to deliver advanced solutions. An enterprise should ensure that it retains its ability to capitalize on these innovations to get ahead of the competition. A Digital Backbone innovation office should be tasked with continually exploring such solutions and proactively introducing these capabilities through engineered platforms.

The initial setup of Digital Backbone delivery was done through a centralized unit or center of excellence model with on premise technologies as part of a natural transition to the cloud. Clearly, expectations today revolve around speed, flexibility and scale. As a result, there is an urgent need for models that foster innovation and agility, dependency-free teams, and dynamically scalable and distributable integration. While these requirements cannot be met overnight, having the right organizational model that balances the current integration while considering the new is crucial. It is essential to use self-service automation tools that can administer, provision and govern much of the routine activities, use cloud-powered platforms for scale and have autonomous delivery capabilities for the new integration programs to be delivered seamlessly.

Find out how Infosys helped a manufacturing client shorten the delivery of interfaces drastically from months to days.

> **For one of our manufacturing clients, we moved to Digital Backbone using a self-service citizen integration platform with all inbuilt administration, provisioning, and governance features, which has shortened the delivery of interfaces from months to days.**
>
> **We have set up a flexible squad scaling model for another financial service client that manages the platform as its core activity but can scale up to deliver the integrations for a new program on its own/working with the existing application team.**

Benefits of Digital Backbone

Digital Backbone enables web scale industrialized infrastructure and capabilities to support digital transformation across the enterprise, connecting legacy, cloud apps and digital capabilities for next gen digital business platforms. The chief benefits include:

- Unparalleled experience by enabling on demand data required for building experience apps for employees and customers
- API and Event marketplace to enable composable enterprise for faster time to market
- Standardized infrastructure and platform capabilities driving consistent business capability across different digital initiatives
- Improved performance through a web scale architecture
- Bring in innovation required for digital transformation

Conclusion:

IT is no longer just a support department. On the other hand, it plays a strategic role in an organization's growth. It is evident that organizations will be in a hybrid state for a while, amplifying the need for a robust plan to support a hybrid Digital Backbone. For this to happen, organizations must invest in innovative technologies and products. In addition, organizations should focus on people and processes. With changing roles and responsibilities of IT teams, there is a need to invest in refreshing and reskilling the workforce

For more information, contact askus@infosys.com

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