The Intelligent Digital Mesh: Laying the Foundation for Next-Gen Digital Ecosystems

Abstract

The breakneck pace of technological change is driving the world to the next level of innovation in the digital ecosystem. Emerging technologies such as the cloud, Internet of Things (IoT), artificial intelligence (AI) are enabling an intelligent, connected, and digitally empowered mesh of people, things, and services.

The result: new digital business models and ecosystems are emerging to reorient business and customer relationships. This creates a huge opportunity for enterprises to enable a pervasive user experience, and derive greater value from connected platforms and near real-time integration - both within and beyond organizational boundaries.

The emerging digital ecosystem requires a shift at all levels, from enterprise wide digital strategy to architecture, networks, and individual applications. To deliver flexible and adaptable systems, IT leaders must consider a fluid digital mesh architecture underpinned by microservices, APIs, serverless computing, digital technology platforms, and the cloud. This paper discusses the key components and benefits of digital mesh architecture, and offers insights into overcoming the challenges that stand in the way of its implementation.
Connected Digital Mesh Architecture: Three Key Components

According to Gartner, the Intelligent Digital Mesh will act as the foundation for next-generation digital business models and ecosystems. Realizing this, many businesses have already begun transitioning to the world of digital ecosystems to drive value through improved interactions within and outside the organizational boundary. They are leveraging artificial intelligence (AI), data science, cloud, and advanced machine learning based solutions to significantly improve information analysis as well as interaction among systems.

Smart digital services delivered through multiple devices in real time, create an ambient and intelligent digital experience for people and organizations. Each interconnected element in a digital mesh ecosystem communicates through standard APIs, eliminating the dependency on underlying technologies.

The connected digital mesh architecture helps businesses deal with the ever expanding connections and capitalize on emerging opportunities. An ideal connected digital mesh architecture comprises the following three components:

- **Connectivity**: A common architecture pattern that is being leveraged to digitize and connect a mesh is the microservices, cloud, and API based server-less computing model. It provides an integrated ecosystem that enables an enterprise to collaborate through a wide range of devices, communicate in near real-time, and use data from multiple sources.

- **Security**: Connected digital mesh ecosystems require an adaptive and multi-layered security architecture with user and entity behavioral analytics to deal with complex or unanticipated consequences such as cyberattacks, particularly in the IoT and AI-based systems.

- **Stakeholder Participation**: Extended and direct participation of stakeholders beyond the enterprise boundary is critical for success in today’s connected digital world. Enterprises are therefore looking for standardized digital platforms to interact with customers, partners, adjacent industries, and even competitors to drive mutually beneficial goals, including commercial gains and innovation.
Enterprises must invest in building user-centric, intelligent digital networks to increase the interaction between businesses, people, and things, narrowing down the fissure between virtual and physical worlds.

The Impact of Evolving Trends on Business Strategy and IT

The emerging intelligent and integrated digital network demands a fresh look at strategic business and technology planning. Leveraging the real-time links between the ever-expanding set of people, devices, content, and services, to bring incremental business value will be a major focus area for enterprises.

The linear, one-dimensional value chain that has been part of enterprise business models for long will give way to a multi-dimensional and multi-directional digital ecosystem for co-innovation, risk management, and value creation, while ensuring comprehensive risk management. Parallel, open, API-based innovation, real-time data driven customer relationships, faster feedback loops, and rapid learning will be key to generating business value from the new ecosystem.

Disruptive technologies and new digital trends will bring big shifts in almost all areas of IT, including uses cases for digital technologies, underlying architectures, and best practices to support the intelligent digital experience.

Managing the Multi-pronged Implementation Challenges

As digitalization continues to gain pace, it also brings with it certain challenges. The increasing complexity of connections raises unprecedented expectations from IT for a multichannel, continuous, and ambient digital experience. In other words, users expect devices and experiences to be totally customized to their individual needs. Building such an experience is contingent upon making changes to the underlying digital technologies, applications and IT services, as well as security architecture. The success of a digital mesh ecosystem depends on IT systems’ ability to support business agility needs.

The mammoth challenge however lies in aligning dynamic business needs with user expectations to create continuous and ambient digital experiences across channels. Managing multi-channel, real-time information flow in an ever expanding and dynamic network needs a new approach to building digital and mesh-ready applications.
How Businesses Will Benefit

The connected digital mesh architecture allows enterprises to leverage cloud and API based scalable solutions. Figure 1 represents an indicative architecture to build microservices and API based ecosystems that connect the applications and data within and outside the enterprise boundary seamlessly.

Figure 1: Digital Mesh Solution Architecture

A digital mesh architecture will allow enterprises to:

- Build an agile, flexible, and cloud-ready ecosystem to enable real-time connectivity of employees, business processes, business data, things, and services to help address high volumes of traffic and become cloud-native and mobile-first.

- Extend the connections beyond organizational boundaries to create an ambient experience that allows users to switch between devices without losing the context.

- Overcome the key challenges typically encountered when embarking on digital transformation, such as cost, pace, and quality of change, with the ability to react more quickly to business changes as compared to that in linear business models. Digital mesh architecture enables enterprises to build one application for all categories of consumers leveraging API-based headless architecture.
Digital mesh architecture enables enterprises to become ‘API economy’ ready and unlock opportunities for new business concepts and lines of business.

- Leverage technologies such as artificial intelligence, data science, and advanced machine learning to build intelligent and auto configurable interfaces between applications, reducing the need to maintain costly integration components.
- Expose the core business capabilities to multiple systems and channels in a near real-time to create an integrated and holistic enterprise system.
- Embrace the API economy to rapidly create new digital assets and unlock their true value.

**Embracing Technology Convergence will be Key to Success**

The digital mesh provides significant opportunities for enterprises to realize the first-mover competitive advantage. It lays the base for building highly fluid, intelligent, and adaptive digital business solutions. Be it smart homes, smart cars, or intelligent business applications, mesh networking will be at the core of tomorrow’s businesses, given that an estimated 21 billion connected sensors and endpoints will be deployed by 2020. Artificial intelligence and machine learning will further drive the creation of innovative physical and virtual systems.

For high tech companies, the convergence of digital technologies and trends is an exciting development that can drive competitive advantage and strengthen market leadership. Closely monitoring the developments and making relevant investments in research and development will be critical to staying ahead of the curve.

**References**

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