5 Trends Drive the Gartner Hype Cycle for Emerging Technologies, 2020

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The Gartner Hype Cycle for Emerging Technologies, 2020 highlights 30 technology profiles that will significantly change society and business over the next five to ten years.

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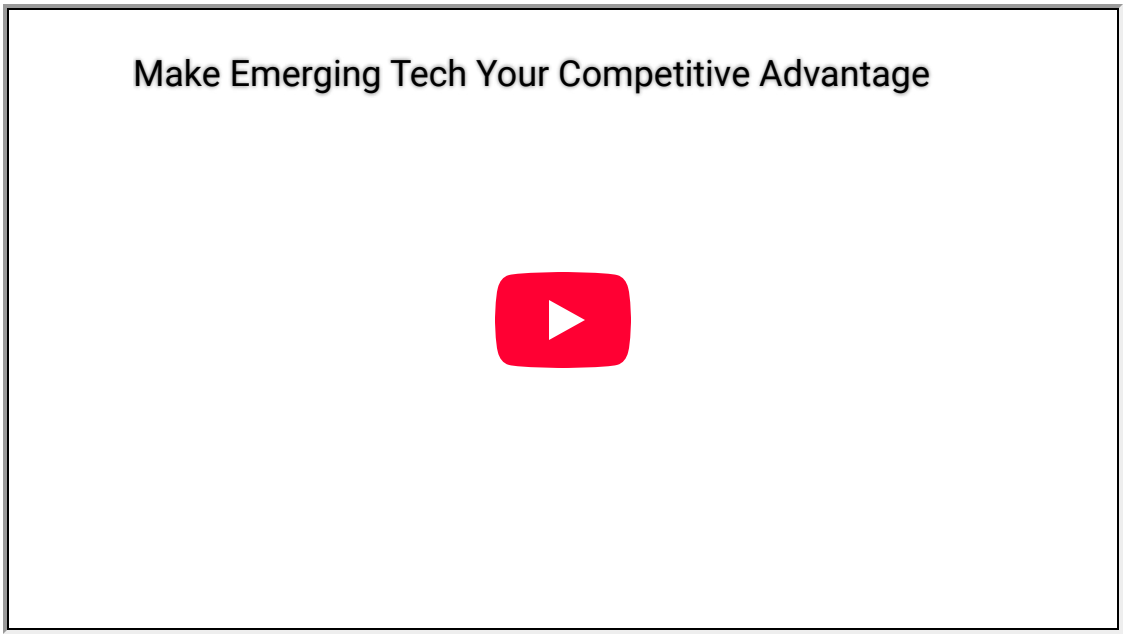
In most cities in China, citizens and visitors must download Health Code — an app that indicates COVID-19 status — to access many public and private spaces and services. A green screen means the person is free to travel, yellow indicates required quarantine and red means a confirmed infection.

“ The Hype Cycle for Emerging Technologies is a unique Hype Cycle that distills more than 1,700 unique technologies”

In India, the Aarogya Setu app indicates which travelers are “safe” to use rail and air travel. The United Arab Emirates recently launched ALHOSN UAE, which also indicates via color if a person is okay, infected or need to be quarantined, but also has an option for “hasn’t been tested.” ALHOSN UAE is currently being used to grant access to air travel.



All of these apps, called health passports, are examples of a pandemic/epidemic response technology and one of the new additions to the Gartner Hype Cycle for Emerging Technologies, 2020. The sheer populations in India and China using health passports pushed this technology to a 5% to 20% market penetration, an unprecedented number for a technology just entering the **Hype Cycle (/en/research/methodologies/gartner-hype-cycle)**.

“This Hype Cycle highlights technologies that will significantly affect business, society and people over the next five to 10 years,” says Brian Burke, Research VP, Gartner. “It includes technologies that enable a composable enterprise, aspire to regain society’s trust in technology and alter the state of your brain.”

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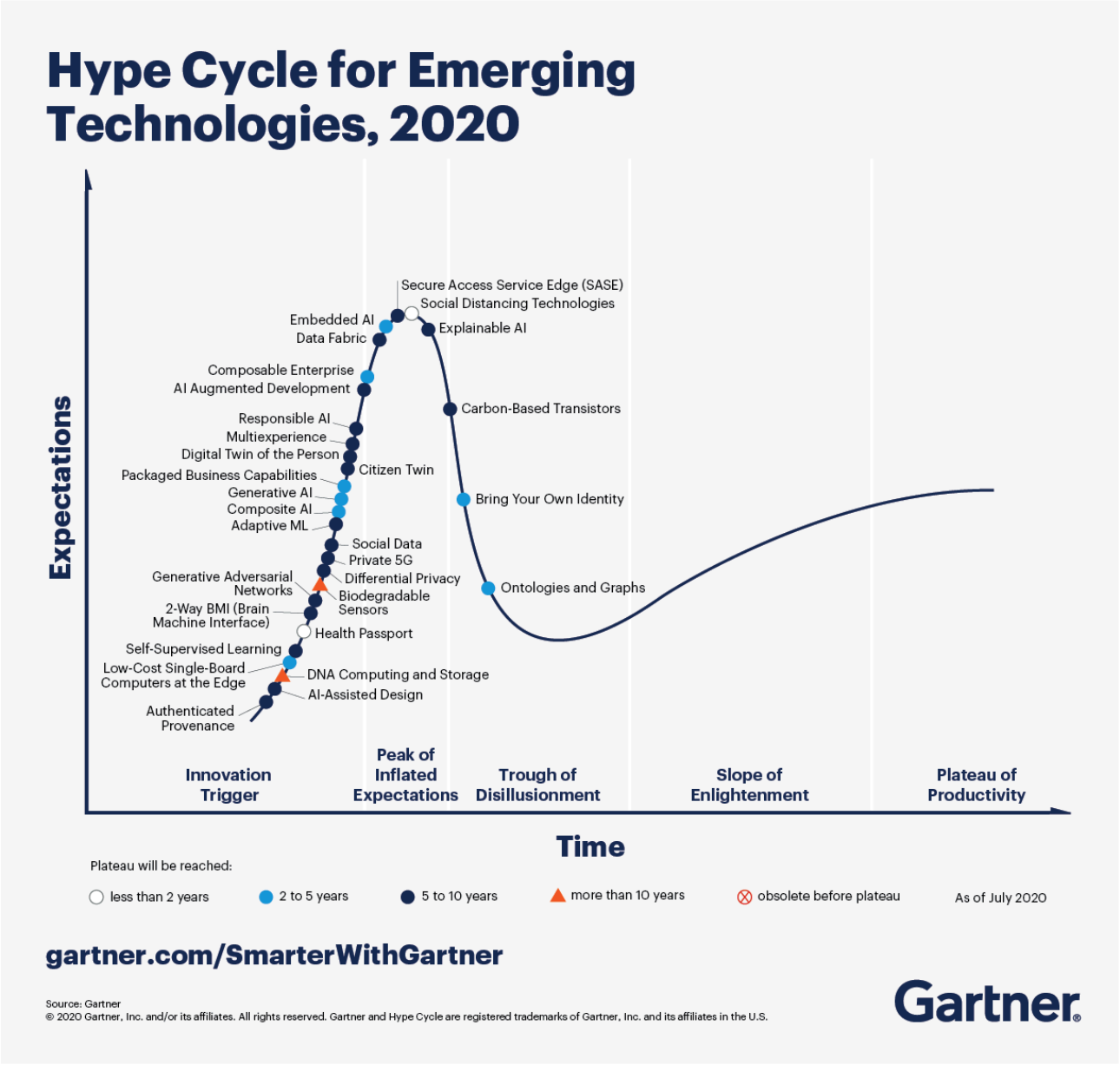
The **Hype Cycle for Emerging Technologies (/en/articles/hype-cycle-for-emerging-technologies)** is a unique Hype Cycle that distills more than 1,700 unique technologies into a list of must-know technologies and trends. This year's list highlights five unique trends:

- Composite architectures
- Algorithmic trust
- Beyond silicon
- Formative artificial intelligence (AI)
- Digital me



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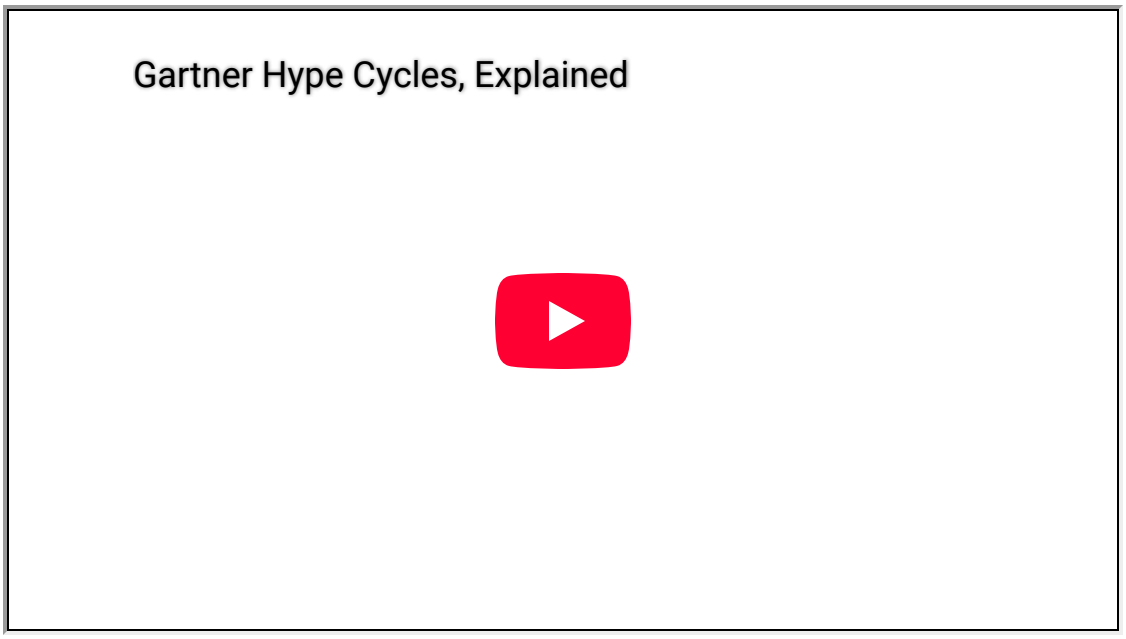
Hype Cycle Trend No. 1: Composite architectures

In the face of rapid changes and decentralization, organizations need to shift to more agile, responsive architectures. A composite architecture is made up of packaged business capabilities built on a flexible data fabric. This allows the enterprise to respond to rapidly changing business needs.

For example, a “composable enterprise” supported by a composite architecture offers increased business resilience. This modular design enables organizations to “recompose” when needed, like during a global pandemic or economic recession. The composable enterprise has four core principles: Modularity, efficiency, continuous improvement and adaptive innovation. Although many organizations apply these principles in a piecemeal fashion, a composable enterprise applies all four across all parts of its organization — from business models to how employees work.

This modular business model enables organizations to move from rigid, traditional planning to active agility. Composable enterprise thinking creates more innovation, reduced costs and better partnerships.



Other emerging technologies under this trend include packaged business capabilities, data fabric, private 5G and embedded AI.

Hype Cycle Trend No. 2: Algorithmic trust

Increased amounts of consumer data exposure, fake news and videos, and biased AI, have caused organizations to shift from trusting central authorities (government registrars, clearing houses) to trusting algorithms. Algorithmic trust models ensure the privacy and security of data, provenance of assets, and the identities of people and things.

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For example, "authenticated provenance" is a way to authenticate assets on the **blockchain (/smarterwithgartner/the-cios-guide-to-blockchain/)** and ensure they're not fake or counterfeit. While blockchain can be used to authenticate goods, it can only track the information that it is given.

To adequately track assets, they must be tracked from their source. For example, if a counterfeit item is added to the blockchain as a genuine version, the blockchain will continue to verify its authenticity based on the bad original data input. Due to the nature of the immutable ledger, it can never be modified or deleted.

Gartner believes increased interest in **blockchain (/smarterwithgartner/the-reality-of-blockchain/)**will create increased digital authentication and verification options.

Other emerging technologies in the algorithmic trust trend include differential privacy, responsible AI and explainable AI.

Hype Cycle Trend No. 3: Beyond silicon

Moore's Law predicts that the number of transistors in a dense integrated circuit would double every two years, but technology is quickly reaching the physical limits of silicon. This has led to the evolution of new advanced materials with enhanced capabilities designed to support smaller, faster technologies.

For example, "DNA computing and storage" use DNA and biochemistry in place of silicon or quantum architectures to perform computation or store data. The data is encoded into synthetic DNA strands for storage and enzymes provide the processing capabilities through chemical reactions.

Despite two successful prototypes, the technology is currently rudimentary and expensive with significant technical barriers to mainstream use. However, the impact of a successful DNA computing and storage option would transform data storage, processing parallelism and computing efficiency.

Other emerging technologies in this trend include biodegradable sensors and carbon-based transistors.

Hype Cycle Trend No. 4: Formative AI

Formative **AI (/smarterwithgartner/the-cios-guide-to-artificial-intelligence/)**is a type of AI capable of dynamically changing to respond to a situation. There are a variety of types, ranging from AI that can dynamically adapt over time to technologies that can generate novel models to solve specific problems.

For example, generative AI is a type of **AI (/smarterwithgartner/how-to-prevent-ai-dangers-with-ethical-ai/)** that can create new novel content (images, video etc.) or alter existing content. The new artifacts are similar to, but not exactly the same as, the original. This technology is responsible for deep fakes content, which can cause serious disinformation and reputational risk, and is expected to increase in numbers over the next five years. However, less nefarious uses like drug discovery and synthetic data generation — and even AI-generated artwork — are also increasing in popularity.

Other emerging technologies in this trend include composite AI, differential privacy, small data and self-supervising learning.

Hype Cycle Trend No. 5: Digital me

From health passports to digital twins, as technology integrates with people, there are more opportunities to create digital versions of ourselves. These digital models represent humans in both the real and virtual worlds.

For example, bidirectional brain-machine interfaces (BMIs), are brain-altering wearables that enable two-way communication between a human brain and a computer or machine interface. BMIs can be either wearables or implants that monitor EEGs (electrical activity in the brain) and individuals' mental states. The difference between regular monitoring BMIs and bidirectional BMI is that the latter can use electrostimulation to modify the mental state of the person.

In the business world, potential applications include **authentication (/smarterwithgartner/7-security-areas-to-focus-on-during-covid-19/)**, access and payment, immersive analytics and exoskeletons. But other applications, which have their own social and ethical concerns, might include using stimulation to boost alertness in a fatigued employee or changing the mood of an irritable teacher by applying currents to the brain. While there are many potential use cases, BMIs also introduce an additional avenue of vulnerability for would-be attackers to exploit.

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Hype Cycle for Emerging Technologies, 2020 (https://www.gartner.com/document/3987951)

*Note that some documents may not be available to all Gartner clients.

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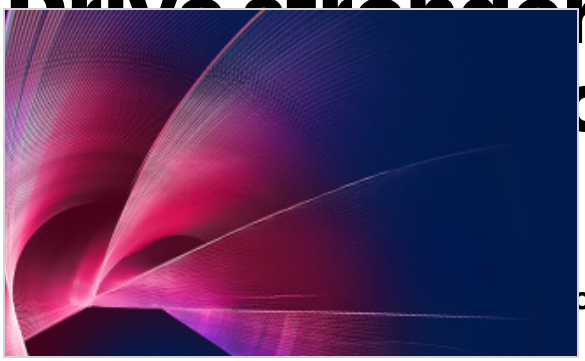

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