Thinking differently

The cloud as a value driver

A white paper by Colin Eberhardt

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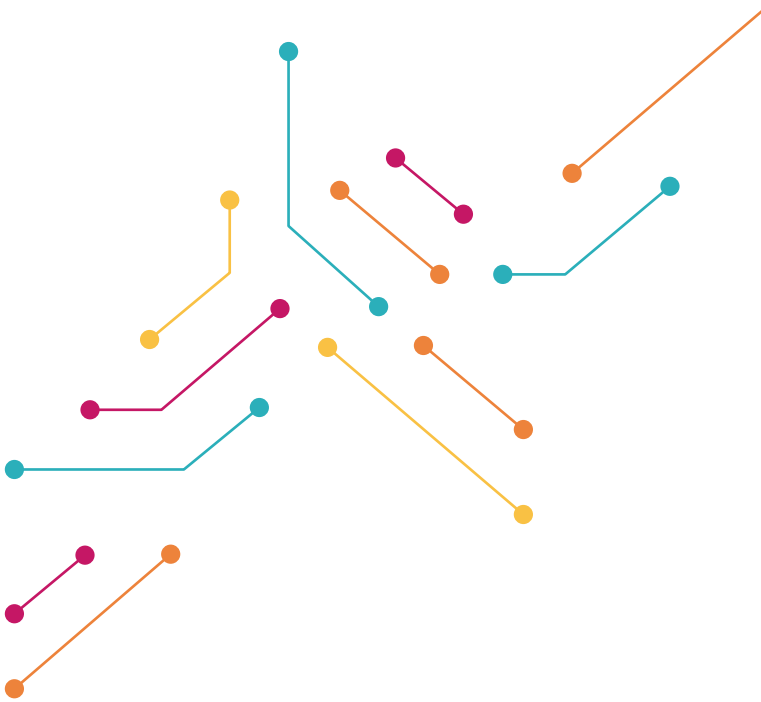
Executive summary

Faced with an accelerated rate of change in competition, regulations, buying habits and customer expectations, financial services organisations are having to vastly enhance their capacity for responsiveness to keep pace. Technology is central to many of these changes, and in order to respond quickly it must be an enabler, not an inhibitor.

One of the greatest technology enablers of the past decade is public cloud. The strategic importance of this has been widely accepted by the industry; however, the prevailing focus on the cloud as a means to reduce costs is overlooking its greatest capability: agility!

Public cloud platforms give an unprecedented level of technical agility. Their pay-as-you-go model makes it easy to experiment with and evaluate different technology solutions, and the high levels of automation allow rapid iteration and feedback. The cost-effective scalability of the cloud allows you to easily create systems that provision extra capacity in real-time. Furthermore, the effort and cost required to make cloud solutions scalable, secure and robust is greatly reduced.

The public cloud provides a platform for change and a foundation for business agility. It allows you to create new services, experiment with new technology, explore SaaS offerings and provide greater user engagement with a rapid time-to-market.

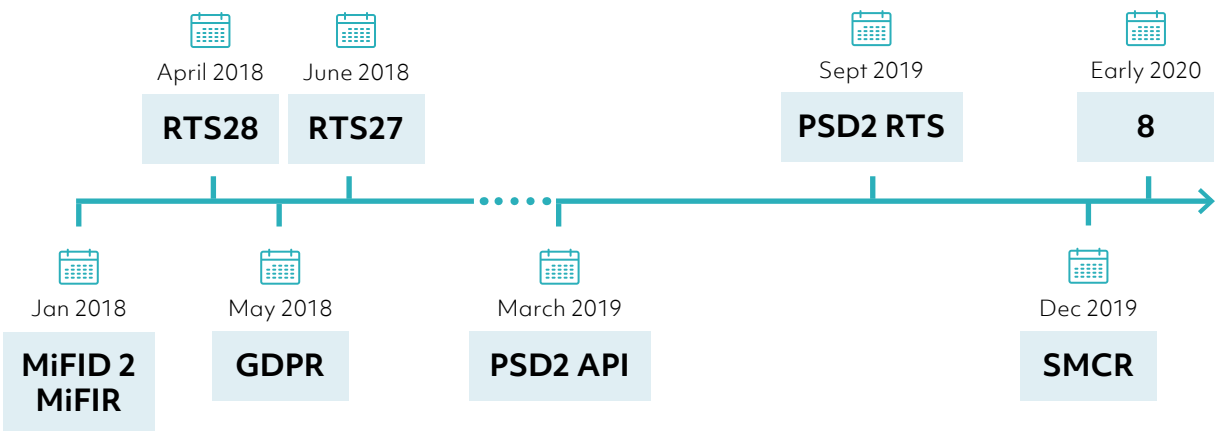


Challenging times

The past decade has seen the financial services industry grapple with a wide range of regulatory challenges.

These have been varied in their nature, from PSD2, which was intended to increase competition in retail banking, to GDPR, which enforces tighter controls over personal data. MiFiDII was the most far-reaching in its coverage, including transaction reporting, best execution, HFT, record-keeping, and improved risk controls for algo trading. The dust is starting to settle on MiFiDII and GDPR, but the next challenges are just around the corner with SFTR looming.

There's a growing demand for richer user experiences driven, in part, by the younger generation of customers. Direct to consumer (D2C) platforms require a significantly improved user experience via multiple, diverse channels, with robo-guidance platforms further raising the bar. Engaging directly with a potentially tech-savvy user-base requires product design skills that many companies lack.



Competition is also on the rise, with companies that were once startups becoming mature competitors. A prime example of this is the wealth management startup Nutmeg, which after six years of business, has recently secured a £45m investment from Goldman Sachs[1]. There are also threats from the current tech giants. For example, despite Google commissioning a report in 2014 on how to enter the asset management industry, there haven't been any signs they're acting on this. However, other industries are handling similar threats, with Amazon's acquisition of PillPack in mid-2018[2] causing shockwaves among the incumbents in the pharmaceutical industry.

However, companies that rise to the challenge are rewarded by their ability to reach potentially untapped clients, for example 40% of Nutmeg's customers had never invested before[3].

Similarly, fee compression is also a continued threat, with low-cost passive investment products impacting the fees that actively managed funds are able to charge. Many businesses are exploring technology solutions, such as robotic process automation, as a way to improve operational efficiency and retain profits.

It is becoming increasingly important for businesses to be able to adapt in response to regulations, competition, changes in buying habits and client expectations. Furthermore, the speed at which your business can respond is quite critical. Technology is central to many of these changes, and to be able to respond quickly it must be an enabler, not an inhibitor.

The move to the cloud is probably the biggest technology revolution we've seen since the birth of the internet. It is much more than just a change in where our software is running, it is a change in how we architect, a change in economics, a step change in capability and much more.

However, despite this, many companies see the cloud as little more than an economic play, a mechanism for moving Capex to Opex. To quote a recent white paper:

> "Using cloud-based solutions versus onsite solutions over a four-year period could lower the total cost of ownership by 55 percent.[4]"

Confluence, Five Drivers of the Cloud in Asset Management

While the opportunity to reduce TCO by 55% is quite enticing, this focus on cost savings is flawed for a couple reasons. First, the challenges discussed above cannot be tackled by protecting the bottom line, and 'tightening your belt', top line growth is just as (if not more) important. Second, these cost savings are rarely achievable in practice: a good cloud strategy that supports business agility does cost money, but it is money well spent.

We'll explore these concepts in more detail later, but first, let's take a closer look at the cloud itself.

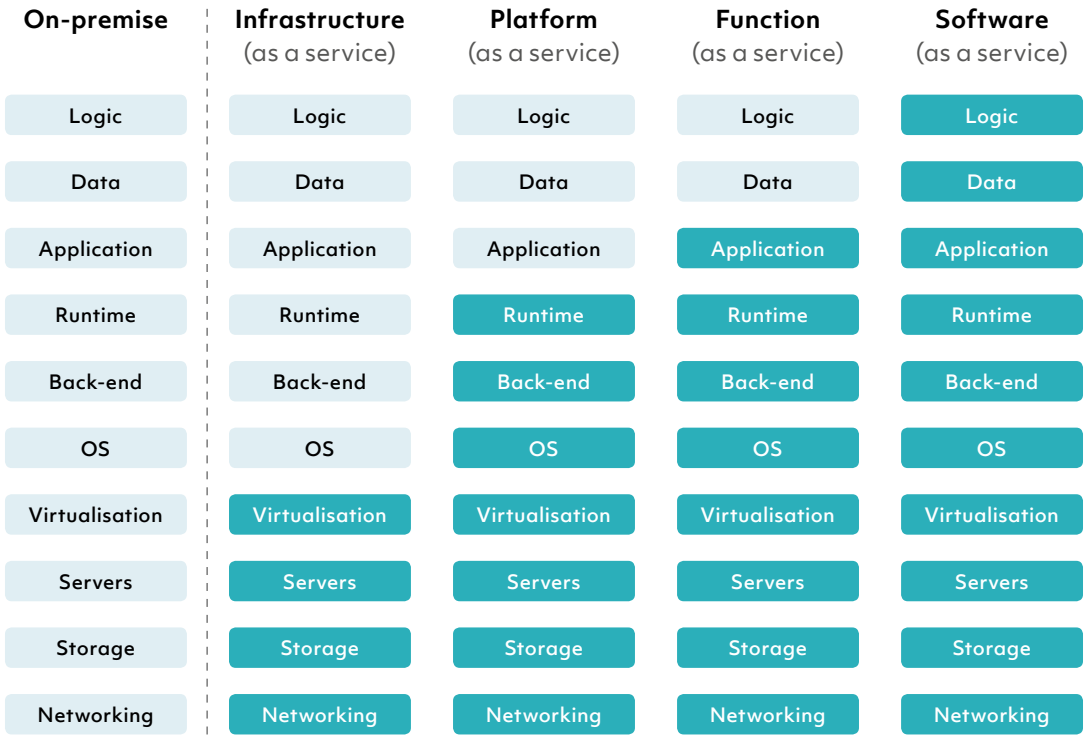
[1] www.nutmeg.com/nutmegonomics/goldman-sachs | [2] www.theverge.com/2018/6/28/17515176/amazon-pillpack-walgreens-pharmacy-market
[3] www.nutmeg.com/nutmegonomics/goldman-sachs | [4] www.confluence.com/uploads/confluence-whitepaper-five-drivers-cloud.pdf

The raw economics of the cloud

The modern cloud computing era began in 2006 when Amazon launched their Elastic Compute Cloud (EC2), providing on-demand compute resources. Google followed soon after with their App Engine, and a few years later Microsoft entered the fray with their Azure platform.

Early cloud computing offerings were quite simple, providing the basic ingredients required to build software solutions: compute and storage. These days, cloud computing is a lot more complicated. Each of the 'big three' vendors have a bewildering array of services, with Amazon offering more than 100, and many more are added each year.

The 'as a service' model provides a convenient classification for understanding the different types of cloud services. The differences between them are often illustrated using the following diagram:

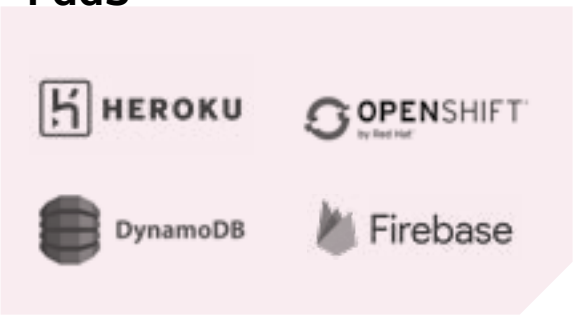


When deploying software on-premise or within your own data-centres, you are responsible for provisioning everything from low-level components such as servers, network and storage, all the way up to the application data and logic. However, it is highly unlikely there's anything unique about your network layer, or storage devices, servers or virtualisation technology, i.e. your infrastructure. With the Infrastructure-as-a-Service (IaaS) cloud computing model, these components are outsourced to the cloud provider.

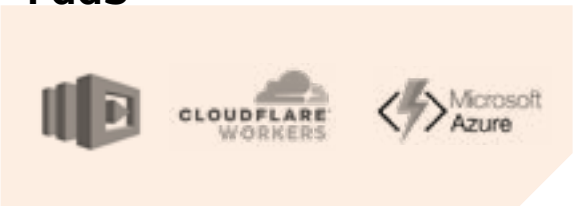
Through economies of scale, they are able to manage these components more cheaply and efficiently than you would be able to yourself. With the 'as a service' model, the further you "move to the right", the more of these components are managed by the cloud provider. With Platform-as-a-Service, you provision large-scale software components such as databases and middleware, and with Software-as-a-Service you provision entire applications, for example CRM systems.

IaaS

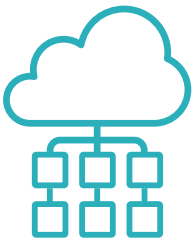
PaaS



FaaS



SaaS



Function-as-a-Service is a very new category of cloud computing, providing the building blocks for serverless architectures. It is cloud computing in its most 'pure' form, where your code is deployed directly to the cloud. One of the key benefits of this approach is the associated billing model, where cloud providers charge for execution time alone, providing the potential for very cost-effective solutions. In contrast, most IaaS solutions tend to charge for the duration of provisioned service.

With the SaaS model, you are outsourcing everything, and as a result this model has the potential to be the most cost-effective. Should you then strive to use this approach for all your IT systems?

While Software-as-a-Service provides the greatest potential cost-savings, you do have to make some significant compromises to achieve this. With SaaS offerings, you are no longer in direct control of your application logic and data. Instead, the design of the application and the business processes it imposes are the responsibility of a third party. This is in stark contrast to IaaS, PaaS and FaaS, where the underlying logic of the solution is entirely under your control.

In simple terms, the difference is essentially that of buy (SaaS) versus build (IPFaaS).

Selecting a cloud service model

Determining which of these cloud computing models is right for your business is a challenge, and in practice you're likely to leverage a combination of different models.

The Sapient white paper "CLOUD-BASED SOLUTIONS: why the time is right for asset managers to consider adoption"[5] suggests a convenient and simple model where business functions are classed as either "Optimize and Differentiate", or "Economize and Standardize", with a worked example that applies this to the front-, middle- and back-office.

For systems that have been classed as "Economize and Standardize", the SaaS route is the most favourable. There are entire business processes that can be outsourced to cloud solutions, such as regulatory reporting and client engagement. In these cases, it can sometimes make sense to adapt business processes to fit those dictated by a SaaS solution (in fact, these processes may be improved by doing so!)

For "Optimize and Differentiate" a bespoke build allows you to offer a unique value proposition to the customer.[6] As a general rule, you should aim to move as 'far to the right' as possible, creating an architecture which is a combination of FaaS and PaaS cloud services, allowing you to derive maximum value from the cloud.

[5] www.sapientglobalmarkets.com/blog/cloud-computing-for-asset-managers-a-game-changer-and-game-saver
[6] This differs somewhat from the advice provided the Sapient's paper which still advocates on-premise as a solution for a number of business functions.

A false economy

Now that we've looked at the various cloud service models, I want to briefly return to the statement I rebuked in the introduction, that cloud technology will lower your TCO by 55% in the next four years. It is unlikely anyone will achieve these savings in practice.

The economics for on-premise deployment are quite straightforward, the way in which hardware is provisioned creates a natural ceiling for costs. A fixed number of servers will typically be ordered up-front, together with the associated licences, and the application designed to fit this hardware configuration. With this approach, costs are capped and quite predictable.

Budgeting and cost controls with public cloud are challenging for a couple of reasons:

Public cloud is not cheap

A common pattern for migrating to the cloud is lift-and-shift, where on-premise hardware is replaced by virtualised cloud-based equivalents. The net result of such a migration can be surprisingly expensive, often it is no cheaper than the all-in costs for an on-premise equivalent. Public cloud can be cost-effective, but to achieve this you need to change the way you approach scalability and make use of the elasticity the cloud provides. This means provisioning capacity (compute and storage) as and when it's required.

Consumption is easy

The ease of service provisioning with public cloud inevitably leads to an ever-increasing consumption. Where you might have previously had a small handful of environments, with the cloud you'll likely have many (although most will be ephemeral). It is this ease of consumption that leads to agility, but it does come at a cost.

Managing the costs of public cloud is a significant challenge. At a high level, I'd recommend the following:

- Cost attribution
  As your public cloud spend increases, it is very important to understand where all your money is going. With many different IT systems often sharing the same cloud 'account', it is very important to be able to understand the costs of each. The strategy for achieving this needs to be considered from day one, with the services suitably 'tagged' in order to allow 'drill down' and detailed reporting.

- Value agility over cost
  As we'll see in the following sections, public cloud has much more to offer than a lowered TCO. Businesses that maximise the benefits of public cloud acknowledge that agility comes at a cost, but understand the value it brings. This instils a very different mindset from the opposite, where cost is the priority and agility is stifled.

From cloud economics to cloud agility

Given that most explanations of the 'as a service' model focus on the economics, it is understandable that many view the cloud as little more than a mechanism for reducing their IT budget.

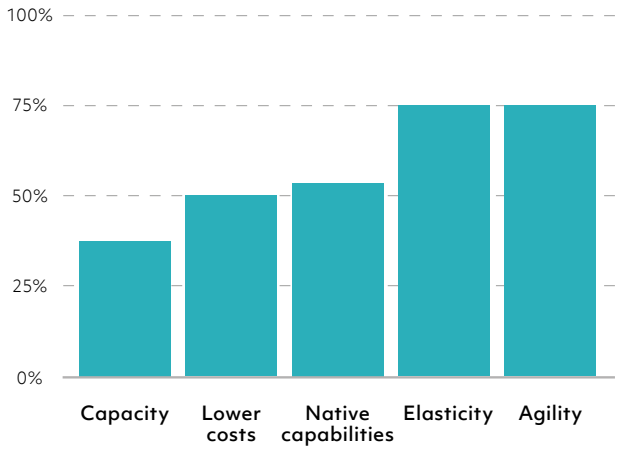
However, the benefits that a business can reap from cloud adoption are much more far reaching. In a recent survey of capital markets IT, the respondents ranked agility, elasticity and capabilities (machine learning and AI) all above cost reduction when asked about the benefits of cloud technology[7].

To understand these other benefits, we need to look more closely at how public cloud is assembled.

When you provision a new server within your own data-centre, this typically involves someone purchasing the hardware, walking into the building, then placing it in the rack. They will manually install the required storage, connect the network and install the OS. With public cloud, all of these steps are virtualised and fully automated, allowing them to rapidly provision services for all of their clients without manual intervention.

This rapid provisioning not only benefits the cloud providers, but benefits their clients also. Compute, storage and networks are available within seconds - at the click of a button. So too are PaaS services, databases and middleware, in production-ready configurations (e.g. multi availability zones, master-slave replication). Furthermore, with "infrastructure as code", the provisioning of services can be entirely automated and reproducible. In contrast with the on-premise model, where creating a new test or staging environment can take weeks or months, with cloud technology this becomes minutes!

Banking survey ranks cloud benefits



We'll look at how this rapid provisioning leads to a greater technical agility, the ability to make technology changes fast and with confidence. This provides a solid foundation for business agility, where new ideas can be rapidly brought to market.

[7]www.gft.com/uk/en/index/discovery/thought-leadership/cloud-adoption-research-paper/

Technical agility

Public cloud platforms give an unprecedented level of technical agility. In the early stages of product development, the ease of provisioning and the pay-as-you-go model make it very easy to experiment with and evaluate different technology solutions. Within the construction phase of product development, the team can rapidly provision environments and adapt to feedback with speed and confidence, backed by high levels of automation.

When moving to production the cost-effective scalability of the cloud allows you to easily create systems that provision extra capacity in real-time (and reduce capacity when no longer required), to create truly elastic solutions.

The effort, and often the cost, required to make cloud solutions scalable, secure and robust (e.g. replication, fail-over) is really quite minimal. Finally, production issues can be resolved rapidly and deployed with complete confidence, thanks to infrastructure as code and the levels of automation it offers.

Business agility

It's easy to see why technology teams love the cloud: it allows them to spend less time solving technology problems and more time on the problems that really matter – the business problems. And it is this that leads us to the most important property of the cloud, its ability to provide a platform for change and a foundation for business agility.

In the introduction, we touched upon a whole raft of challenges that financial services organisations are facing (regulations, competition, changes in buying habits and client expectations). To meet these challenges, change is inevitable. From a technology perspective, this might mean integrating a suitable regulatory SaaS platform, creating a public API or/and providing a self-service portal for client reporting. The cloud is a platform that supports rapid and confident change, and this ultimately leads to a faster time-to-market and a much more agile business.

Cloud adoption, start small

Most businesses have cloud on their technology roadmap, but it is often a long-term goal which is pushed further into the future each time it gets a little close for comfort. The reasons for this are varied and often numerous. After all, moving to the cloud does require tackling technical, regulatory and compliance issues, to name a few.

Moving to the cloud takes confidence, requires time, education and learning. However, you don't have to tackle this all at once; a big-bang approach is not needed.

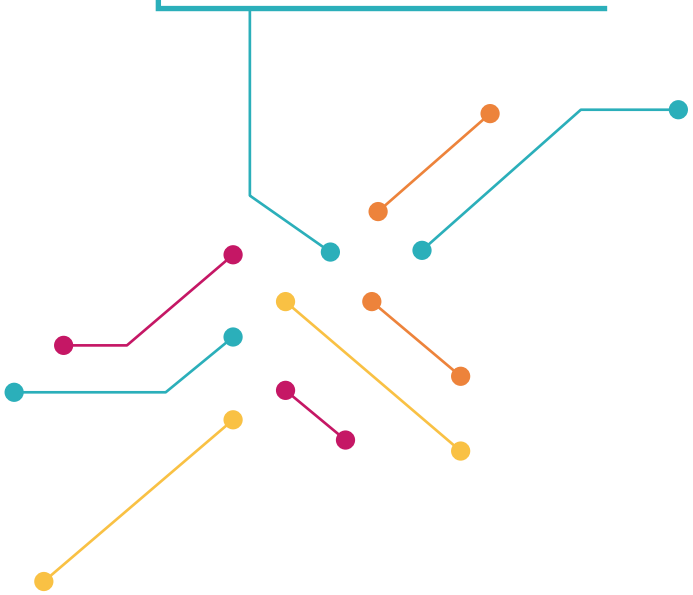
The specifics of a cloud migration strategy are beyond the scope of this paper, and such a strategy should be bespoke to your business. However, as a guiding principle you should start small, pick a problem (or even a small part of a problem), and use that as a vehicle for gaining experience. Perhaps implement part of an ingestion pipeline? Client report generation? Or the creation of an API layer?

An agile approach to cloud adoption gives you the opportunity to learn, assess and, most importantly, gain experience.

Conclusions

Faced with an accelerated rate of change in competition, regulations, buying habits and customer expectations, financial services organisations are having to vastly enhance their capacity for responsiveness to keep pace. Public cloud provides an ideal technology foundation, allowing you to rapidly respond to challenges with confidence. Adoption of this key technology ultimately leads to a more agile business.

If you're not using cloud technology in your business, now is the time to start.



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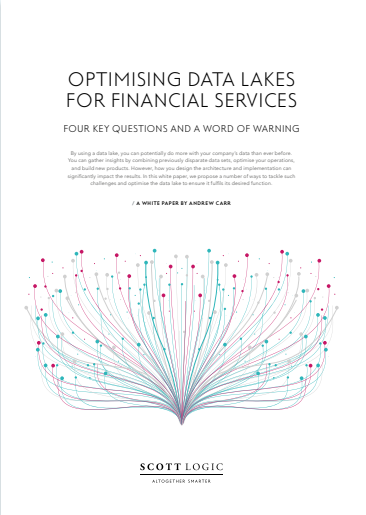

Optimising data lakes for financial services

By using a data lake, you can potentially do more with your company's data than ever before. You can gather insights by combining previously disparate data sets, enabling you to optimise your operations and build new products. However, how you design the architecture and implementation can significantly impact the results. In this white paper, we propose a number of ways to tackle such challenges and optimise the data lake to ensure it fulfils its desired function.

The journey to DevOps

The case for the public sector to innovate around service delivery, whilst driving cost-savings and improving efficiency, has never been greater. This paper is written for technology managers within such organisations, who face the significant challenge of designing and delivering transformative digital services.

If you'd like a copy of these sent to your inbox, please email **colin@scottlogic.com**

Want to discuss cloud technology in your organisation?

At Scott Logic, we design and build software that transforms the performance of some of the world's biggest and most demanding organisations. This means truly understanding current and emerging technologies, and helping our clients make the right choices.

If you'd like to discuss the impact of cloud, or any other technology challenges that face your organisation right now, we're always happy to chat.

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