Everest Group®
RESEARCH

The Future of Applications

Unlocking Value through Next-generation Applications

Yugal Joshi, Vice President
Prasun Dey, Senior Analyst

Executive summary

Enterprise expectations from applications are rapidly shifting from driving business processes efficiently to enhancing stakeholder experience, building new business models, and preparing business for the future. Such evolving expectations need a dramatically different application ecosystem, as applications of the future are likely to be significantly different from their predecessors.

Next-generation applications will be better equipped to respond to enterprises' needs of agility and resilience. They will augment human capabilities, provide differentiated experiences, and operate seamlessly across business functions and the technology landscape.

However, enterprises need to find ways to make such applications simple and easier to build and capable of working autonomously. They should be mindful of the technical debt, suboptimal processes, and other limiting factors that threaten to hamper their operations. Also, enterprises should be realistic about their talent models and existing processes and fine-tune them as needed to cater to next-generation applications.

This report analyzes enterprises’ evolving expectations from applications, outlines the guiding principles to build applications that meet those expectations, describes the benefits of such applications for enterprises, and suggests a roadmap for delivering breakthrough value.
In particular, we focus on the following areas:

- New enterprise expectations from applications
- Features of applications of the future
- Key considerations when building next-generation applications
- Value drivers for applications of the future
- An approach to build future-ready applications

Enterprise expectations from applications are evolving rapidly

Enterprises expect their applications to transform their businesses and create breakthrough value

Everest Group take

As enterprises prepare to thrive in the digital era, they expect their applications to enable agile delivery, provide superior stakeholder experience, augment human capabilities in performing complex tasks, and completely take over repetitive and programmable work.

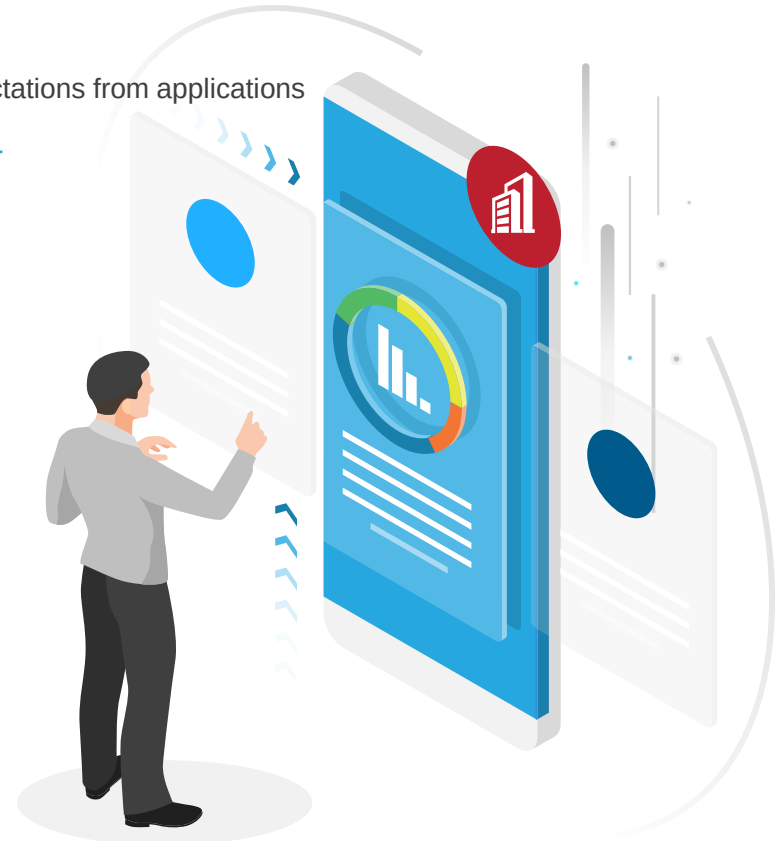
Enterprises no longer view applications from the traditional perspective of "executing a code to run business" but consider them to play a vital role in achieving sustained, meaningful, and measurable business benefits. A recent survey conducted by Everest Group indicates that 87% of enterprises consider their application priorities to have a significant influence and impact on their overall business transformation strategies.

Exhibit 1 illustrates the shift in enterprises' expectations from their applications.

EXHIBIT 1

Evolving enterprise expectations from applications

Source: Everest Group (2020)



	Applications that are	equipped for	and are	to achieve
Traditional expectations	Process centric	Support operations	Monitored and automated	Performance excellence
New expectations	Flexible and fungible	Intelligence augmentation	Autonomous and aware	Superior stakeholder experience

Let us take a closer look at the characteristics and expectations from next-generation applications:

Flexible and fungible

In a world where no business is immune to disruption, enterprises need to anticipate evolving industry needs and trends, and respond to customer requirements as they arise. The need to continuously improve products, shorten release cycles, and deliver frequent updates is common across industries, from healthcare to automobiles and retail. Thus, be it a telehealth provider that wants to add a new customer engagement feature in its mobile application, or an automobile manufacturer that promises an improved car every week, or a retailer that is competing against digital-native companies such as Amazon, all need nibble and responsive applications to evolve quickly at scale.

Enterprises are increasingly looking at new approaches to application development. Our research indicates that **59%** of enterprises[1] have adopted containers- and microservices-based application architecture

Insight-driven

The traditional goal of applications was to free humans from doing repetitive and programmable work. However, forward-looking enterprises have leveraged recent advancements in Artificial Intelligence (AI) to augment the cognitive abilities of human stakeholders via actionable insights and complex problem-solving. Be it evaluating the potential risk of a prospective insurance buyer, helping a buyer identify an appropriate product, or augmenting a purchase with a value-added service, enterprises are unlocking tremendous potential through insight-driven applications.

Autonomous and aware

While enterprises look to augment human capabilities through intelligent applications, they also need to build systems that minimize human intervention and can govern themselves. Such applications should be cognizant of the ecosystem, aware of the context, and be able to operate independently in complex situations. To this end, enterprises are extensively deploying conversational assistants to serve clients beyond the conventional service hours and building autonomous and self-healing systems to enhance service resilience.

About **73%** of enterprise leaders[1] mention that investing in intelligent automation is a core focus area of their application services strategy

1 Survey among 200+ global CXOs and application leaders from large enterprises (revenue > US$1 billion)

Experience-centric

With a surge in the number of touchpoints and a deluge of information targeted at end users, it becomes vital for enterprises to deliver differentiated, personalized, and seamless digital experiences. Enterprises expect their applications to enable and streamline the delivery of such stakeholder-driven experiences. The quality and consistency of the application experience significantly impact the experience of customers, partners, and employees. Enterprises expect their applications to provide a consistent experience across service channels, offer hyper-personalized and immersive experiences using insights, and most importantly, think and act to adapt to human behavior.

64% of enterprises[1] consider end-user experience to be the major driver of their application services strategy

Key features of future-ready applications

Everest Group take

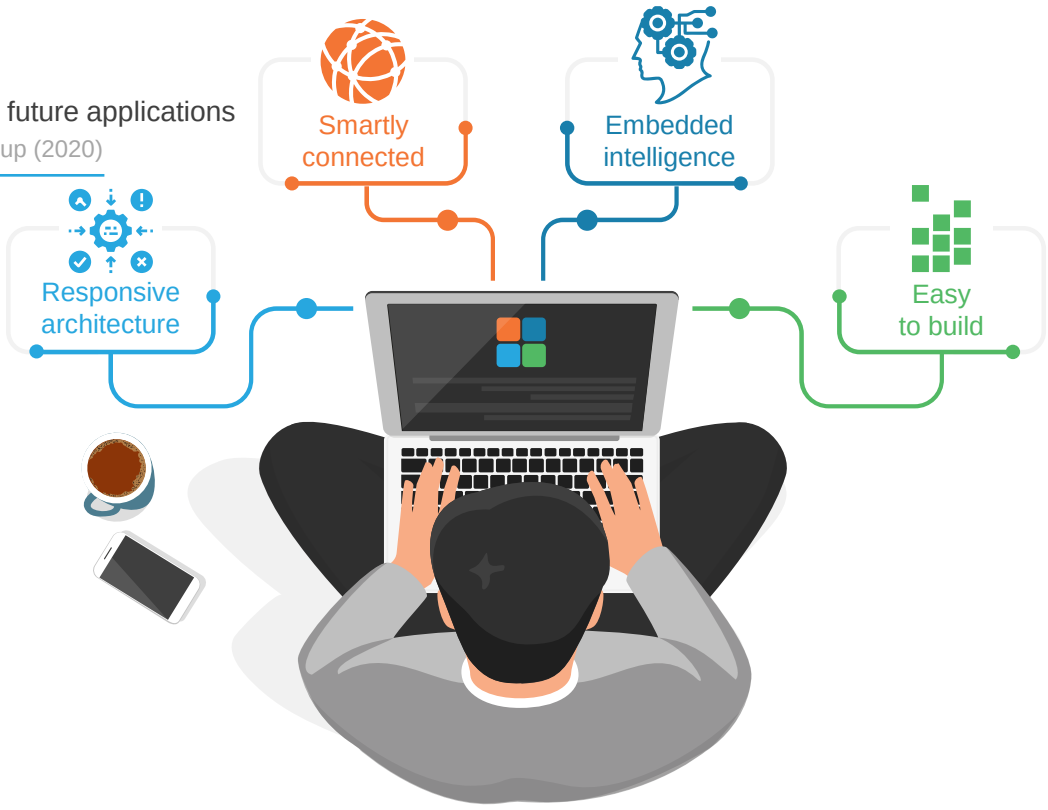
An application's ability to meet enterprise expectations of the future will depend on its architectural design, ecosystem benefits leveraged through smart connections, intelligence offered to enhance experience, and the ease and speed with which it can deliver value to customers.

Next-generation applications will have to meet the criteria defined in Exhibit 2 to be future-ready.

EXHIBIT 2

Characteristics of future applications

Source: Everest Group (2020)

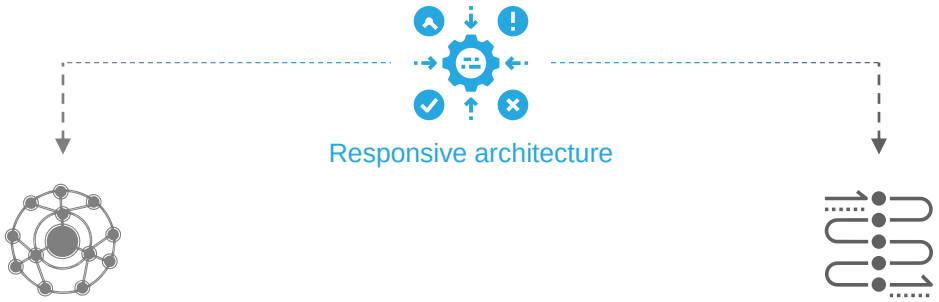


1 Survey among 200+ global CXOs and application leaders from large enterprises (revenue > US$1 billion)

Let us take a closer look at each of these features.

Responsive architecture

Future-ready applications need to be designed in a way that they can continuously evolve and align with changing business needs. This means that they should be built and managed on an architecture that is *discrete* and *dynamic*.



Discrete architecture	Dynamic architecture
One way to achieve a responsive application landscape is to adopt an architecture composed of discrete components of applications as micro-services versus a monolithic, tightly coupled structure. This architecture makes it easier, faster, and safer to add new components or make changes in individual components. As enterprises adopt cloud technologies, these modular components can be packaged as containers with minor modifications that are nimble and scalable across application environments, thereby shrinking release cycles. A case in point is Adidas, which containerized its e-commerce website that earlier ran on Virtual Machines (VMs). The adoption of cloud-native architecture and agile methods, enabled it to push new releases in a matter of hours.	To deliver on evolving business expectations, it becomes imperative for enterprises to have a dynamic architecture that adapts and reconfigures easily according to changing customer preferences. Such an architecture should focus on delivering value to customers, irrespective of the delivery technologies. Architects should be able to pick and choose application components and technologies anywhere, anytime to allow for quick modifications to the architecture.

Smartly connected

While application elements are broken into microservices, Application Program Interfaces (APIs) join these loosely coupled services and connect them with existing ecosystem components. For example, Nordea bank has built a contactless payment system with Fitbit and Garmin wearable devices. The core strength of APIs comes from the fact that they enable connection between disparate systems and technologies and form the backbone to integrate, streamline, and standardize processes. Connected applications can leverage interconnected hardware, applications, and databases to gather data and functionalities, and provide enhanced services.

While enterprises are connecting their applications to leverage internal capabilities, enterprises are driving innovation by opening APIs to the external world. The banking and financial sector has experienced a major uptick in third-party innovation after the open banking reforms in different parts of the world.

While enterprises want to realize ecosystem benefits through smart integration, they face interoperability and connectivity issues. Our study suggests that **40-60%** of connected devices cannot realize their total economic value because of interoperability and interconnectivity challenges

As enterprises look to deliver faster, superior, and personalized user experience, it becomes vital for enterprises to develop an API strategy that takes into consideration both the internal and external ecosystems. It is also important for enterprises to develop a technology backbone that is platform-agnostic and provides seamless connection with IoT devices, databases, and various applications.

Embedded intelligence

Intelligent applications can assess their performance, maintainability, and business value to suggest changes. A case in point is Google Translate, which was a 500,000 lines code program when initially created. Powered by Google's machine programming algorithm, it reduced itself to 500 lines and became more accurate in the process.

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Applications that learn, change, and make contextual decisions can significantly enhance services and end-user experience. Intelligent applications can analyze operational incidences such as system failure; softer aspects of human behavior such as mood, tone, intent, etc.; and predict anomalies much more efficiently and effectively by running simulations and analytics. Besides, enterprises can improve their own applications using intelligent automation.

To enhance user-experience, enterprises are extensively leveraging AI-based technologies such as natural language processing, facial recognition, image processing, and recommendation services. Conversational bots now offer a cost-effective, timely, and consistent customer experience.

To embed intelligence in applications, enterprises need to combine and process data from various sources, such as sensors, edge devices, customer interactions, and social media feeds, which mandates a strong data management practice, adept leverage of intelligence-based services, and proactive adoption in decision-making.

1 Survey among 200+ global CXOs and application leaders from large enterprises (revenue > US$1 billion)

Easy to build

As the development and deployment life cycles become short and agile, businesses need to quickly experiment and prototype their applications. Applications of the future are not going to wait for n specialized army of expensive developers to cater to business demands. These applications need to be accessible and comprehensible to and modifiable by a wider audience. In recent times, Shell Downstream significantly reduced its applications' time-to-market by empowering its business units with a drag and drop platform to create applications and add functionalities anytime, anywhere.

To build such capabilities, enterprises can adopt low-code/no-code platforms to enable citizen developers who do not possess technical know-how to self-develop capabilities. As these low code platforms are often programming language-/syntax-agnostic, they support automation, DevOps operations, and multi-cloud deployment, and are generally easier to integrate with the existing landscape.

Key considerations when building applications of the future

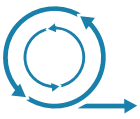
As enterprises build applications that are flexible and fungible, intelligent and aware, and experience-centric, they also need to factor in the following considerations, as illustrated below.

Business alignment

Though this appears obvious, it needs to be re-iterated that in pursuit of building the best applications, enterprises should not lose sight of the bigger objectives of business alignment. The efficacy of next-generation applications needs to be measured by the business value they deliver that goes beyond time-to-market, quality, and cost. The KPIs for applications need to evolve from operational performance to more nuanced metrics that link them with business outcomes

Co-existence with legacy

Enterprises cannot operate future-ready applications in isolation. These applications need to be connected to and should leverage useful parts in legacy systems to support critical business functions



Fluid delivery

To keep up with dynamic customer needs, an enterprise needs to have a scaled delivery and distribution model. DevOps has become a default standard in today's world, and enterprises will continue to experiment with similar models that improve delivery

Process optimization

To unlock significant value from applications, an enterprise needs to transform its processes. It is imperative to have a simple, optimized, and automated set of processes across the application-to-business value chain

Talent awareness

Access to the right talent, at the right place, and at the right time continues to remain a key factor in building futuristic technologies for enterprises. Businesses need to empower their citizen developers with self-serving tools for prototyping and improvisation. Enterprises need to be aware of the talent they possess to build such applications and resist the urge to take initiatives that do not align with their talent models

Value drivers for applications of the future

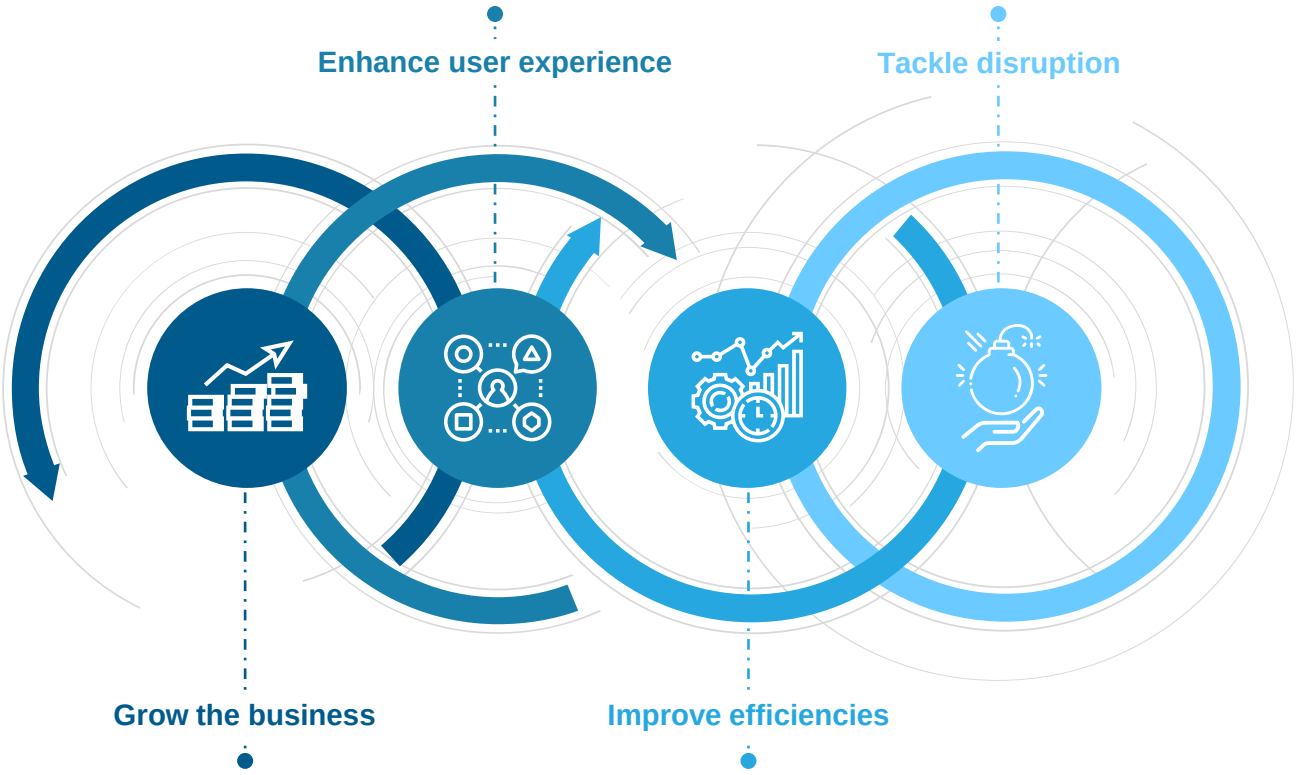
Everest Group take

Applications of the future will drive business growth, enhance user experience, unlock efficiencies, and prepare enterprises to face and surmount disruption, as illustrated in Exhibit 3.

EXHIBIT 3

Value drivers for applications of the future

Source: Everest Group (2020)



Grow the business

Applications of the future will help identify and support the development of new business opportunities by their extensibility and ability to reap ecosystem benefits. They will facilitate revenue growth by creating newer avenues and business models. Flexible and fungible applications can help enterprises quickly spin up new service channels. A case in point is Unilever, which unified its existing portfolio of applications and brand catalogs with APIs over a platform to create a fully functional e-commerce entity within six months.

As applications get smartly connected to a wider ecosystem, they get access to new avenues for services such as social connections, smart assistants, partner service channels, and even adjacent industries.

Enhance user experience

To enhance user experience, enterprises are leveraging a light and nimble application architecture to push incremental functionalities and services. As applications get intelligently connected to more and more devices and systems, they obtain access to intimate data and interaction mediums with customers, facilitating a seamless, personalized, and consistent experience across channels. Further, self-healing and self-governing applications make services available round the clock for customers.

Improve efficiencies

Applications of the future will self-learn and continuously improve themselves, thereby making processes more efficient. The application architecture's flexibility will let them adapt and respond to evolving requirements, making changes easier and scalable. Seamless connectivity and visibility will make application monitoring and maintenance more efficient.

The value of automation is not restricted to programmable tasks that enhance an application's operations. Next-generation applications will enable humans to make complex decisions, improve business productivity, and reduce costs associated with human bias, fatigue, and errors.

Tackle disruption

As enterprises face increased competition and disruptive forces, applications of the future provide them with a platform for continuous evolution and experimentation, enable collaborative innovation, and open new channels for improvisation, especially as they access ecosystem partners. Besides, these applications provide enterprises access to valuable insights to understand, predict, and respond to evolving customer needs.

An approach to build future-ready applications

To build future-ready applications, we recommend enterprises to take a three-phase approach – Equip, Evolve, and Excel – which requires a shift in the way applications are built, run, maintained, interact with users, and deliver value to enterprises. In Exhibit 4, we detail the specifics of the Equip, Evolve, and Excel approach, which will help enterprises build agile and resilient next-generation applications.

EXHIBIT 4

Journey to build applications of the future

Source: Everest Group (2020)

Equip

Build

Design a flexible architecture and adopt an enterprise-wide API strategy to integrate applications with existing assets

Run and repair

Develop CI/CD pipelines to automate workflows

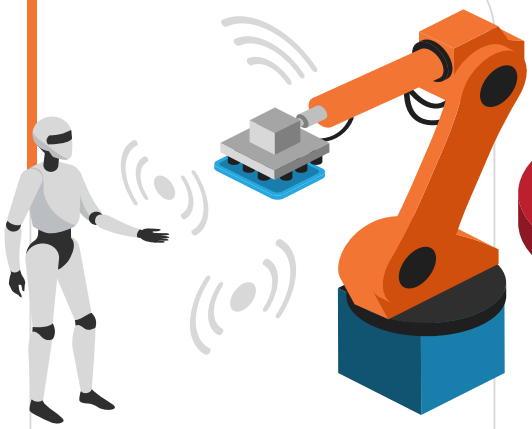
Interaction

Build user-centric and responsive interfaces using design principles

KPIs

Focus on running business operations efficiently

Evolve



Build

Adopt cloud-native principles to build applications and open APIs for ecosystem entities

Run and repair

Embed intelligence to develop self-healing capabilities

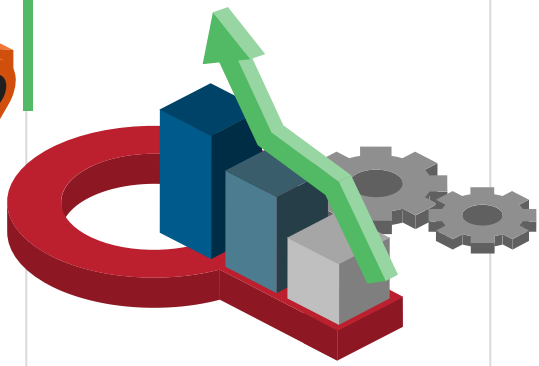
Interaction

Build omnichannel capabilities to offer hyper-personalized and customized advisory services

KPIs

Focus on experience and effectiveness

Excel



Build

Develop interoperable capabilities to orchestrate workloads across different environments

Run and repair

Introduce machine programming to improve applications and workflows

Interaction

Offer conversational and interactive experiences through voice and visuals

KPIs

Focus on real-time business value delivered

These incremental steps to build applications of the future not only modernize the current technology landscape but also equip an enterprise with applications that can evolve with time. It is highly likely that these applications would become an important enabler for enterprises in taking the next big step in their digital journey.

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For more information about Everest Group, please contact:

+1-214-451-3000
info@everestgrp.com

For more information about this topic please contact the author(s):

Yugal Joshi, Vice President
yugal.joshi@everestgrp.com

Prasun Dey, Senior Analyst
Prasun.Dey@everestgrp.com