

STL Perspectives

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We evaluate the role of disaggregation and cloud native infrastructure and

key breakthrough opportunities for network operators.

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**|**

September 2021

**PURSUING HYPERSCALE**

**ECONOMICS: WHAT, WHY AND**

**HOW TELCOS CAN DO IT**



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PURSUING HYPERSCALE ECONOMICS | SEPTEMBER 2021

In our research, we spoke to 14 senior executives from

telecoms operators globally. They shared a range

of different perspectives and plans on the pursuit of

hyperscale economics, the role of a disaggregated,

cloud native model as well as the approaches they

are taking and challenges they face.

In summary, our findings were:

•

**concept**

**The**

**of**

**economics**

**hyperscale**

**resonates with telco stakeholders, but it is**

**interpreted in different ways.**

Some see it as

a matter of size and scale, others see it as a

change in the way they operate but there is

consensus that disaggregation and the move

to cloud native architecture for networking has

changed what is possible with regards to the

pursuit of hyperscale, from a cost, capability and

revenue standpoint.

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**However, not all telco operators believe**

**that hyperscale economics is applicable or**

**achievable for them.**

Some see the lack of

skills as a barrier and continuous change as a

challenge, others see as a reason to accelerate

their transformations and embrace the need for

continuous change as the new normal, including

adoption of continuous integration/continuous

delivery (CI/CD) pipelines and agile practices.

We argue that hyperscale economics is not just

about size and that the latter perspective holds

greater promise for operators in the long run.

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**We believe hyperscale economics should be**

**seen as an ongoing strategic goal and pursuit**

,

and telcos should identify key breakthroughs and

aim for the feasible stages of disaggregation

and automation in sight that enable them

to disentangle their costs and capabilities.

One strong candidate area, common to all

operators, is bringing cloud native practices and

disaggregated software architecture to core

networking, including core transport (particularly

user plane) functions. We explore this in more

detail in our report.

Telecoms operators’ interest in the hyperscale cloud

providers is threefold:

•

As business partners, who can drive new areas of

demand and provide infrastructure and software

services to operators;

•

As threats, who reduce operators’ value through

and

OTT)

(

over-the-top

under-the-network

-

providing distributed cloud infrastructure as-a

(

service to operators) services, commoditising

operators’ core business;

•

As models that operators can learn from and

adopt business practices, operating procedures

and technology.

This paper focuses on the third, and on hyperscale

economics, which provide a disruptively different

relationship between costs and capabilities for those

that can harness them:

Rather than seeing hyperscaler economics as

an outcome of pure scale or of adopting specific

technologies and practices, we contend that operators

should consider hyperscaler economics to be their

goal. We argue that there are business benefits in

doing so. Firstly, it is an aspiration that the whole

company can get behind. Secondly, it is a cultural

shift that emphasises change as desirable and

never-ending rather than something to be minimised

and avoided. Finally, the emphasis on continuous

resource optimisation provides a clear framework for

sustainable growth to engage stakeholders, including

customers, technology partners, investors, regulators,

governments and influential interest groups.

EXPONENTIALLY

GROWING

CAPABILITIES

HYPERSCALE ECONOMICS

LINEAR COST

BASE

**OR**

LINEAR

CAPABILITIES

EXPONENTIALLY

DECREASING COST

BASE

**Executive summary**

PURSUING HYPERSCALE ECONOMICS | SEPTEMBER 2021

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**Preface**

The document has been prepared by independent consulting and research firm STL Partners. It is based on the

output of an extensive interview programme conducted by STL Partners with telecom operators globally, as well

as STL Partners’ continuous research programme into the future telecoms operator and how to get there. The

research programme has kindly been supported by DriveNets.

STL Partners maintains strict editorial independence. Mentions or allusions to companies or products in this

document are intended as illustrations of market evolution and are not included as endorsements or product/

service recommendations.

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01. Introduction

**The promise of hyperscale economics**

# Managing demands and disruption

As telecoms operators move to more advanced, data intensive services enabled by 5G, fibre to the X (FTTX) and other value added services, they are looking to build the capabilities to support the growing demands on the network. However, in most cases, telco operators are expanding their own capabilities in such a way that results in their costs increasing in line with their capabilities.

This is becoming an increasingly pressing issue given the commoditisation of traditional connectivity services and changing competitive dynamics from within and outside the telecoms industry. Telco operators are facing stagnating or declining ARPUs

within the telecoms sector as price becomes the competitive weapon and service differentiation of connectivity services diminishes.

The competitive landscape within the telecoms industry is also becoming much more dynamic, with differences in progress made by telecoms operators adopting cloud native technologies from a new ecosystem of vendors. At the same time, the rate of innovation is accelerating and revenue shares are being eroded due to the changes in the competitive landscape and the emergence of new competitors, including:

* Greenfield operators like DISH and Rakuten;
* More software-centric digital enterprise service providers that provide advanced innovative applications and services;
* Content and SaaS players and the hyperscale cloud providers, such as AWS, Microsoft and Google, as well as the likes of Netflix and Disney.



**We are in another transition period in the telco space. We’ve made a lot of mess in the past, but now everyone is talking about cloud native and containers which gives us an opportunity to start over based on the lessons we‘ve learned.**

VP Cloudified Production

European converged operator 1



Even for incumbents or established challengers in more closed and stable markets where connectivity revenues are still growing, there is still a risk of complacency for these telcos. Markets with limited historic competition and high barriers to entry can be prone to major systemic shocks or sudden unexpected changes to the market environment such as government policy, new 5G entrants or regulatory changes that mandate for structural separation.

## Telecoms industry seeking growth

The telecoms industry’s response to threats has traditionally been to invest in better networks to differentiate but networks have become increasingly commoditised. Telcos can no longer extract value from services that exclusive run on telecoms networks. In other words, the defensive moat has been breached and owning fibre or spectrum is not sufficient to provide an advantage. The value has now shifted from capital expenditure to the network-independent services that run over networks. The capital markets therefore believe it is the service innovators – content and SaaS players and internet giants such as Amazon, Microsoft or Apple – that will capture future revenue and profit growth, rather than telecoms operators. However, with 5G, edge computing and telco cloud, there has been a resurgence in interest in more integration between applications and the networks they run over to leverage greater network intelligence and insight to deliver enhanced outcomes.

**For the same total revenues, the market**

**capitalisation of the 7 internet giants is larger**

**than that of all telecoms operators combined.**

**Source:**

Company accounts from 165 operator groups and 7 internet players

Google, Apple, Microsoft, Amazon, Facebook, Tencent, Alibaba); STL Partners analysis,

(

2019

**$0**

**$1**

**USD Trillions**

**$2**

**$3**

**$4**

**$5**

**$6**

**Telecoms**

**industry**

**Selected**

**internet giants**

**Telecoms**

**industry**

**Selected**

**internet giants**

Google

Apple

Facebook

Amazon

Microsoft

Alibaba

Tencent

Global telecoms

**Revenue and market capitalisation, telco vs. internet**

## Defining telcos’ roles in the Coordination Age

Given that the need for connectivity is not going away but the value is not going to grow, telcos are now faced with the challenge of figuring out what their new role and purpose is within the Coordination Age,[[1]](#footnote-1) and how they can leverage their capabilities to provide unique value in a more ecosystem-centric B2B2X environment.

Success in the Coordination Age requires more from the network than ever before, with a greater need for applications to interface and integrate with the networks they run over and to serve not only customers but also new types of partners. This calls for the need to not only move to more flexible, costeffective and scalable networks and operations, but also the need to deliver value higher up in the value chain to enable further differentiation and growth.

**Telcos can either define themselves as a retail business selling mobile and last mile connectivity, or figure out how to work more closely with demanding partners and customers to provide greater value. It is not just about scale or volume, but about the competitive environment. At the end of the day, telcos need to prepare for the capabilities to do innovative things like dynamic slicing.**

**Group Executive, Product and Technology**

Asia Pacific operator



### Responding to the pace of change

The introduction of cloud native technologies and the promise of software-centric networking has the potential to (again) significantly disrupt the market and change the pace of innovation.[[2]](#footnote-2) For example, the hyperscale cloud providers have already disrupted the IT industry and are seen simultaneously as a threat, potential partners and as a model example for operators to adopt. More significantly, they have been able to achieve significant growth whilst still maintaining their agile operations, culture and mindset.



With the hyperscalers now seeking to play a bigger role in the network, many telco operators are looking to understand how they should respond in light of this pace of change, otherwise run the risk of being relegated to being just the connectivity provider or the ‘dumb pipe’.

Our report seeks to address the following key question:

**Can telecoms operators realistically pursue hyperscale economics by adopting some of the hyperscaler technologies and practices, and if so, how?**

Our findings in this report are based on an interview programme with 14 key leaders from telecoms operators globally, conducted from June to August 2021. Our participant group spans across different regions, operator types and types of roles within the organisation (see Appendix 1 for more details).

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| 02. Hyperscale economics  **Understanding the principles and drivers**  **What is hyperscale economics?**  COSTS GROW IN LINE  WITH CAPABILITIES  EXPONENTIALLY  GROWING  CAPABILITIES  HYPERSCALE ECONOMICS  LINEAR COST  BASE  LINEAR  CAPABILITIES  EXPONENTIALLY  DECREASING COST  BASE  **OR**  **Hyperscale economics is not necessarily about big and bigger** |

The term hyperscale economics originates from the computing world whereby ‘hyperscale‘ refers to the ability of a technology trajectory to scale and meet increasing demand that is mathematically fundamentally different from the resources (costs) needed to do so. Many within the industry, including some of our interviewees, believe that hyperscale economics is about size and scale, and therefore only achievable by companies such as Google, Microsoft, Facebook, Amazon, but we argue that scale is not a guarantee of success. These companies have grown in a way that maintains their early stage agility and nimbleness without its size becoming unwieldy. Besides technology, this is about their processes and operating models that have allowed them to maintain a degree of the dynamism, with more DevOps practices, supporting increasing variety and running continuous integration and delivery (CI/CD) of software updates.

We define hyperscale economics as the ability to separate the rate at which your capabilities grow in comparison to how your cost base grows as a result. Achieving hyperscale means that either your capabilities grow exponentially with a linear or flat cost base, or capabilities grow in a linear way while costs fall exponentially. In theory, we believe hyperscale economics can be pursued regardless of the size of the organisation.

Note that capabilities does not always necessarily equate to revenues. Some essential capabilities include the ability to add more capacity without costs increasing at the same rate, other capabilities are more directly revenue generating, for example the ability to provide new over-the-top (OTT) or networkenabled services.

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| **Understanding the key drivers for pursuing hyperscale economics**  Faster innovation and  Flexibility and resilience  Optimal scalability  time to market to shocks |

### Optimal scalability

Telco operators need to be able to respond quickly to the need for increased capacity to support data traffic growth, with infrastructure and systems that work and scale quickly as intended, even when demands grow. However, today, when most telcos scale to meet such requirements, their costs increase at a similar rate. This becomes an even bigger issue when operators need to enhance the capacity of one network while other networks are underutilised. One Middle Eastern operator we spoke to cited that it would take months to enhance capacity to handle a sudden spike in traffic (e.g. due to an event) but later finds itself with underutilised hardware.

There is a clear need for greater elasticity in their existing infrastructure that enables them to easily scale up and down to meet peaks and troughs in demand. This was the case with COVID-19 where operators needed to enhance capacity for home users while their enterprise networks were underutilised. Hyperscalers’ fully virtualised infrastructure enables them to increase capacity in one network using physical resources that are shared with another network that is underutilised. Telcos are not able to manage the same capacity requirements in factors less in cost, in a way that bypasses scalability issues, given their overall infrastructure is not as dynamic, but rather siloed monolithic networks. Therefore, hyperscale economics is about expanding capabilities in a continuous way that optimises resource utilisation and cost efficiency, extending the lifetime value of resources, for example by sharing them better across different networks and services and/or through (re) use of commercial off-the-shelf (COTS) hardware.

### Faster innovation and time to market

Hyperscale economics is also about accelerating the beat rate of innovation and adopting agile practices when it comes to service development and versatility. Many of our interviewees see the hyperscale cloud providers as models that operators can learn from, not only from a technology standpoint but also about their business practices and operating procedures such as self-provisioning and third party services. Hyperscale economics is therefore also about the speed at which telcos can pursue and grow new revenue streams and address customer needs.

### Flexibility and resilience to shocks

Our interviews have also emphasised the need to scale without compromising on flexibility as part of achieving hyperscale. Some have mentioned the need to adopt hardware acceleration techniques as workarounds and means of increasing throughput, potentially at the expense of flexibility (to be explored later). The concept of flexibility is often mentioned as part of what our telco interviewees describe when citing the need for scalability, but many telcos we spoke to also associated this with the need to become more vendor agnostic and infrastructure agnostic.

Some of the telcos we spoke to described hyperscale economics as being about the robustness, resilience and ability to sustain shocks better, which includes internal failures or external market impacts (e.g. a regulatory shock or new entrant or competitor). A prerequisite for hyperscale economics is that resilience, stability and reliability increase through scale. This is an inherent characteristic of the mindset.

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| 03. Approach to hyperscale  **A mindset and pursuit, not an end goal**  **Hyperscale economics is not an end goal but more an ongoing pursuit**  **No single breakthrough Means of aligning stakeholders** |

Achieving hyperscale economics requires a shift in the way that telecoms operators deploy, run, operate, manage and plan their networks. The pursuit of hyperscale is not about identifying a single breakthrough to separate the rate at which telcos‘ costs and capabilities evolve. A single breakthrough can result in progress, albeit temporary.

Therefore, pursuing hyperscale economics should be seen as more of an ongoing pursuit and a successful journey should look like a succession of breakthrough changes in technology and practices. Telco operators should also see the pursuit of hyperscale as a mindset of continuously looking for the next innovation.



Telco operators should also see hyperscale economics as a means of anchoring their company strategy. We found that the term resonated with many individuals we spoke to. Furthermore, it is also one that is readily understood by different stakeholders and decision makers within the business, in comparison to terms like ‘disaggregation‘ and ‘cloud native‘.

Having this as an ongoing strategic goal or a ‘North Star’ also means that it can be linked to what different business units or stakeholder groups need to aim for.

It can be used in the following ways:

* To challenge the technical teams to pursue new

**By introducing merchant silicon, we achieved [hyperscale economics] temporarily - we are now flat or in decline on costs when it comes to capacity while traffic is doubling every second year. We are still riding this wave, but it will break again at some point.**

**Head of Transport Network Strategy** European converged operator 2



innovations and concepts such as disaggregation and cloud native networking;

* As a means for ‘internal customers‘ such as product management or development teams to set requirements and needs from the technical teams;
* As a means to communicate with other internal stakeholders such as the Chief Financial Officer (CFO) and commercial leaders;
* As a framework for sustainable growth to engage external stakeholders such as investors, technology partners, customers, regulators, governments and influential interest groups. The emphasis on continuous resource optimisation can support wider sustainability goals.

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| **The current focus: cloud native networking and disaggregation** |

There was a degree of consensus among our interviewees that the move to cloud native and a more disaggregated model within telco networks plays an important role in enabling hyperscale economics, and fundamentally changes what‘s possible in comparison to how networking has been done up until now in the traditional appliance-based world and with the first wave of network function virtualisation. Many telecoms operators see the terms cloud native networking and disaggregation as two peas in a pod, or in some cases, the former adopted in order to achieve the latter. We explore below how telcos are defining the concepts of cloud native and disaggregation, and the role they play in unlocking hyperscale economics.

### Cloud native networks: a fundamental shift

We have found general alignment among our interviewees on what cloud native means and the applicability to telco networking. This is in line with the definition by the Cloud Native Computing Foundation (CNF), but interpretations of different elements within the definition have differed slightly from individual to individual. Although cloud native principles have been widely adopted by IT, our telco interviewees see the move to cloud native within telco networks as work in progress, albeit inevitable (but not without its challenges).

Some operators see the role of cloud native in enabling greater flexibility and agility. For example, when it comes to building infrastructure-agnostic applications and services, these are designed to be evolve in a way that is not tied down by the underlying infrastructure. These operators see cloud native not only as the technology evolution but also a change in the operating model. This change can involve the adoption of CI/CD pipelines as part of agile development and greater automation, enabling telcos to react much more quickly to internal and external customer needs in a more cost and time efficient way.

The advent of cloud native is seen as a fundamental evolution from the first wave of network function virtualisation (NFV), given that NFV failed to deliver the scalability, flexibility and cost savings that it originally promised. Many deployments of VNFs involved running largely unchanged network functions inside virtual machines on dedicated hardware, and were therefore not that different to the traditional appliance-based functions. As previously mentioned, most operators have sought to adopt different types of hardware acceleration techniques, such as:

* Single root input/output virtualisation (SR-IOV), to increase capacity at the expense of flexibility;
* Smart network interface cards (SmartNICs), to offload more network intensive tasks;
* Introduce dedicated standardised network processing units (NPUs) into grey boxes, in combination with central processing units (CPUs).

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| **Cloud native technologies empower organizations to build and run scalable applications in modern, dynamic environments such as public, private, and hybrid clouds. Containers, service meshes, microservices, immutable infrastructure, and declarative APIs exemplify this approach.**  **These techniques enable loosely coupled systems that are resilient, manageable, and observable. Combined with robust automation, they allow engineers to make high-impact changes frequently and predictably with minimal toil. Source:**  Cloud Native Computing Foundation |

This is all part of an evolving optimisation of resources, from which some blueprints are now emerging.



**Cloud native is not an app that’s been stuffed into a virtual machine - it is truly designed for the cloud and is managed by a platform in an orchestrated, containerised environment. Cloud native networking plays an absolutely critical role in hyperscale economics; you have to have the plumbing underneath that can be programmed and automatically configured in the network.**

**Vice President, Core Network Engineering**

North American converged operator



### Disaggregation: Not if, but how

In general, most of our interviewees define disaggregation as the move away from monolithic architectures but in comparison to how our telco interviewees define cloud native, disaggregation is either seen as more of a black and white concept (i.e. full disaggregation or not) or a stepwise progression. For some, it involves decoupling the underlying hardware infrastructure, from re-architected applications (network functions) and orchestration. For others, it is about pursuing ‘best-of-breed’ supplier strategies working with (a potentially different) selected vendor for each component, or about the greater use of open source software. From a supplier strategy perspective, many interviewees have talked about disaggregation and ‘best of breed‘ in the same sentence. This optionality fosters greater competition and choice within the vendor ecosystem, and brings more control back to telcos.

At a fundamental level, we see disaggregation as the ability to separate the network into different elements or functional components that can evolve independently of each other. (i.e. you can make changes/swap one component without impacting the others). This promises much greater choice of solutions for telcos and access to innovations beyond that available from a single vendor, which impacts telcos‘ own ability to innovate and launch new services quickly.

We see levels of disaggregation that telcos can pursue, and each has its own implications and associated benefits. First is the decoupling of hardware and software. This is already seen as desirable by all of our interviewees so the question is not about ‘if‘ it will happen, it is a question of ‘how‘. Many see this as moving from appliance-based to more generic hardware so telcos are no longer dependent on the hardware elements but there are many potential flavours of this.

Not all hardware, even commoditised or commercial off-the-shelf (COTS), is best suited to all network functions so telcos are keenly focused on assessing which available options are more performant and scalable. The decoupling of the underlying infrastructure, the applications running atop of it and the orchestration and management of those applications has been described by some interviewees as ‘disaggregation of the basic building blocks‘.

Although it has aspirations to move away from custom application-specific integrated circuit-based (ASIC) appliances, one particular operator in Asia Pacific cited that the cost curve of COTS-based approaches hasn‘t necessarily changed enough yet compared to the appliance-based model. In some cases, telcos who have scale have been able to leverage the level of competition to their own benefit for better negotiation power to drive down appliance costs without actually adopting COTS hardware.

The concept of disaggregation generally resonated with our interviewees and is seen as inevitable. The majority of telcos we spoke to feel that disaggregation is a necessary prerequisite in order to pursue hyperscale economics. They argue that the sought after divergence in capability and cost curves will not happen if telcos continue to invest in monolithic architectures. A select few interviewees even counter that hyperscale economics in theory can also be achieved through a strong vertically integrated solution but that it defeats the other benefits of disaggregation, which is about preventing vendor lock-in and being tied to the innovation cycles of a particular vendor.

However, there are still questions on ‘how much is too much disaggregation‘ and ‘where is the sweet spot‘. Most interviewees admitted that the more telcos disaggregate, the greater the need to understand the underlying technology (or the plumbing as we like to call it), and the more accountability or responsibility telcos must take on to run the network code. Without a lead vendor‘s ‘neck to choke‘, it is their neck on the block. Most operators do not expect to recompose their networks from scratch but to start from a limited number of proven blueprints, potentially based on deployments from leading operators.



**There are different levels of disaggregation and different projects we are pursuing within our organisation, from breaking down into the basic building blocks to full disaggregation with open source software, depending on whether you are talking about the core, fixed line side, O-RAN etc.**

Vice President, Cloudified Production

European converged operator



### Identifying key areas in the network

This shift to a disaggregated, cloud native model is taking place across all telco network domains: radio access networks, wireline/fibre access, core

**We are not dogmatic about disaggregating for the sake of disaggregating. Once you do, you have to manage the disaggregated pieces. We have some capabilities today but still need to continue building our internal skills. In some cases, like for O-RAN, we cannot manage the full end-to-end piece.**

Group Chief Technology Officer

Asia Pacific converged operator



transport, MEC and data centre networking.

However, given the progress in the core network,[[3]](#footnote-3) it is the core transport (and in particular user plane) functions where we observe an inflexion point due to a combination of factors, including the following: • Continued growth in traffic volumes;

* Maturity of ecosystem and technologies, in comparison to the radio access network;
* Learnings from the first wave of network function virtualisation (NFV);
* Deployment of 5G standalone (SA);
* Continued pursuit of network convergence and consolidation (some of which are indirectly driven by 5G e.g. fixed wireless access);
* Greater need for automation in anticipation of

service expansion (slicing, network APIs, MEC);

* And the need to attract, retain and optimise scarce skills-set.

We focused on this domain in our interviews.

# Unlocking the ability to automate

## Disaggregate to better automate

Disaggregation and automation have a very symbiotic relationship as concepts. The abstraction and disaggregation of hardware and software elements enables telcos to automate to a much greater extent. However, disaggregation can only break the cost curve to achieve hyperscale through automation, and without it, operators can be left with complexities that become difficult to manage.

Previously, telcos‘ automation efforts were thwarted with fragmented siloes and proprietary network management tools and systems from vertically

integrated stacks. One particular Middle Eastern operator highlighted that telcos‘ efforts to move towards automated testing and one click onboarding haven‘t been successful, as a result of many vendors only providing proprietary automation tools for their own network functions, as opposed to generic tools for multi-vendor environments. Another European operator cited the automation and scale as a driver for designing a network abstraction layer, as they could not automate given the complexity they had in their underlying systems and infrastructure they had in the past.



**With the monolithic approach, there was no agility or flexibility to move to zerotouch. Disaggregation will give the choice of choosing using best in class hardware, software and tools to automate the entire lifecycle.**

**Executive Vice President, Network Strategy** Asia Pacific converged operator 2



**The goal is to automate as much as we can, including automated testing, instantiating, onboarding etc. Up until now, we haven’t been able to achieve this as each of the vendors have their own proprietary tools for their own network functions, no generic tools for a multi-vendor environment. It is still not infrastructure agnostic.**

**Cloud Infrastructure Solution Architect**

Middle Eastern operator



## Enabling more possibilities for automation

With more programmable and open underlying infrastructure, software components with open APIs and greater abstraction within the network, network disaggregation drastically improves and simplifies the automation and management across the entire endto-end delivery lifecycle. One of the operators in Asia Pacific we spoke to emphasised that the importance of making everything softwarised and disaggregated is about the ability and need for automation, AI enablement and agility.

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| 04. Key challenges  **Is hyperscale economics for everyone?**  **Not all operators think hyperscale economics is applicable to them Seen as achievable for some, but not others Different attitudes towards change** |

By being able to automate to a much further degree, telcos can streamline their operations, react much faster to incidents (in real time) and enable their workforce to focus on more value-added tasks, and less on manual tasks. This has a significant impact not only on the bottom line (by reducing costs), but also the top line in telcos‘ ability to serve customers and respond to their needs in a much quicker fashion.[[4]](#footnote-4)The majority of telco operators see the move to a disaggregated, cloud native model as desirable, or even in some cases inevitable, as part of the pursuit of hyperscale economics but not all operators see hyperscale economics as applicable or achievable for them. Many operators we spoke to feel that they cannot take the same approach as some of the leading Tier 1 operators, but still feel hyperscale economics can be achieved in other ways. Other operators are less sure that this is achievable for them given certain constraints (e.g. lack of the right skills, internal capabilities, resources).



The pursuit of hyperscale economics not only relates to technology, but it is also about the change in the operating model. Many operators we spoke to cited the adoption of more agile practices for service development, DevOps, CI/CD pipelines as part of this model, which fundamentally points to a philosophy of continuous change as the new normal.

However, in our research, we found different (and sometimes contrasting) perspectives of how our interviewees think about the need for continuous change in pursuing hyperscale economics. Some

**Our own teams have to evolve: we have to develop software skills inside our network team, and network knowledge in software teams but it doesn’t happen overnight. You won’t suddenly transform a network expert into a software expert but you do have to minimise the gap.**

**Vice President, IT and Network Strategy** European group operator



embrace continuous change and see it as both the goal and part of the transformation. For some of these operators, the lack of skills is seen as an accelerator to pursue this new operating model, in order to more effectively (and quickly) address future opportunities. Other operators we spoke to expressed that they see continuous change as a challenge they have to overcome (particularly from an operational perspective), and the lack of skills as a barrier. These views influence the extent to which the operator believes that hyperscale economics is applicable and achievable for them, and how they might go about pursuing it.

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| **Source:**  STL Partners analysis  **AVID BELIEVERS**  **LEADING PIONEERS**  **CAUTIOUS PRAGMATISTS**  ***ATTITUDE TOWARDS THE NEED FOR CONTINUOUS CHANGE***  ***THOUGHTS ON APPLICABILITY OF HYPERSCALE ECONOMICS***  **CONSTRAINED FOLLOWERS**  “Continuous change should be embraced as the  new normal, incl. CI/CD pipelines, DevOps and  agile practices. This should be part of what we  want to move to in terms of the way we work”  “Continuous change is a  challenge we have to deal  with, particularly from an  operational perspective but we  have to do it and will do it.”  “Change is a challenge given  our lack of skills and  culture/mindset so we have  to rely on our partners to  innovate”  Hyperscale, disaggregation  and cloud native are the  goals and  **will lead the**  **efforts to achieve this, incl.**  **taking a DIY approach**  Hyperscale is the goal  through disaggregation and  cloud native but  **relies on**  **collaboration efforts and**  **blueprints to get there**  Sees value of hyperscale  economics but  **sceptical on**  **the applicability to them**  .  Some still see the value in  working with incumbent  vendor partners  **Don’t see the pursuit of**  **hyperscale economics as**  **applicable or achievable for**  **them**  given constraints, lack  of skills, capabilities and  resources  ***Change is the goal***  ***Change is the challenge***  **Telecoms operators will take different strategies to pursue hyperscale** |

The diagram above showcases a high-level overview of the types of operators we encountered in our research programme. Telco operators in the first two groups, the Leading Pioneers and Avid Believers, see hyperscale economics, disaggregation and cloud native as the goal but may take different approaches in pursuing hyperscale. The Leading Pioneers will spearhead efforts to achieve this, which may include taking a DIY approach to assembling and reassembling disaggregated components and taking on the integration accountability, or leading collaborative efforts within the industry with vendor partners and other operators to create blueprints for others to adopt. Telcos who are Avid Believers rely on such collaborations and blueprints as well as forums to pave the way. Regardless, both groups see the need to embrace agility and a philosophy of continuous change as part of the pursuit of hyperscale economics.

The latter two operator groups see change as more of a challenge. Operators in the Cautious Pragmatist group feel impeded by the current skillset and culture. but will find ways of overcoming the challenges. One particular Asian operator we spoke to stated that they are developing the skills in-house and are in the early stages of deploying CI/CD pipelines and more frequent software updates, but they have encountered a number of speedbumps, particularly from an operational perspective. The main challenge is that given this space is still nascent, they don’t know what they don’t know. Therefore, operators within this group see the value in hyperscale economics but are more sceptical about its applicability to them. Many of them still see value in working with established vendor partners. The final Constrained Followers group consists of operators who see their lack of skills and capabilities as a significant barrier and rely on their vendor partners to innovate.

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**Key examples for scale and optimisation**

**in core networking**

05

. Finding breakthrough opportunities

**Wave 1**

**Decoupling of hardware and software**

This is about moving away from dedicated hardware,

such as custom ASIC-based appliances or proprietary

silicon, to more generic, commoditised hardware so

that telco operators can have the option to select the

best individual hardware and software from different

leading vendors, for greater flexibility and optionality.

One European operator we spoke to cited that their

decision to adopt merchant silicon was driven by the

lack of optimality with custom ASICs from a feature

and openness perspective, including interoperability

issues. The decoupling of hardware and software,

combined with move to more generic hardware

enables telcos to standardise the management

tools across all hardware. As a result, there is more

operational uniformity even across different vendors

for better (and easier) control, management and

operation of the network. It also means that progress

and innovation on new capabilities can be added via

software, as opposed to rip and replace of existing

dedicated hardware.

That being said, the decision on the type of generic

hardware is important as not all generic non-

proprietary hardware is the same. Some may not be

as suited to more intensive networking tasks, which

impacts the ability to scale capabilities in a cost

efficient way (i.e. in a way that doesn‘t result in costs

increasing in suit by the same factor).

This can be an issue where certain flavours of generic

hardware end up being relatively expensive when

scaling up to support more intensive networking tasks,

such as user/data plane network functions with more

capacity intense networks. Telcos therefore need to

consider the spectrum of solutions available to them

and assess how each impacts the following aspects:

•

Ability to scale quickly as needed based on

demand and at incremental cost,

•

Ability to utilise their resources more efficiently to

create that breakthrough in the cost curve,

•

Potential compromises on flexibility (as a result

of bypassing scalability issues).

As discussed in our earlier sections, hyperscale economics should be seen as an ongoing pursuit and mindset

in continuously looking for the next breakthrough opportunity. Below, we highlight key examples of breakthrough

opportunities for hyperscale economics that we found in our research with telecoms operators globally.

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**Wave 2**

**Abstraction and disaggregation of the software**

**components to enable software-based innovation**

Disaggregation of these elements enables telcos to

move, change and evolve each individual building

block without impacting the others, moving away from

monolithic software architectures to more generic

componentised architectures. In particular, a few of

our telco interviewees highlighted the importance

of this in being able to separate out the software

infrastructure elements so that they can create more

those

infrastructure-agnostic

services

(

whether

infrastructure elements are hardware or software).

The value of this is the ability to unlock different

types of operating models between the infrastructure

business (referred to as the ‘Infraco‘), and the services

business (the ‘Servco‘). The Servco is then able to

innovate in a much more agile way without being

tied to the Infraco, and the softwarised/cloudified

infrastructure elements act as the interface point

between the Servco and the underlying infrastructure.

This disaggregation fundamentally enables them

both to co-exist to deliver the real value of telco cloud.

Once the software components have been broken

up into the basic building blocks, they can be further

disaggregated into smaller building blocks. It is then

possible to develop open interfaces between the

software components to avoid unwieldy monolithic

systems from holding back innovation.

This disaggregation is one of the mechanisms by which

hyperscaler economics is achieved. It allows for more

innovation within a Servco or within a multi-tenanted

environment by enabling greater independence and

autonomy across multiple Servcos. This can in turn

enable a services marketplace, which can be purely

internal to the operator or include third parties (e.g.

wholesale). In summary, by taking a disaggregated

approach, firms can adopt best practices faster and

more reliably. This allows them to adopt capability

trajectories that continue to diverge from costs.

**You need to decouple each layer and be**

**more vendor-agnostic, and it’s that layered**

**architecture that enables you to be cost**

**effective, avoid lock-in, have that flexibility,**

**scalability, and accelerate that beat rate of**

**innovation.**



**Group Executive, Product and Technology**

Asia Pacific operator



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**Wave 3**

**Expansion of automation toolsets to**

**manage the end-to-end lifecycle**

Once operators have mastered the basic automation

of their core in-life processes, the next step is to

automate across the entire service delivery lifecycle.

By leveraging more generic automation tools, telco

operators can automate their root cause analysis and

remedial actions. They can build CI/CD pipelines for

more automated testing, deployment and software

releases. This means that telcos can launch new

services with quicker time to market as well as

reiterate existing services much faster, which in

turn results in the ability to deliver greater value for

customers and positive impact on top line growth.

With more open interfaces between software

telco

APIs,

open

common,

and

components

operators can also improve the way that they assure

their networks without being inhibited by proprietary

network management systems. This enables them

to achieve better visibility across their network,

better streamline their operations across different

network domains and resolve faults or incidents in a

more holistic way, which should lead to better overall

customer experience.

It also becomes easier for telcos to orchestrate

across different domains and partners. By being able

to maintain and update their ensemble in an ‘IT-like‘

way, operators can make changes more efficiently.

This enables them to fix bugs more quickly and to

decrease their time to market with new releases or

updates, thereby minimising the investment in time

and cost required to offer new services or capabilities.

Finally, with automation and true disaggregation (i.e.

between hardware and software, and infrastructure,

applications and orchestration elements), it becomes

easier for telcos to manage multi-tenancy cloud

networks (i.e. multiple logical networks that share

underlying resources). This epitomises the concept

of hyperscale economics, if telcos are able to use

their existing infrastructure and resources (directly

related to costs) to add additional capabilities such

as network slicing or to safely expose network

capabilities and insights to customers, partners and

other third parties.

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06. Conclusion

**Our key recommendations**

**For most operators, this is as much a cultural**

# transition as a technical one

## Change is the goal, not a barrier to overcome

At the risk of oversimplifying things, the telco leadership we interviewed fell broadly into two groups:

* Those who saw the new technologies as a burden that involved many ‘hidden‘ implementation costs, such as needing to acquire (scarce) skills sets and practices
* Those who saw the change in skills as the main objective and a necessity enabled by the technologies and fundamental to pursuing hyperscale economics

Although both are right, we would argue that the second perspective holds greater promise for achieving hyperscale economics, as this is rooted in a continuous quest for breakthrough adaptations rather than the stability of proven practices.

However, we also recognise that operators have a legacy: existing services, technologies, people. For many operators there is also a legacy of repeated and largely unsuccessful technology-led transformation. This has created an understandable (and not altogether unfounded) organisational fatigue and resistance to the leadership’s latest rallying call for ‘digital / all-IP / next-gen’ transformation.

Our recommendations to operators should be taken in this context.

## Our recommendations to telco leadership

1. **Focus on hyperscale economics not as the outcome of good strategy but as the goal.** Emphasise the ‘economics’ rather than the ‘hyperscale’ to build common understanding and ownership across the organisation. This should be an endeavour that all stakeholders intuitively understand and (most of) the organisation supports. Do not see as a technology exercise but instead see it as the measure by which strategic decisions should be assessed by the leadership: ‘Will this directly support our goal to meet hyperscale economics? If not, is it an acceptable indirect detour to reaching this goal?’
2. **Use the concept of hyperscale economics as a means of informing your wider strategy, and challenge teams to deliver.** Ask the most experienced practitioners to challenge (some of) what they know. This will be particularly hard for those who have worked extensively across the organisation and on whose judgement the company relies every day. Identify and aim for stages/breakthrough that are in sight. This is necessary to build momentum and credibility.
3. **Be your own catalyst and build your own conviction.** If the leadership does not actually believe that their organisation is facing an existential crisis, then they cannot expect others to share this view and behave accordingly. Clearly communicate this vision to drive significant belief and change within your organisation.

|  |
| --- |
| PURSUING HYPERSCALE ECONOMICS | SEPTEMBER 2021  Appendix  **Interview programme**  **Interviewees by region**  **33**  **%**  Asia/MEA  **42**  **%**  Europe  **8**  **%**  Middle East  **17**  **%**  N. America |

Our findings in this research report are based on an interview programme with 14 senior executives from telecoms operators globally, conducted from June to August 2021.

Our participant group spans across different regions, operator types and types of roles within the organisation, with a primary focus was on the technology and networking domains of the organisation. The interviewees’ roles included Chief Technology Officer, Head of Network Strategy, Vice President of Technology Strategy, and Chief Network Architect.

# 33%

**Group level**

**17**

**%**

**OpCo within**

**50**

**%**

**Single**

**market**

**group**

## Interviewees by operator type

**Group level** Strategic level of a organisation presiding over 2+ operators in different countries

**OpCo within** Local team for an operating business **group** which is part of a larger group

**Single market** An operator in a single market, not part of a global operator group

1. In more detail in our report, Telco 2030: New purpose, strategy and business models for the Coordination Age. [↑](#footnote-ref-1)
2. In more detail in The Telco Cloud Manifesto. [↑](#footnote-ref-2)
3. In more detail in our report, The 5G core and NFV: Different sides of the same coin?. [↑](#footnote-ref-3)
4. In more detail in our report, A3 for telcos: Mapping the financial value. [↑](#footnote-ref-4)