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Building Software-Defined Foundation

For Hybrid Multicloud Infrastructure

November 2020

LEADING WITH INNOVATION

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Executive Summary

Businesses in the GCC are beset on all sides by business and technological challenges; the global Covid-19 pandemic and resultant economic downturn hit global markets hard, and enterprise IT, often already stretched delivering ambitious digital transformation projects, needs to enable a completely reshaped workforce, customer engagement and business strategies.

This whitepaper describes how optimized hybrid infrastructure enables an agile and efficient IT organization to embrace next-generation technologies, optimize existing applications, and secure the infrastructure from end to end.

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Introduction

Enterprises across the world are undertaking Digital Transformation (DX) initiatives as the global digital economy recovers from the Covid-19 pandemic. In 2019, organizations worldwide spent almost $1.2 trillion on DX alone; in 2020, the pressure to realign remote workforces and customer engagement were among the drivers of renewed focus on DX. Regional research conducted by IDC at the peak of the pandemic showed that only 7% of enterprises in the region have no plan at all to undergo DX, while 76% are already well underway with their DX journeys. These digital initiatives take the form of technology-driven and business-centric transformations that focus on using new technology solutions to deliver key operational outcomes.

The business priorities driving these transformations include customer experience, employee, and workforce optimization, product innovation, quantum improvements in business agility, and process and infrastructure optimization. Growth is also a key driver, with organizations in the GCC seeking disruptive new products, business models, and growth opportunities.

Infrastructure and Security are Top Investment Areas for GCC CIOs
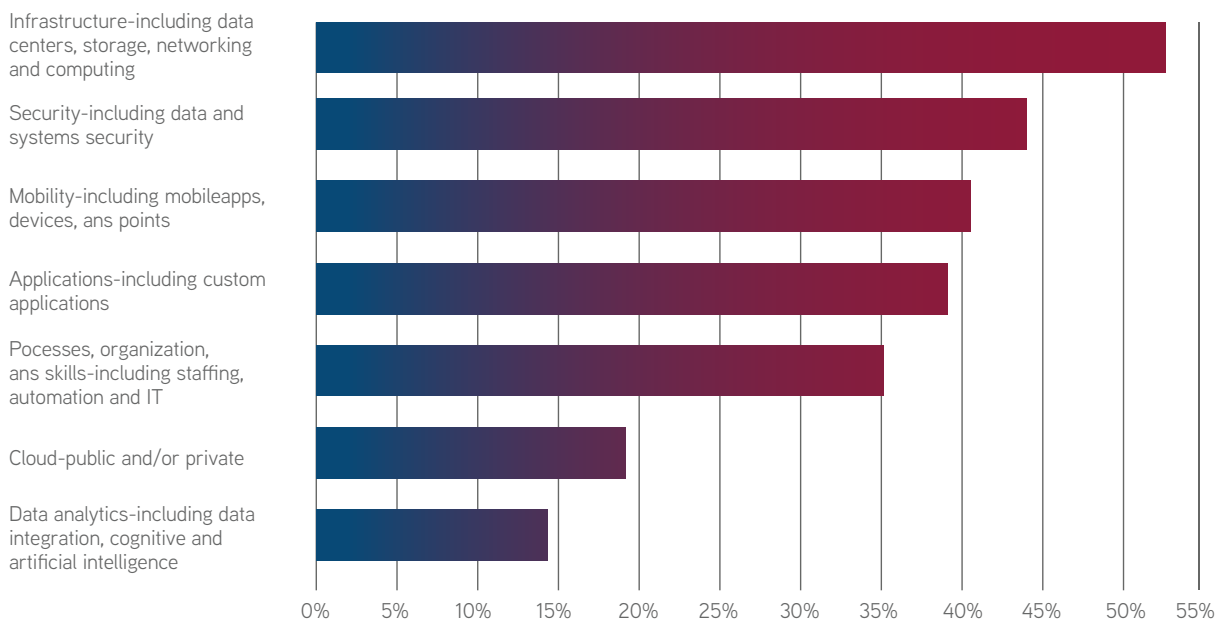
"In which areas are investments likely to be made?" Source: IDC Middle East CIO Survey, June 2020

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Globally,
nearly USD1.2 Trillion was spent on DX in 2019 alone

Addressing these priorities requires a new approach to technology processes and infrastructure that takes advantage of solutions such as artificial intelligence (AI), augmented reality/virtual reality (AR/VR), and Internet of Things (IoT). These emerging technologies are supported on the present-day pillars of digital infrastructure; on-and off-premise (hybrid) cloud, automation, software-defined infrastructure, analytics, and next-generation security. Internally, technical development istaking advantage of new practices and technologies including micro services, continuous integration and orchestration, serverless applications, containerization, DevOps and DevSecOps, and more.

Despite these high expectations and well-funded DX initiatives, many organizations express frustration at their lack of progress. This frustration has become common enough that global research firm IDC has coined a term for it: "Digital Dead lock."
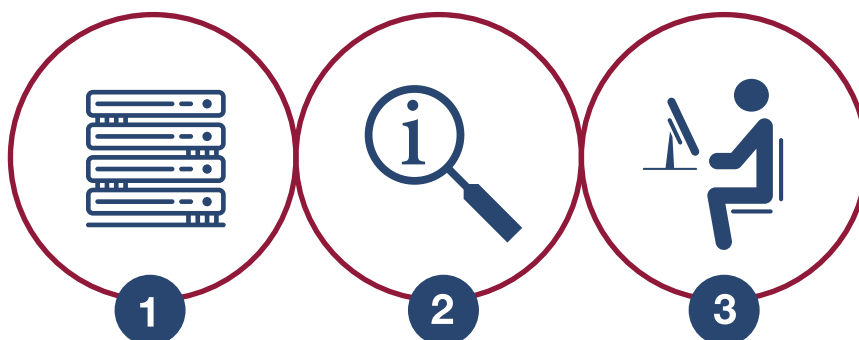
Digital Deadlock

According to the joint research conducted by GBM and IDC, we believe that almost two thirds of global organizations engaged in DX projects find themselves in a "digital dead-lock". Despite early successes with their DX initiatives, these organizations reach a point at which they are unable to progress beyond isolated or siloed efforts. Attempts to scale or accelerate DX often prove elusive, with complexity leading to escalating costs and delays.

58% of organizations engaged in DX find themselves stuck in a "digital deadlock"

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This digital deadlock can be caused by a range of underlying issues, including a lack of coordination between parts of the business and lines of business, platform silos, and a lack of expertise or suitable key performance indicators (KPIs) across the teams responsible for transformation. By recognizing the symptoms and root causes of a digital deadlock, an organization can minimize risk and break down obstacles before DX initiatives stall.

Some of the common causes of a digital deadlock include:

1. A Lack of Agile, Scalable, and Secure Infrastructure: DX is expected to deliver agile infrastructure that adapts to the changing needs of organizations engaging with the new digital economy. However, the delivery of such infrastructure requires investments in technologies and platforms that bolster agility without sacrificing interoperability, security, and scalability. Dead ends at the platform level (e.g., technologies that become obsolete or cease to be supported due to changes in strategy) often go unnoticed during early stages of DX, ultimately manifesting as complex integration overheads when the transformation starts to accelerate and build momentum. The longer the time and cost of backtracking is deferred, the greater the risk. Moving legacy applications to the cloud without taking the opportunity to modernize them, neglects much of the potential DX value.

2. Information Silos: Silos, which commonly arise from separate line of business initiatives, prevent organizations from creating value through data-driven customer engagements, generating insights from analytics and machine learning, developing new products, services, and relationships, and monetizing different forms of data. Attempts to perfect a single data infrastructure that can anticipate all use cases is very rarely successful; as such, data infrastructure must be able to adapt and evolve as well as build bridges between the information silos as DX road maps demand.

3. Manual, Misaligned, and Outdated Business Processes: Such processes keep organizations from being able to improve business agility and produce repeatable customer and employee experiences. Technological innovation and transformation without business-wide process transformation risks misaligning the ICT and business views of DX.

Towards Agile Hybrid Infrastructure

Hybrid/multi-cloud infrastructure can be complex and may change rapidly as business needs evolve. A consolidated management approach provides a unified view of architecture and aligns operational management with business outcomes so that capacity can be optimized, security streamlined, and data managed regardless of where it resides, to deliver true digital transformation and agility.

Develop Digital Infrastructure that is Agile, Scalable & Secure

Develop a Robust Information Architecture
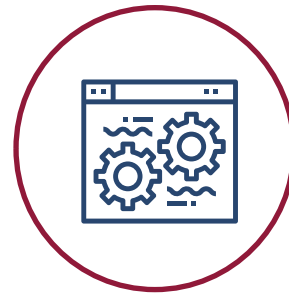
Digitally Transform Business Processes

Cloud Strategies Drive DX

A strong cloud strategy is a key component that binds the strategies mentioned above. Cloud platforms provide the functionality, capacity, flexibility, security and agility required to drive DX. For most organizations, cloud investment will comprise a hybrid mix of public and private cloud.

Cloud solutions have brought a breath of fresh air to IT strategies, given their potential to optimize business processes that have thus far relied on heavily customized legacy solutions. Cloud solutions are usually faster to implement, secure and more adaptable to changing business needs as organizations evolve. Their continual flow of new features and functionalities allow organizations to innovate faster than counterparts that use traditional on-premises enterprise applications.

Cloud, whether public or private, is a foundational pillar that enables modern business practices and leads to other advanced technologies such as namely cognitive computing

AR/VR, 3D printing, and so on. Cloud's agility, continual innovation, and technical openness allows an organization to fully exploit these technologies.

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Private cloud solutions are either deployed on on-premise infrastructure or collocated within a hosting environment. Private clouds provide many of the benefits of a cloud platform (agility, self-provisioning, consumption-based billing, etc.) while enabling customers to retain greater control of the technology stack.

The Hybrid Multi-cloud Enterprise Landscape

A growing number of organizations across the globe have already begun adopting hybrid infrastructure environments that span of multiple data centers, multiple cloud platforms, edge computing systems and require a variety of operational management technologies.

90%
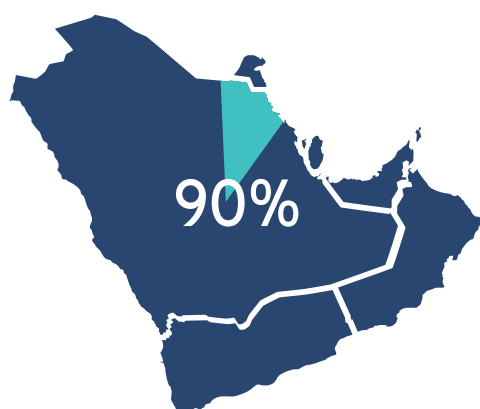
GBM believes that 90% of large organizations in the GCC will move toward hybrid cloud models

that provide them with the flexibility to place applications and data on various platforms to achieve the best performance

Hybrid multi-cloud infrastructure covers a broad set of varying functionalities that can evolve rapidly at different stages of an organization's DX. Primarily among the desired functionalities are – Agility/Speed, Bridge the traditional to the new emerging technologies, management of application layers between different cloud layers and lastly improve cyber resiliency.

The variety of cloud offerings gives enterprises different approaches for creating agile, scalable, secure and cost-effective IT infrastructure that support their businesses. However, there is no one-size-fits-all cloud model: public cloud is not appropriate for all workloads, not all platforms offer the same services, and there are numerous private cloud infrastructure options.

A web-scale infrastructure that provides the benefits of cloud without its drawbacks can be delivered by equipping hybrid IT environments with sophisticated software-defined capabilities.

Architectural considerations such as performance, availability, security, regulatory

compliance, access patterns, and cost will influence a customer's decision to keep (or place) a workload in private cloud infrastructure. There are also case where we will need to repatriate that workload from the public cloud to on-premise cloud infrastructure.

These considerations reflect the complex mix of applications, workloads, and data that is evolving in large organizations. Today, the workload portfolio that CIOs and their IT teams own is more complex, more diverse, and more liable to change than ever before.

A clear example of this is that most companies are investing in new multifunctional customer-facing applications (built with both mobile first and edge computing paradigms) that are intended to deliver an optimal digital experience. Many organizations are also investing in new data-intensive applications models to improve asset use and business operational processes through complex analytics and even AI. These new approaches require a holistic view with easy access to the enterprise infrastructure and applications.

The Need For Software-Defined Infrastructure

The traditional notion of all organizational workloads and data being stored, processed within, and accessed from an in-house datacenter is now passé. Data can now move easily and efficiently across on-prem and cloud environment. Managing operations across such hybrid environments is going to be critical. Traditional hardware-based infrastructure cannot keep pace with the different data locations.

SDI spans all aspects of enterprise infrastructure; compute, storage, networks, and applications. It enables improved security and business resiliency, and streamlines

> **"Software-defined infrastructure (SDI) is foundational for a robust hybrid multi-cloud environment.**
> SDI is necessary to support the rapid allocation, mobility, and security of infrastructure resources, data, and applications.

operations through automation, orchestration, and analytics. It also provides for seamless management across the hybrid public/on-premise cloud mix, and as applications come to take advantage of containerization and microservices, the flexibility and agility offered by the hybrid cloud becomes greater. Software-defined architectures have become prominent in recent years, fueled by the explosion of data, the rising complexity of applications, and the use of cloud services.

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It is expected that 70% of organizations worldwide will adopt dynamic and secure software-defined infrastructure that deliver flexibility, scalability and compliance across cloud, datacenter, and edge computing.

CIOs today need to fundamentally understand the value of data to their organizations and realize the importance of provisioning services to leverage, manage, and protect that data. Initially, CIOs recognized the significance of storage architectures as enterprise data handling requirements expanded in the era of social media, analytics, cloud, and Big Data. Enterprises then started looking for cheaper and more agile solutions, efforts that eventually gave birth to distributed, scaled out, and software-defined architectures that utilized commodity hardware.

As applications become more agile and customer-centric and rapidly change, there will be a growing need for infrastructure to be provisioned responsively, without the luxury of extensive buildouts.

CIOs are acutely aware of the increasing line-of-business (LOB) influence in mandating and even provisioning applications, especially customer-centric workloads like customer relationship management and customer analytics.

At the same time the pressure grew on CSOs to manage the security of this complex new infrastructure, protecting data and identities while also taking advantage of new technologies, especially automation and analytics, to improve security insights and respond to threats.

Many of these applications and workloads are not entirely well suited to public cloud services due to the sensitive nature of data and relatively reduced control; however, software-defined infrastructure is agile, secure and flexible enough to be used to provision cloud services in hybrid environments.

As organizations develop their hybrid strategies, most will consider secure software-defined infrastructure as part of their strategic roadmaps to enable next-generation business capabilities.

Modernizing Applications With Hybrid Cloud

CIOs are tasked with maintaining or modernizing the applications that not only address existing needs but also increasingly serve as data sources underpinning new digital services. A CIO's strategic priority is to ensure that processes are in place and resources (read: skills) are available so that IT teams can accomplish all workload modernization initiatives within the next several years.

Organizations that delay modernization of their applications start to build up technical debt: for example, legacy applications that are unable to take advantage of contemporary infrastructure capabilities will not only fail to achieve their own potential but also begin to delay other projects (due to their growing legacy overhead).

For each workload, CIOs have a range of options:

Rehost

Rehost the workload on more modern software-de ned or cloud-based infrastructure to reduce ongoing operational and capital investment costs. This rehosting incurs minimal disruption and can often be achieved with a direct migration of virtualized workloads. However, it also yields few long-term bene ts and risks migrating legacy issues onto a new platform.

Refactor

Refactor the workload to take advantage of more modern infrastructure delivery mechanisms. Refactoring maintains the outward behavior of the application, ensuring smooth migration for users and application programming interface (API)-dependent components. While refactoring requires greater e ort than rehosting, it takes advantage of more platform capabilities to deliver operational advantages.

Re-architect

Re-architect the workload using cloud-native architectures (such as containers and microservices) that make it easier to link existing applications with the growing portfolio of new cloud-based applications previously discussed. Re-architecting is the most resource-demanding approach and must be approached with care to ensure continuity. However, re-architecting is intended to not only take advantage of new technologies but also position the workload to adapt to other future requirements over time. This highlights the need for an infrastructure platform capable of delivering such capabilities as well.

The answer for virtually all large enterprises in the GCC in the next several years will be "all of the above." Within five years, an explosion in new application developments based on cloud-native architectures and the modernization of many existing business applications by ISVs will signal a wholesale shift to container and microservices architectures. For CIOs, the most important implication of this shift is its impact on underlying infrastructure requirements and long-term application resiliency.

When architected correctly, SDI and cloud significantly reduce the pre-allocated compute and storage capacities required per application (an important consideration in edge IT deployments) and boost overall service resiliency.GBM has many years of experience and skills in all of these areas to deliver successful application modernization projects using cloud and software-defined infrastructure

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Security: Reducing The Risk Of Transformation

Maintaining security is a top technology challenge for GCC-based CIOs. Security strategies need to be reviewed for the fluid, agile, and complex hybrid environment as traditional perimeters vanish and securing data across on-premise and service provider datacenters, and within multiple clouds, becomes crucial. Managing identity and access across these hybrid environments will become ever more challenging.

Although a customer's digital strategy and its supporting technologies may change, there are still some tried and true security practices that organizations can leverage to build new security architecture — including risk assessment processes, threat modelling exercises, and security procedures.

The immediate challenge facing enterprises in the GCC is understanding how the legacy approaches fit — or do not fit — within a DX environment.

While much changes with DX, the fundamental disciplines of security such as identity, trust, vulnerability and threat management, do not.

The lack of visibility into disparate resources and insufficient knowledge about the effectiveness of existing security controls become extremely apparent when security and operations teams begin planning significant infrastructure-as-a-service projects.

The growing complexity of security products is also symptomatic of the reactive approach security teams take to adopting new technologies and inconsistent security policies. Longstanding security gaps and siloed investments in security technologies (to solve regional compliance requirements) compounds the complexity of integrating multiple cloud environment resources with existing infrastructure.
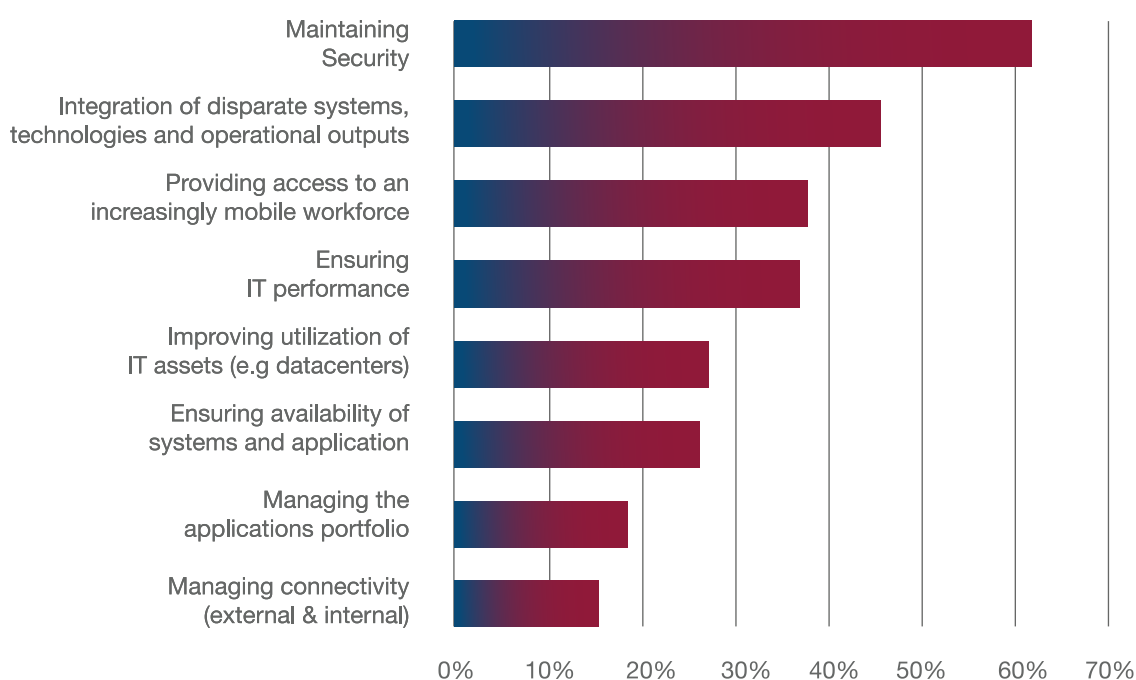
Addressing these concerns through an architectural approach will enable the secure integration of data protection, identity and access management is a critical component of DX. Without the security layer in place — or minimally the infrastructure which will enable it — the overhead of adding a security later poses a high risk of becoming its own digital deadlock.

A comprehensive security solution in the DX era needs to encompass many focus areas. Cloud and application security, identity and access management, data protection, analytics, and incident response and automated defense. Integrating across all of those requires careful selection of platform technology and infrastructure partners.

Breaking The Digital Deadlock

GBM offers three pathways that enable organizations to break the digital deadlock and accelerate their DX. Each pathway represents a strategy that organizations can employ — in partnership with GBM — to breakdown the hurdles that create digital deadlocks. Each of these pathways mirrors the challenges that organizations experience in their journey to true DX:

- GBM designs, builds, and manages secure hybrid digital infrastructure to help organizations accelerate their DX; the company also helps customers adopt infrastructure that is agile, scalable, and secure.

- GBM enables organizations to transform data into actionable insights and business value. By leveraging the latest hybrid/multi-cloud technologies, analytics and AI/ML technologies, GBM helps organizations break down the information silos that hamper the development of singular, accurate views of the customer.

- GBM enables organizations to optimize, automate, and redesign business processes. The company also helps organizations create optimized and repeatable processes that improve customer service.

Each pathway is supported by core technology elements that GBM brings to bear in assisting clients. With respect to scalable infrastructure, these elements include hybrid and multi-cloud, network and security transformation and next generation software-defined data centers with app modernization. GBM enables data transformation through hybrid data management, AI/cognitive technologies, and business analytics. Finally, GBM applies digital business innovation, business process transformation, and advanced enterprise applications to enhance operational processes. GBM partners with some of the world's leading technology providers to help clients navigate their DX journeys.

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Roadmap To Hybrid Infrastructure

As the region rebuilds in the wake of Covid-19, organizations in the GCC need an infrastructure strategy that delivers agility, cost efficiency, and security. A hybrid approach which leverages the benefits of public and private cloud and enables the organization to provision and re-task components to support agile business processes.

DEVELOP A ROBUST HYBRID STRATEGY TO ACCELERATE DX:
CIOs should make on- and off-premise cloud options a part of enterprise-wide DX initiatives that aim to bring the organization into the digital economy. Without a wider enterprise DX plan, cloud-enabled technologies will be "islands of innovation." Cloud will deliver some value but will not live up to its full promise.

PREPARE FOR A HYBRID MULTI-CLOUD ENVIRONMENT:
CIOs should consider whether workloads need to be rehosted, refactored or re-architected, and determine the integration requirements of attendant applications and sub-systems (such as security and identity).

TRANSFORM INFRASTRUCTURE INTO A SOFTWARE-DEFINED ONE:
This will support hybrid cloud/hybrid IT environments as well as the digital objectives of the business.

SHIFT TOWARD A CLOUD-NATIVE APPROACH FOR APP DEVELOPMENT AND MODERNIZATION:
Such an approach would improve app mobility across hybrid, public, and private cloud environments and support innovation.

REVIEW THE SECURITY STRATEGY FOR DX AND HYBRID CLOUD:
This review should focus on integrated approach to identity and access management, data, applications and cloud security with key focus on the overall governance, risk and compliance.
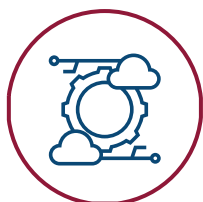
DEPLOY MANAGEMENT TOOLS THAT PROVIDE A SINGLE PANE OF GLASS FOR MANAGING HYBRID INFRASTRUCTURE:
that provide a "single pane of glass" for managing hybrid infrastructure.

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About Gulf Business Machines

With more than 30 years of experience, GBM Qatar is an end-to-end digital solutions provider, offering a broad portfolio, including digital infrastructure, digital business solutions, security and services. GBM has nurtured deep partnerships with some of the world's leading technology companies and have invested in skills and resources to assist their customers on their path towards DX.

GBM offers 3 pathways that enable organizations to break the "digital deadlock" and accelerate their DX. Each pathway represents a strategy that organizations can employ, in partnership with GBM, to breakdown the hurdles that create the digital deadlock. Each of these pathways mirror the challenges that organizations experience in their journey to true DX:

- GBM designs, builds and manages secure digital infrastructure to help organizations accelerate their DX, helping customers move towards infrastructure that is agile, scalable and secure.

- GBM enables organizations to transform data into actionable insights and business value, breaking down information silos that hamper the development of a single, accurate view of the customer, leveraging the latest analytics and AI/ machine learning technologies.

- GBM enables organizations to optimize, automate, and redesign business processes assisting customers in creating processes that are repeatable, optimized and deliver an excellent customer service.

Each pathway is supported by core technology elements that GBM brings to bear in assisting their clients. In the case of scalable infrastructure, these are the cloud, network transformation, security and next generation data centers. GBM enables data transformation through hybrid data management, AI/Cognitive technologies and business analytics.

Finally, GBM assist in the transformation of business processes using digital business innovation, business process transformation and advanced enterprise applications. GBM partners with some of the world's leading technology providers to assist their clients in navigating their DX journey.

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