Top 10 Strategic Technology Trends for 2017: A Gartner Trend Insight Report

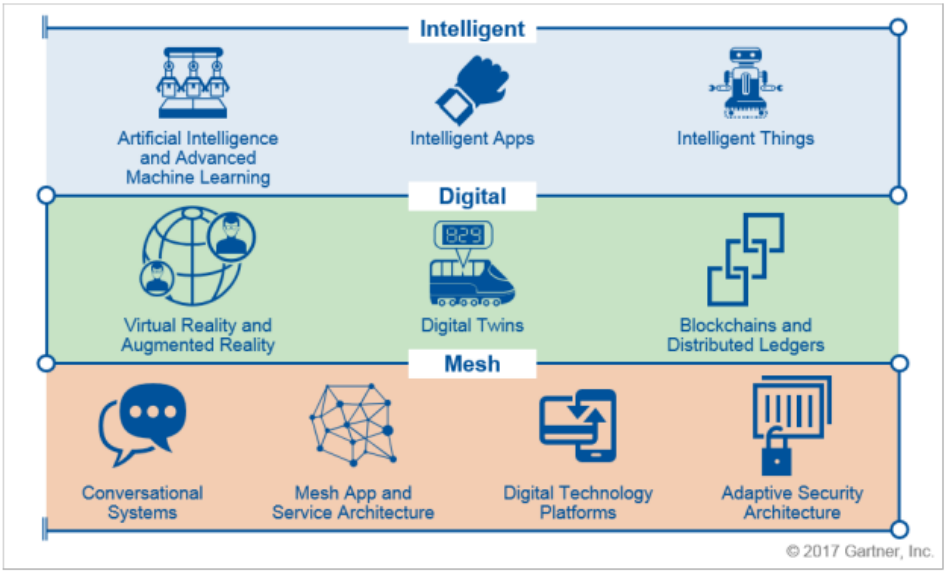
Executive Overview

Our top 10 strategic technology trends are rapidly evolving breakout trends affecting digital business and its ecosystems.

They have the most disruptive potential through 2021. Our top 10 trends pose the biggest threat and offer the most potential for competitive advantage. They fall into three main themes (see Figure 1):

- **The intelligent theme** explores how AI and machine learning are seeping into virtually every technology and represent a major battleground for technology providers over the next five years. The use of AI and machine learning for well-scoped and targeted purposes delivers more adaptable, flexible and potentially autonomous systems.
- **The digital theme** focuses on blending the digital and physical worlds to create an immersive, digitally enhanced environment. Digital services, connections and interfaces link the two. Digital trends, along with opportunities enabled by AI and machine learning, are driving the next generation of digital business and the creation of digital business ecosystems.
- **The mesh theme** refers to exploiting connections between an expanding set of people and businesses, as well as devices, content and services, to deliver digital business outcomes. The mesh demands new interface modalities (for example, conversational interfaces), security models, technology platforms and approaches to solution design.

Figure 1. The Top 10 Strategic Technology Trends for 2017



Source: Gartner (March 2017)

Intelligent: AI and Advanced Machine Learning Enhance Systems
AI and machine learning have reached a critical tipping point and will increasingly augment and extend virtually every technology enabled service, thing or application. Creating intelligent systems that learn, adapt and potentially act autonomously rather than simply execute predefined instructions is primary battleground for technology vendors through at least 2020.

Trend No. 1: AI & Advanced Machine Learning

AI and machine learning (ML), which include technologies such as deep learning, neural networks and natural-language processing, can also encompass more advanced systems that understand, learn, predict, adapt and potentially operate autonomously. Systems can learn and change future behavior, leading to the creation of more intelligent devices and programs. The combination of extensive parallel processing power, advanced algorithms and massive data sets to feed the algorithms has unleashed this new era.

In banking, you could use AI and machine-learning techniques to model current real-time transactions, as well as predictive models of transactions based on their likelihood of being fraudulent. Organizations seeking to drive digital innovation with this trend should evaluate a number of business scenarios in which AI and machine learning could drive clear and specific business value and consider experimenting with one or two high-impact scenarios..

Trend No. 2: Intelligent Apps

Intelligent apps, which include technologies like virtual personal assistants (VPAs), have the potential to transform the workplace by making everyday tasks easier (prioritizing emails) and its users more effective (highlighting important content and interactions). However, intelligent apps are not limited to new digital assistants – every existing software category from security tooling to enterprise applications such as marketing or ERP will be infused with AI enabled capabilities. Using AI, technology providers will focus on three areas — advanced analytics, AI-powered and increasingly autonomous business processes and AI-powered immersive, conversational and continuous interfaces. By 2018, Gartner expects most of the world's largest 200 companies to exploit intelligent apps and utilize the full toolkit of big data and analytics tools to refine their offers and improve customer experience.

Trend No. 3: Intelligent Things

New intelligent things generally fall into three categories: robots, drones and autonomous vehicles. Each of these areas will evolve to impact a larger segment of the market and support a new phase of digital business but these represent only one facet of intelligent things. Existing things including IoT devices will become intelligent things delivering the power of AI enabled systems everywhere including the home, office, factory floor, and medical facility.

As intelligent things evolve and become more popular, they will shift from a stand-alone to a collaborative model in which intelligent things communicate with one another and act in concert to accomplish tasks. However, nontechnical issues such as liability and privacy, along with the complexity of creating highly specialized assistants, will slow embedded intelligence in some scenarios.

Digital: Bringing together the Real and Virtual Worlds
The lines between the digital and physical world continue to blur creating new opportunities for digital businesses. Look for the digital world to be an increasingly detailed reflection of

the physical world and the digital world to appear as part of the physical world creating fertile ground for new business models and digitally enabled ecosystems.

Trend No. 4: Virtual & Augmented Reality

Virtual reality (VR) and augmented reality (AR) transform the way individuals interact with each other and with software systems creating an immersive environment. For example, VR can be used for training scenarios and remote experiences. AR, which enables a blending of the real and virtual worlds, means businesses can overlay graphics onto real-world objects, such as hidden wires on the image of a wall. Immersive experiences with AR and VR are reaching tipping points in terms of price and capability but will not replace other interface models. Over time AR and VR expand beyond visual immersion to include all human senses. Enterprises should look for targeted applications of VR and AR through 2020.

Trend No. 5: Digital Twin

Within three to five years, billions of things will be represented by digital twins, a dynamic software model of a physical thing or system. Using physics data on how the components of a thing operate and respond to the environment as well as data provided by sensors in the physical world, a digital twin can be used to analyze and simulate real world conditions, responds to changes, improve operations and add value. Digital twins function as proxies for the combination of skilled individuals (e.g., technicians) and traditional monitoring devices and controls (e.g., pressure gauges). Their proliferation will require a cultural change, as those who understand the maintenance of real-world things collaborate with data scientists and IT professionals. Digital twins of physical assets combined with digital representations of facilities and environments as well as people, businesses and processes will enable an increasingly detailed digital representation of the real world for simulation, analysis and control.

Trend No. 6: Blockchain

Blockchain is a type of distributed ledger in which value exchange transactions (in bitcoin or other token) are sequentially grouped into blocks. Blockchain and distributed-ledger concepts are gaining traction because they hold the promise of transforming industry operating models in industries such as music distribution, identify verification and title registry. They promise a model to add trust to untrusted environments and reduce business friction by providing transparent access to the information in the chain. While there is a great deal of interest the majority of blockchain initiatives are in alpha or beta phases and significant technology challenges exist.

Mesh: Making the Connection

The mesh refers to the dynamic connection of people, processes, things and services supporting intelligent digital ecosystems. As the mesh evolves, the user experience fundamentally changes and the supporting technology and security architectures and platforms must change as well.

Trend No. 7: Conversational Systems

Conversational systems can range from simple informal, bidirectional text or voice conversations such as an answer to “What time is it?” to more complex interactions such as collecting oral testimony from crime witnesses to generate a sketch of a suspect. Conversational systems shift from a model where people adapt to computers to one where the computer “hears” and adapts to a person’s desired outcome.

Conversational systems do not use text/voice as the exclusive interface but enable people and machines to use multiple modalities (e.g., sight, sound, tactile, etc.) to communicate across the digital device mesh (e.g., sensors, appliances, IoT systems).

Trend No. 8: Mesh App and Service Architecture

The intelligent digital mesh will require changes to the architecture, technology and tools used to develop solutions. The mesh app and service architecture (MASA) is a multichannel solution architecture that leverages cloud and server less computing, containers and microservices as well as APIs and events to deliver modular, flexible and dynamic solutions. Solutions ultimately support multiple users in multiple roles using multiple devices and communicating over multiple networks. However, MASA is a long term architectural shift that requires significant changes to development tooling and best practices.

Trend No. 9: Digital Technology Platforms

Digital technology platforms are the building blocks for a digital business and are necessary to break into digital. Every organization will have some mix of five digital technology platforms: Information systems, customer experience, analytics and intelligence, the Internet of Things and business ecosystems. In particular new platforms and services for IoT, AI and conversational systems will be a key focus through 2020. Companies should identify how industry platforms will evolve and plan ways to evolve their platforms to meet the challenges of digital business.

Trend No. 10: Adaptive Security Architecture

The evolution of the intelligent digital mesh and digital technology platforms and application architectures means that security has to become fluid and adaptive. Security in the IoT environment is particularly challenging. Security teams need to work with application, solution and enterprise architects to consider security early in the design of applications or IoT solutions.

Multi-layered security and use of user and entity behavior analytics will become a requirement for virtually every enterprise.

Opportunities and Challenges

- Identifying the business opportunities, challenges and disruptions presented by strategic technology trends is an important input into strategic business planning.
- Artificial intelligence (AI) and advanced machine-learning techniques are opening up a new frontier for digital business, as virtually every application, service and digitalized thing incorporates an intelligent aspect.
- The merging of, and interaction between, the physical and digital worlds provides a digital business revenue opportunity and sets the stage for digital business ecosystem development.
- An expanding mesh of rich connections between devices, things, services, people and businesses demands systems that are more adaptable and responsive to changing needs.

What You Need to Know

Organizations gain competitive advantage when they identify trends that are poised to break out of the emerging state and exploit them before they become mainstream.

- AI and advanced machine learning give rise to new classes of physical and virtual systems, as well as delivering intelligent enhancement to existing software and things.
- The digital world will become an increasingly detailed reflection of the physical world, and the digital world will appear as part of the physical world, creating fertile ground for new business models and digitally enabled ecosystems.
- The user-centric intelligent digital mesh requires significant changes in the underlying digital technology platforms, application and service architectures, and security architecture to deliver greater value.