

# Banking on Public Cloud – Getting Ready for the Future



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## Introduction

Information Technology stopped being a technology department at enterprises a few years ago. The CIO's role over the years transformed from core delivery and IT operations to that of a true partner to the C-suite for technology driven business strategies. The power of the business potential of cloud is not only a testimony to these transformative developments, but the game changing factor behind them.

Banking and financial services, an industry that was initially slow to adopt the cloud gradually increased its cloud investments and initiatives, for cost efficiencies and more recently for business innovation. The industry is now opening up to the idea of public

cloud for reasons beyond cost savings to agility, innovation and improved time to market. The transformation possible with the confluence of emerging technologies such as AI, machine learning, blockchain, APIs, automation and big data hinges on the vast potential of cloud computing.

This paper put together by the Banking Visionaries' Council (BVC) instituted by Infosys Finacle, takes a look into the future, of which cloud is one of the clear foundational building blocks. It elucidates the likely cloud-based business models in banking and aims to provide a readiness index for banks transitioning to the cloud.







# I. Cloud – Enabling the ‘**Digital**’ in Digital Businesses

As a classic enabler of digitalization, which Gartner defines as the use of digital technologies to change a business model and provide new revenue and value-producing opportunities, cloud is at the heart of all digital businesses. The DVD-by-mail company of yore – Netflix, is today the primetime web service consuming 37% of downstream Internet bandwidth! The entertainment giant quite accidentally happened to embrace the cloud business model when in 2008 a fire broke out in a Netflix data center and the company decided against being a data center operations company in order to meet the goals of its core video streaming business. With the advantages of scalability, elasticity and global availability of the cloud, there has been no looking back for the company.

There is no dearth of cloud adoption success stories in business today. And these success stories go beyond the digital natives that have custom applications built for the cloud. Traditional businesses have adopted the cloud to innovate, enhance customer service and reduce costs.

Infrastructure as a Service – IaaS, succinctly defined as on-demand access to networking, storage and computing resources has helped shift the focus of tech infrastructure teams from operating data centers for high availability to equipping the development teams with the right tools for faster application development. Vapiano, a German restaurant chain successfully implemented an online ordering system to improve the dining experience, introduce a loyalty system and quickly build scale, by moving all its workloads to Microsoft Azure.

Software as a Service – Broadly defined as a subscription based service for Internet access to third party software, SaaS allows enterprises to run their core business without any installation, maintenance, deployment or management overheads. The life sciences company Veeva that started as a pharma CRM is the industry's biggest SaaS success story today and the leader in industry cloud. The SaaS company today has over 45% of the life sciences CRM market share.

Platform as a Service – Platform as a Service providers offer a development and deployment environment for enterprises to build, run, and customize applications in the cloud. What's more, developers can improve functionality with in-built cloud analytics. With SunGard's

(now FIS) PaaS partnership with Google, the company has built a consolidated audit trail (CAT) reporting and analytics platform for broker dealers that not only helps dealers meet compliance criteria, but also benefit from powerful tools to discover patterns and correlations using big data analytics and forensics.

Important architectural decision before any enterprise moving workloads to cloud is the choice of cloud solution – private, public or hybrid – and the kind of applications that must be retained on premise, and the ones that can be moved to private or public cloud. Security and data residency considerations aside, following is a basic thumb rule to go with:

Workloads that require physical and virtual control over data at all times, or have a low latency requirement need to be hosted on premise.

Workloads or applications that have continuous IT resource requirements or requirements for hardware / OS refresh or upgrade can be moved to private cloud.

Lastly applications that can use SaaS for scale, such as HRMS, CRM, knowledge management, and now even CBS are best suited for the public cloud.

Private and public infrastructures have their own advantages, but leading enterprises are increasingly adopting the hybrid cloud to take advantage of best of breed cloud-based and on-premises integration approaches. For e.g. viewing customer information between cloud based customer relationship management (CRM) systems and on-premises enterprise resource planning (ERP) applications.







## II. Cloud Business Models and Deployment Models – **Today and Tomorrow**

After years of being perceived as a money-saver, the cloud computing conversation is finally changing. Technology buyers are embracing the cloud for benefits of business scalability, market agility, ecosystem connectivity and cost flexibility. And in what is a refreshing change from the apprehension surrounding moving workloads to the public cloud, we are now witnessing banks modernizing their IT by increasingly adopting the public cloud platform for innovation to compete against the agile fintechs and startups. DBS Bank, a progressive bank that aims to compete not with its peer banks but with the leading technology companies of the world is leveraging the public cloud in its Treasury and Markets business by using IaaS to price financial instruments for risk management. The bank also plans to move up to 50% of its compute workload to the cloud by the end of 2018.

## DBS builds future ready cloud engineering skills

DBS Bank collaborated with Amazon Web Services (AWS) to further train them in cloud engineering skills and strengthen the bank's technology talent pool. This will enable the bank to build a pool of employees that can rapidly innovate, build and deliver new products to customers.

The collaboration reinforces DBS' commitment to being at the forefront of banking, and is in alignment with the Singapore government's Smart Nation Agenda. In August 2017, DBS Bank had made a commitment to invest SGD 20 million over a tenure of five years to transform employees into a digital workforce, enabling them to learn and thrive in the future digital economy.

Having been an early adopter of the cloud technology and as part of its digital transformation strategy, DBS intends to move up to 50% of its compute workload on cloud by 2018.

DBS has been an early adopter of cloud among financial services companies, and intends to move up to 50% of its compute workload to the cloud by 2018 to support its digital transformation strategy. In the new programme, AWS technical experts will work alongside DBS employees on selected technology innovation projects in the areas of security, artificial intelligence and data analytics.

DBS employees can further enhance their technology skills through a wide variety of specialized and professional courses in the AWS technical learning curriculum. There will be Tech-Talks on the latest technology innovations, featuring AWS subject matter experts. The curriculum, with private classes customised for DBS, also features hands-on skills enablement workshops in AWS' training labs. DBS will also work with AWS to continue its hiring focus through innovative hiring programmes to attract top IT talent.

## Cloud Business Models

Cloud computing is evolving fast. The business model prevalent today in banking allows for business scalability by moving many of the existing banking applications on the cloud. For instance,

- For seamless digital connectivity banks are putting their sandbox environment and open APIs on the cloud.
- For effective collaboration with FinTechs, banks are going cloud-friendly and are taking their FinTech ecosystems on the public cloud. At a recent FinTech festival in Singapore, most of the participating FinTechs were found to be capable of running on the public cloud.
- Putting IT development and testing on the cloud allows businesses to take advantage of the level of automation possible in the cloud such as automated provisioning of new servers, etc. for enhanced market agility. Moving development and test workloads to the public cloud also helps improve cost flexibility, and banks are increasingly looking to do this by putting their ERP and core on the cloud.

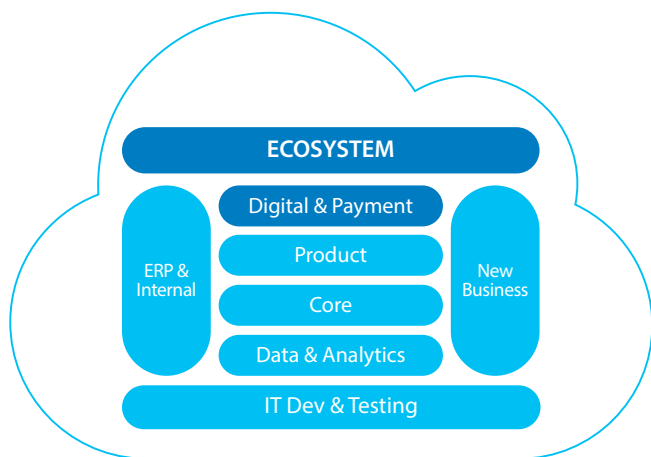
Cloud is the underlying enabler for all things digital. Cloud business models will evolve in lockstep with the technology as enterprises move towards a truly digital future. We see 5 key public cloud business models for banks emerging in the future.





## Seamless Digital Banking

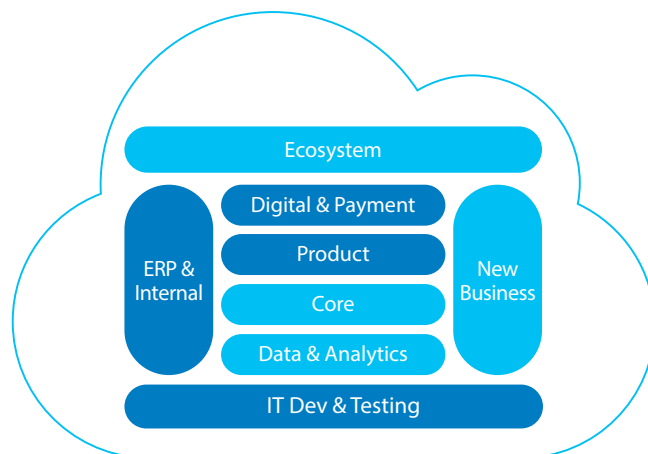
'Digitalization via Cloud', will allow banks to benefit from the business agility of cloud and also help them scale digitally. Digital banks are looking forward to a much lower operational cost while still being able to offer innovative products and engaging experience to their customers. Banks are exploring putting their digital platforms on the cloud, for instance, their digital channels, API gateways, and omni-channel frameworks. This will not only increase the scalability and flexibility of banks, but also the agility to connect with FinTechs for digital innovation since most of the FinTechs support running and integration of their solutions via public cloud.



## Smart Efficiency Banking

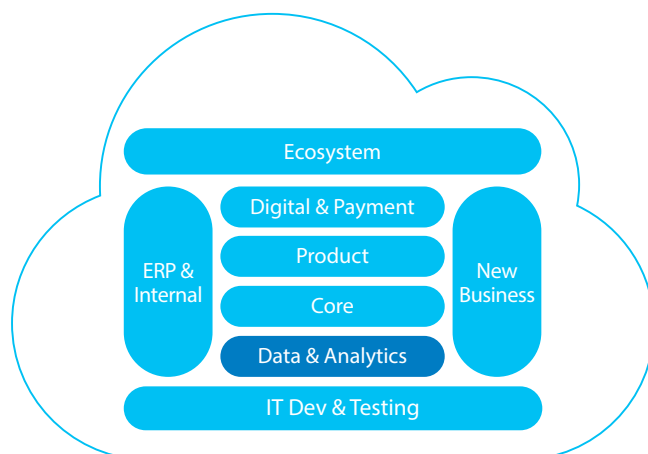
With "Cloud based open banking" banks can not only take advantage of cloud's flexibility and pay-as-you-go pricing, but also benefit from the balance between cost flexibility and business scalability. By putting their non-critical applications such as IT testing environment, ERP and HR on the cloud, banks can manage the critical workload to best suit their capacity and scalability needs. Leading and progressive banks, such as Capital One and Fidor, are putting their core product systems on the cloud, for instance, moving credit card transactions on the cloud during peak time for flexible and efficient workload management. Moreover, cloud offers a scalable infrastructure to support new open banking initiatives. Banks can also build their API

gateways, developer portals and sandbox environment on cloud. Public cloud enables a robust and scalable infrastructure to build any third-party platforms a bank may want, for instance, a car market place, or digital streaming applications.



## Scalable Intelligence Banking

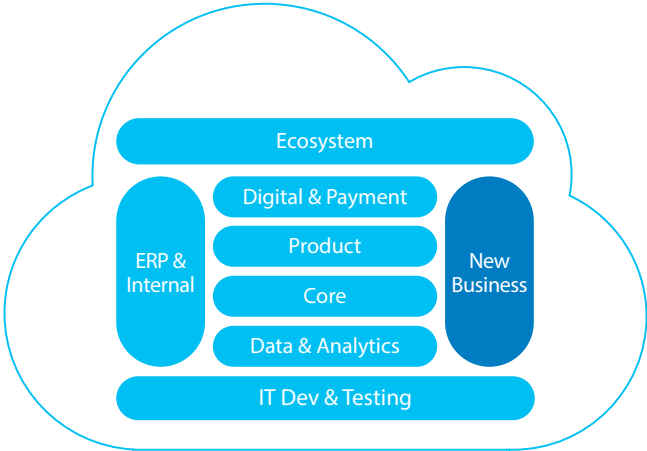
Next, for "AI on the cloud", banks can put their analytics engine, insights and big data leveraging the state-of-the-art AI algorithms, frameworks and hardware. AI is computing-intensive and the demand for computing power varies dramatically between different AI initiatives. It's a challenge for banks to build a one-size-fits-all infrastructure to support AI. Amazon, Google, and other public cloud providers have embedded AI and advanced analytics as part of their cloud offering that banks can leverage. Additionally, some advanced hardware such as Google GPU can only be accessed via cloud.





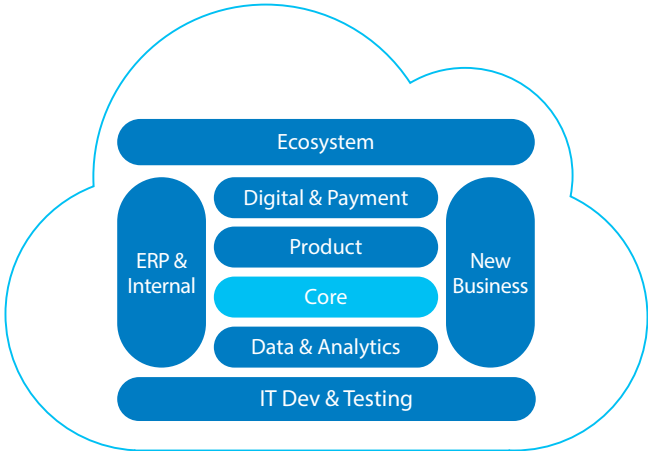
Cloud Business Banking

A key part of the cloud business model tomorrow would be “Banking as a Cloud Service Provider”, where banks will act as a cloud business supplier to customers. Digitization is increasingly collapsing and blurring the industry boundaries. Digital firms and banks are in a race to offer the best possible banking products to customers. Many of these products and services are offered on the cloud. The customer trust that banks have built over the years, puts them in a position of strength to offer trusted cloud services such as digital identity and lockbox on the cloud, and digital file storage on banking cloud. These services could also add value to the traditional business model of banks. For instance, SME banking and trade finance portal could automate the lending process by integrating with digital receipts and invoices stored online.




The Cloud All-In Bank

Lastly, the fifth model will bring all the above four models on the cloud to form a “cloud only” bank ideal for digitalization, open banking, AI, and for offering other cloud services.







### III. Assessing the Readiness for Public Cloud

Understanding the business models and how these services can be deployed is all good. But the key question before any bank moving to the cloud is – ‘Shall I move to the cloud, and if yes, where do I start?’ The answer could be different for different banks. Banks looking to save cost by moving workloads to public cloud may need to delve into the scope for reduction in infrastructure cost, runtime cost and development cost. For example, to reduce infrastructure cost, banks may embark on a data center migration strategy, to move their data centers to the cloud. To optimize run-time cost, banks need to evaluate the different options to move their hardware, database, middleware, or applications to the cloud. On the other hand, banks looking to future-proof their infrastructure for AI & analytics, digital banking and open banking may have to put new systems on the cloud. This requires planning for components such as API gateways, mobile/Internet/IoT, omni-channel services in the cloud architecture design.



Banks also need to bear in mind the infrastructure and regulatory constraints for moving workloads to the cloud. Moving enterprise applications with non-critical customer data such as ERP is less limited by regulations. However, data intensive services such as digital banking and customer analytics are still a few grey areas that banks would do well to explore, investigate and accordingly build their cloud migration strategy for. Core banking systems also contain critical customer and transaction information. Thus, banks must also keep in mind considerations around their core banking systems.

However, besides infrastructure and regulation, banks need to assess a comprehensive set of criteria to evaluate their readiness for cloud, such as legal terms, service level agreement, data risk management, and security framework.

### Banks' Readiness towards Public Cloud

What banks need is an exhaustive checklist to make sure they cover all quarters while designing their cloud strategy. For example, if a bank decides to move its online banking to cloud, what could be the necessary business and technology considerations. Our 6-point public / hybrid cloud readiness checklist can serve as ready reference for banks beginning or enhancing their cloud journey and initiatives:

### Public cloud infrastructure

At the outset banks must be clear about the location of the public cloud and the attributes surrounding it – whether the public cloud will be located within the country of business or outside, the broadband connectivity in the country, support from vendors for hybrid cloud in that country, and cloud integration capabilities. They must also have the details about the cloud offering stack such as hardware, OS, database, middleware etc.

### Regulatory considerations

Different countries may have different privacy, outsourcing and data security requirements. Acts such as Gramm-Leach-Bliley Act (GLBA) in the U.S. impose stringent data security obligations warranting specialized cloud-based offerings. Restrictions on cross-border data transfers may also impact a bank's public cloud strategy.

### Commercial constructs

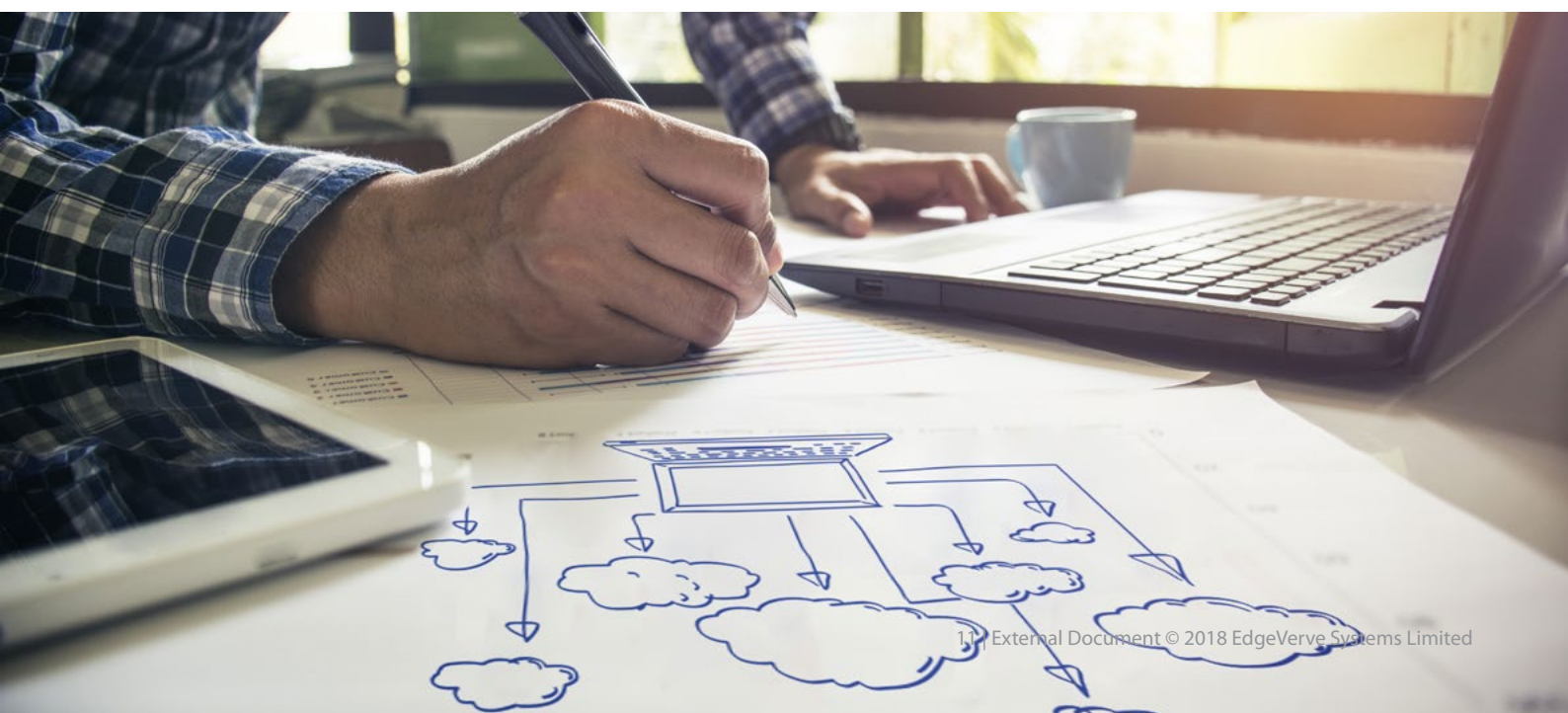
There must be a clear agreement on the ownership and control of data and SLAs on running time with the cloud service provider. Full access to audit for ownership over their customer content (as many banks have done for AWS) is a best practice banks must discuss with their vendors prior to any migration.

### Technology and process

Important technology and process considerations include a well-defined security framework for applications on public cloud, a cloud integration framework, proper due diligence and assessment for selecting the applications to move to cloud, and a thorough upgrade / patch process for seamless updates. Banks also need to understand their system complexity since no two banks are the same. And with banks adopting a hybrid approach to make the most of their cloud investments, it is important that they assess the integration capabilities for different clouds.

### Data center risk management

Hosting applications on cloud warrants the same amount of due-diligence as in-house infrastructure. IT organizations at banks must work with their cloud providers to assess the risks and define the requirements for a cost efficient disaster recovery solution. They must also see to it that once implemented the solution works as planned by agreeing on a regular test cycle with their cloud service



provider. Ensuring a system back up, and having cloud management and monitoring tools in place are essential practices for efficient risk management.

## Ecosystem on cloud

With a sizeable number of FinTechs capable of operating on the cloud, it is essential for banks to ensure compatibility among the

different clouds. If a FinTech a bank collaborates with operates on AWS while the bank runs on MS Azure cloud, the bank needs to make sure the two can talk to each other. With ecosystem and APIs defining the future of banking, it is basic hygiene to ensure compatibility and integration among partners and ecosystem players. Similarly, a bank must select the right open source tools for managing resources on the cloud – storage, compute, etc. and also ensure their cloud compatibility.

## Checklist for assessing the readiness for public cloud

Category	Sub-Category	Showstopper	Description	Sample
Public Cloud Infrastructure				
	Location of Public Cloud (within the country)			
	Broadband Connectivity			
Regulation				
	Outsourcing Policy			
	Data Privacy			
	Cloud Regulation			
Commercial				
	Full Access to Audit			
	Notification of Security Incidents			
	Ownership and Control of the Data			
	SLA on Running Time			
Technology & Process				
	System Complexity			
	Private Cloud Maturity & Standard Interfaces			
	Security Framework (for apps on public cloud)			
	Critical System Assessment (to select which apps move to cloud)			
	Upgrade / Patch Process			
Data Center Risk Mgmt				
	System Backup and Disaster Recovery			
	Cloud Deployment, Management and Monitoring Tools			
	(Optional) Integration Between Multi-Cloud Infrastructure			
Ecosystem				
	Fintech/Digital Ecosystem running on cloud			



# Conclusion

To compete and collaborate with digital natives and fintechs, banks need a level of agility, speed and flexibility that can't be achieved without the right public-private cloud model. As banks look to embrace the digital as-a-service business models of the future, a thorough assessment of every aspect of the transition sets them up for greater cloud success, and consequently greater business success.



# About Banking Visionaries Council (BVC)

Banking Visionaries Council has been instituted by Infosys Finacle to collaborate with senior business and technology leaders from the banking community to develop actionable point-of-views around contemporary themes within the industry. The purpose of this council is to solve the most

pertinent problems with research and collective thought leadership efforts. Currently, the council consists of a twenty-member-strong board with representation from eleven countries across six continents.

This point of view paper is an abridged version of the collaborative research work done by the council and the contributing partner Amazon Web Services (AWS). For more information on the council, please reach out to [finacle@edgeverve.com](mailto:finacle@edgeverve.com).



Share key market development and trends observed in respective geos with rest of the group



Collaborate to develop actionable point-of-view on how banks can leverage emerging trends



Openly discuss learning from innovation initiatives taken by respective banks

## Contributing Partner







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## About Infosys Finacle

Finacle is the industry-leading digital banking solution suite from EdgeVerve Systems, a wholly owned product subsidiary of Infosys. Finacle helps traditional and emerging financial institutions drive truly digital transformation to achieve frictionless customer experiences, larger ecosystem play, insights-driven interactions and ubiquitous automation. Today, banks in over 100 countries rely on Finacle to service more than a billion consumers and 1.3 billion accounts.

Finacle solutions address the core banking, omnichannel banking, payments, treasury, origination, liquidity management, Islamic banking, wealth management, analytics, artificial intelligence, and blockchain requirements of financial institutions to drive business excellence. An assessment of the top 1250 banks in the world reveals that institutions powered by the Finacle Core Banking solution, on average, enjoy 7.2% points lower costs-to-income ratio than others.



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