运营商全面拥抱Hyperscaler

对ADN意味着什么?

Min He 12/2021

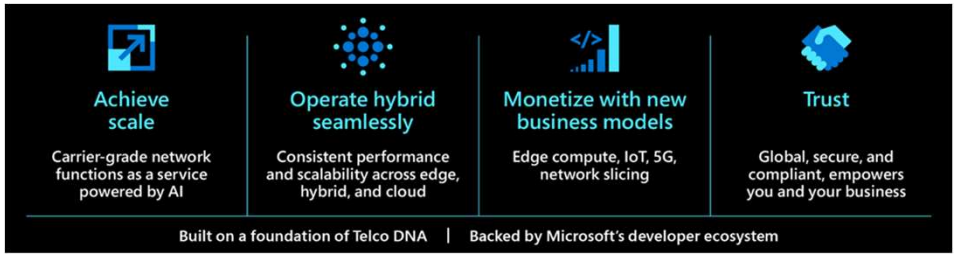
Hyperscaler 解决方案有强大吸引力，运营商不得不在更多的领域内和Hyperscaler合作。

- 过去20个月Hyperscalers 一致认为，在数字化转型的大背景下， 电信行业这个果子已经成熟，是摘果子的时候了。
- 2021 DTWS， Hyperscalers 非常活跃， AWS提供钻石赞助。电信云市场规模2026将达到$52.3B， CAGR 21.4%. (Marketsandmarkets 2021 report: Telecom Cloud Market)
- 同时CSP不断把workload移到公有云并且减少私有云投资。ATT， DT， Globe，
- 目前Hyperscaler运营商解决方案来看，AWS稍微领跑。 Microsoft 和 Google 紧随其后。IBM稍弱但在加大投资
  - Amazon AWS 投资最早，方案最全， 5G Core, OSS/BSS 云部署， 有多达15个产品包括边缘控制服务，边缘基建，IOT服务， 个人边缘服务等等。
  - Microsoft Azure 最有深度， 购买了Affirm network 和 Metaswitch, 不但拿到ATT IT上云，还拿到了ATT 5G Core Network Cloud 平台。号称可以达到Carrier Grade。 Azure for Operators会有很强后劲 。
  - Google Cloud AI及分析能力有优势， 在Edge方面有特长。
  - IBM Service Provider Deliver Environment （SPDE），充分利用RedHat openshift 和Cloud Pak for Network Automation资产。

CSP对Hyperscaler是有需求的

CSP需要Hyperscaler帮助:

- 加速运营商数字化转型
  - 更敏捷
  - 更省钱
- 管理好和使用好大数据
- 高效运用云技术
  - 建，管理，协同，高扩展性，高容错性，高敏捷性
- 联手开拓垂直市场

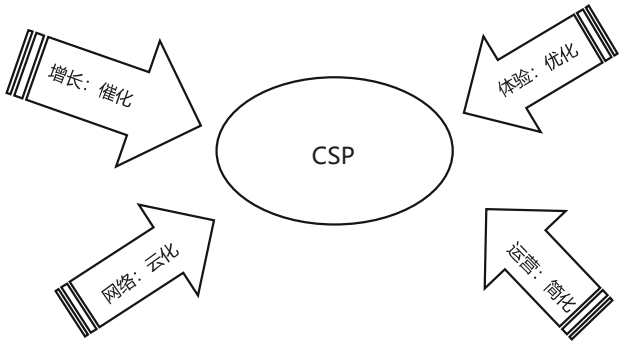


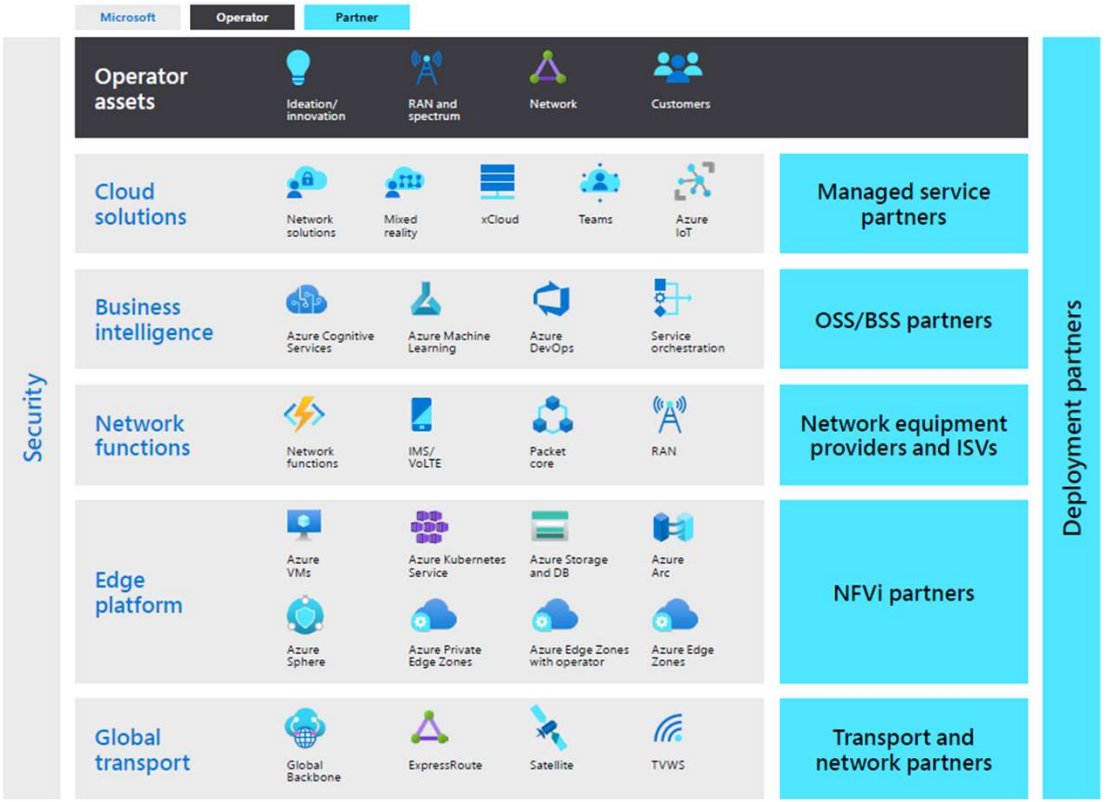
Hyperscaler给CSP讲的故事

- 讲 Hyperscaler 七大优势
  - 云技术 – 能提供Scalability， Flexibility 加上 edge 与 hybrid cloud 能力
  - 云触角 – 全球部署公有云+Edge+Hyper Cloud
  - AI/ML能力 -- 拥有技术及通用AI模型
  - DevOps 能力 –目的导向， 快速迭代， 工具全面。
  - 庞大开放人员社区
  - 众多企业触角
- 讲有能力快速补齐的三大能力
  - 网络知识及能力， 人才
  - 运营商文化， Carrier Grade
  - 运营商必须遵守的法律法规
- 讲不管你们转型处于什么状态， 都可以和我们聊， 我们在你的地方见 “We meet where you at”。
- 讲CSP领导们很清楚想要什么， 我们来可以帮你实现你要的。

Hyperscaler 四大进攻路线

1. **网络云化** :数据湖，边缘+5G+AI
2. **运营简化**：网络IT，OSS/BSS云化
3. **体验优化**：大数据分析，AI/ML人机交互，大量训练好的AI模式可用
4. **增长催化**：垂直行业数字化转型





Microsoft Azure for Operators service stack

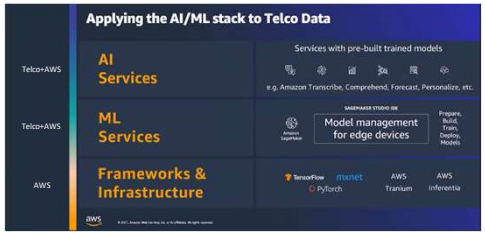
Hyperscaler在四大进攻路线上拥有的武器

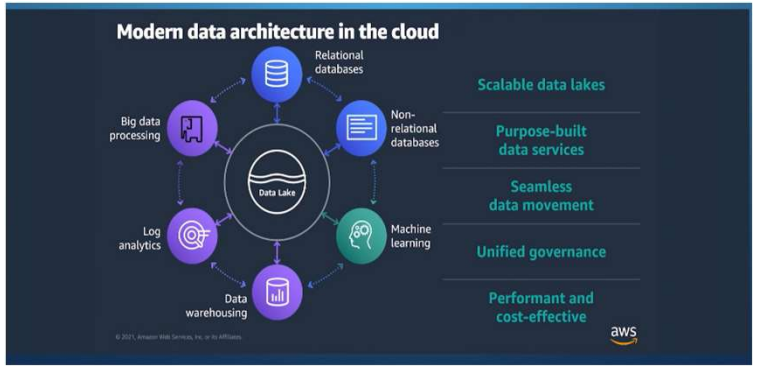
	网络公有云化 Data Lake, Cloud-native 5G Core, Public and Private MEC	用户体验优化 Data Driven insight, AL/ML CX	运营简化 IT, OSS/BSS transformation, digital interaction	商业增长催化 5G Monetization, Vertical Enterprise Transformation
Amazon AWS Verizon, KDDI, SKTelecom, Globe, Vodaphone, DISH 5G Core	Data lake • Lake formation • Redshift • Athena • EMR Cloud Native 5G Core • Zones/Outpost/Wavelength • Amazon private 5G • Graviton2, EKS Anywhere	• Amazon Connect • Amazon Polly • Amazon Lex	• Netcraker Active Resource Inventory • AWS Systems Manager • Amazon VPC(Virtual Private Cloud) • AWS Lambda • AWS Step Functions/Event Bridge • Amazon QuickSight • Beyond infonova Digital Business Platform	• AWS Wavelength • AWS Outpost • AWS IOT Sitewise Edge • AWS Private MEC with 5G
Microsoft Azure ATT 5G Core Telstra	Data lake • Analytics • HDInsight • Store Cloud Native 5G Core • Azure for Operators • Azure private MEC • Azure ExpressRoute • Azure Virtual Networks	• Dynamics365 Customer insights • Dynamics365 Customer service • Dynamics365 Virtual Agent for customer service • Wysdon.AI • Evolving System	• Dynamics365 Finance • Dynamics365 Field Service --- Workforce management • Dynamics365 Power Platform --- BI platform • Dynamics365 for Enterprise – Collaboration • Amdocs – OSS/BSS/Data/Analytics/IoT ..	• Azure Private MEC • Azure IoT • Azure Machine Learning • Amdocs • Axonize -- no code platform for IoT
Google Cloud Telecom Italia, ATT for Business, STC, Telefonica, Vodafone for AI/ML	Data lake • Dataflow • Cloud Data Fusion, Cloud Storage, Dataproc • BigQuery Cloud Native 5G Core • Working with Intel (FlexRAN, OpenNESS)to put 5G vRAN onto Anthos for Telecom	• BigQuery platform • Contact AI	• Amdocs • Netcracker • SAP • Google APIgee • Google Workspace	• GMEC • Anthos for Telecom -- a platform for delivering workloads to the network edge on Google Cloud.

网络云化：帮助CSP建立数据湖

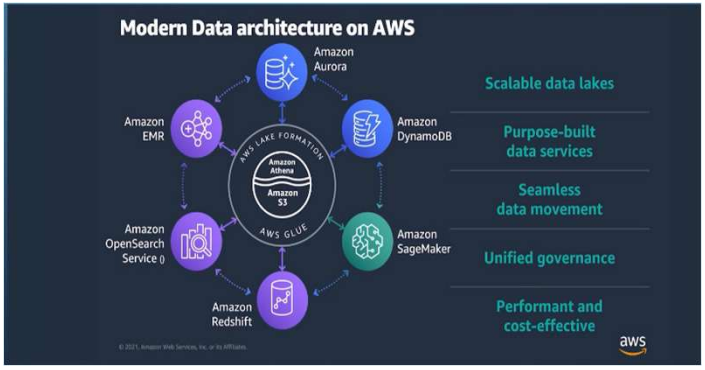
- 数据云化三方面
  - 建立现代化数据存储管理结构
  - 分析，理解数据
  - 使用数据
- 目标

  Data -> AI Serivce



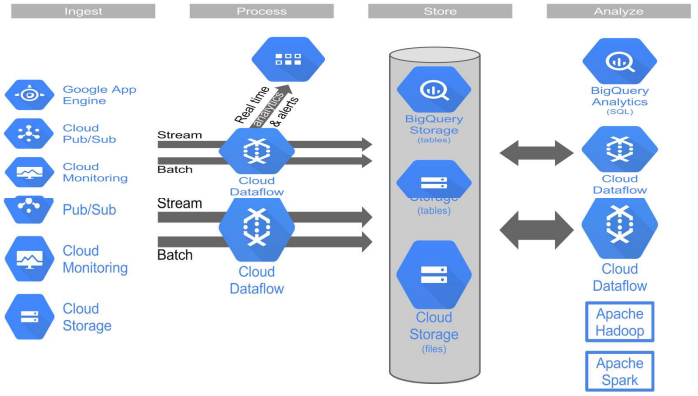


General Data Architecture



AWS Data Architecture

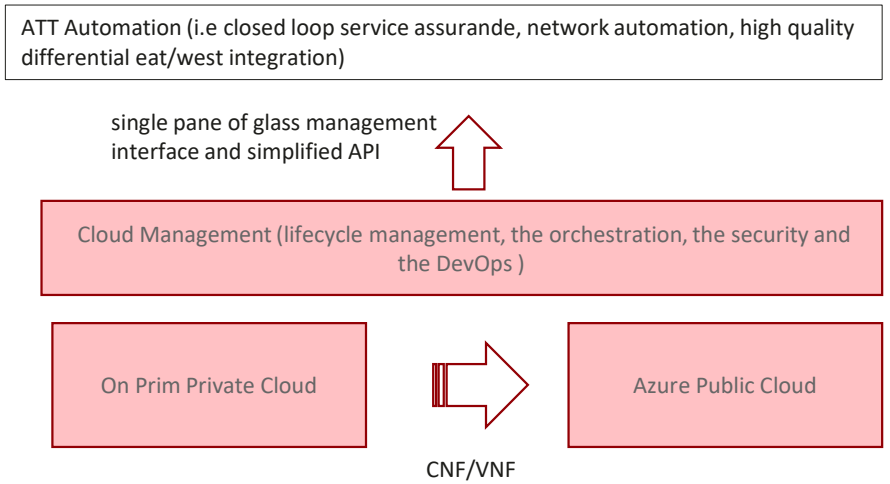
Azure Data Architecture



Google Cloud Data Architecture

网络云化：5G Core+Edege软件化功能在公有云、混合云上运行

- CNF (Container Network Functions), VNF (Virtual Network Function) 分布在公有云或混合云（私有云+公有云+边缘云）。
- Cloud Native 架构， 使用Kubernetes协同。
- 提供统一管理界面和API
- 主要在5G领域。 ATT 目前已经把Mobile Core 让Microsoft Azure 管理。



ATT 5G Core Migration to Azure Plan

18 months:

- Overlay cloud management layer
- hardened Linux layer for telco ready and security
- Migrate CNF/VNF to Azure

36 months:

- full standardized Microsoft product implementation, including the upper layer functions for orchestration
- provide a set of simplified interfaces upwards to at&t
- ATT can built closed loop Service Assurance, additional network automation, high quality differentiable east west integration

Hyperscaler 与CSP 合作案例 1

AT&T 与 Azure 在5G Core 合作方式

- 微软获得AT&T Network Cloud 的知识产权和开发人员。所有给AT&T做的都可以成为Azure for Operator产品的一部分。
- 微软将负责未来基于Azure的Network Cloud 平台的开发， 部署和运维。
- 微软看不到客户数据。
- AT&T仍然拥有5G业务， 硬件（5G，私有云，边缘云）及客户关系。
- AT&T负责选择，验证CNF/VNF 厂商。
- AT&T将会继续支持现有的开源项目。

Quotes from Shawn Hakl VP 5G Strategy Microsoft, Dorothy Blat, AVP/CTO Network Integration, ATT

"we do expect that our cost will be improved as a result of Microsoft being responsible for the cloud software, and at&t no longer having to maintain a dedicated cloud stack for our mobility network. On top of that will benefit from Microsoft cloud technology and scale and the current and future investments in that space." ATT

"As we standardize our network functions and Azure for operators. We do expect cost savings in the operations space. Shawn mentioned a little bit about the tooling and a single pane of glass and things of that nature that will have a benefit there, as well as accelerating deployment of our new services because we'll be focused on services and 5g while we lean on lean on Microsoft to provide the cloud technology hope that helped." ATT

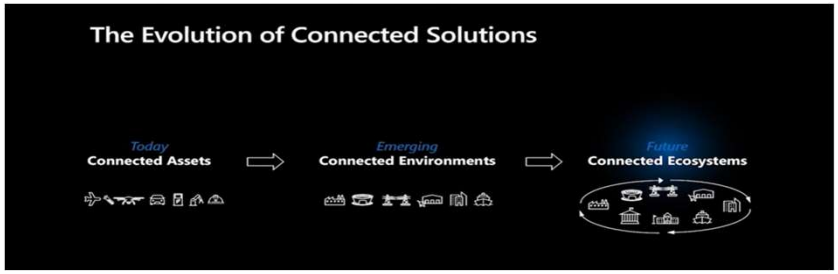
"our existing relationships and arrangements with other suppliers are really not changed by by this deal." ATT

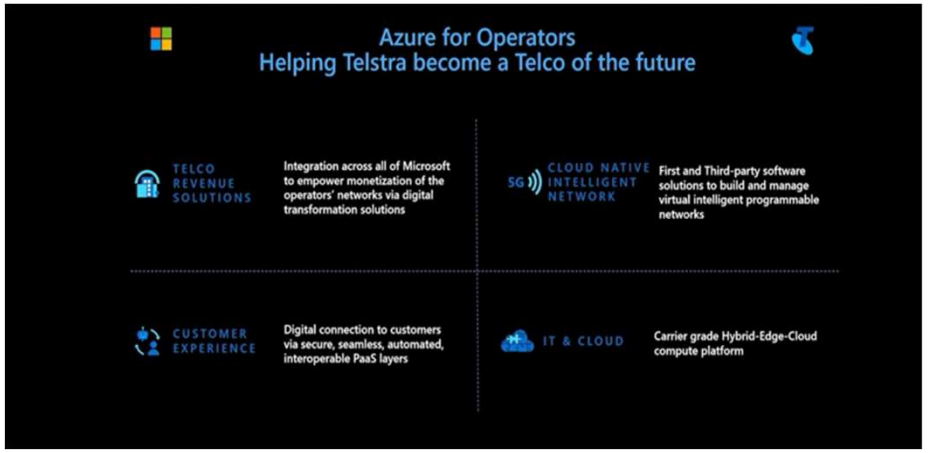
Hyperscaler 与CSP 合作案例2
Philippine Globe Telecom

Globe 全面拥抱AWS，计划将 80% - 90% core infrastructure to AWS, 从改善用户体验的领域开始

- Globe has migrated carrier-grade and mission-critical applications from on-prim data center to AWS, including
  - contact centre operations,
  - customer analytics,
  - network and service assurance systems,
  - infrastructure operations, monitoring, and security,
- Globe Telecom reduced the time required to provision new infrastructure resources from more than
  - two months to less than two days
  - increased app performance by 15 times,
  - reduced infrastructure maintenance and operation costs by 30 per cent.
- Amazon Connect – Customer services
- Amazon Polly -- a machine learning service that turns text into lifelike speech, to help customers that call Globe with service inquiries such as bill payments or updating subscription details.
- Using Amazon Lex, a service for building conversational interfaces into any application using voice and text, Globe built an AI-powered customer service chatbot named Gie of Globe, connected to Globe CRM platforms, in only twelve weeks.
- Globe has migrated seven core carrier-grade workloads from on-premises data centers to AWS, including
  - its MYCOM network and service assurance system, as well as infrastructure operations, monitoring, and security.

- Telstra selecting the path of focusing on new opportunity through transformation instead of protecting existing connectivity assets.
- Platform thinking: create these horizontal components that you can then configure into each of the industries
- Created digital twin of Telstra Headquarter in Melbourne, smart office space management with cameras to efficiently manage hybrid mode of office usage.
- Vertical industries: office management, agriculture, supply chain , mining
- 3 steps in digital transformation: connecting things, connected environment, connected eco-system
-





商业增长催化

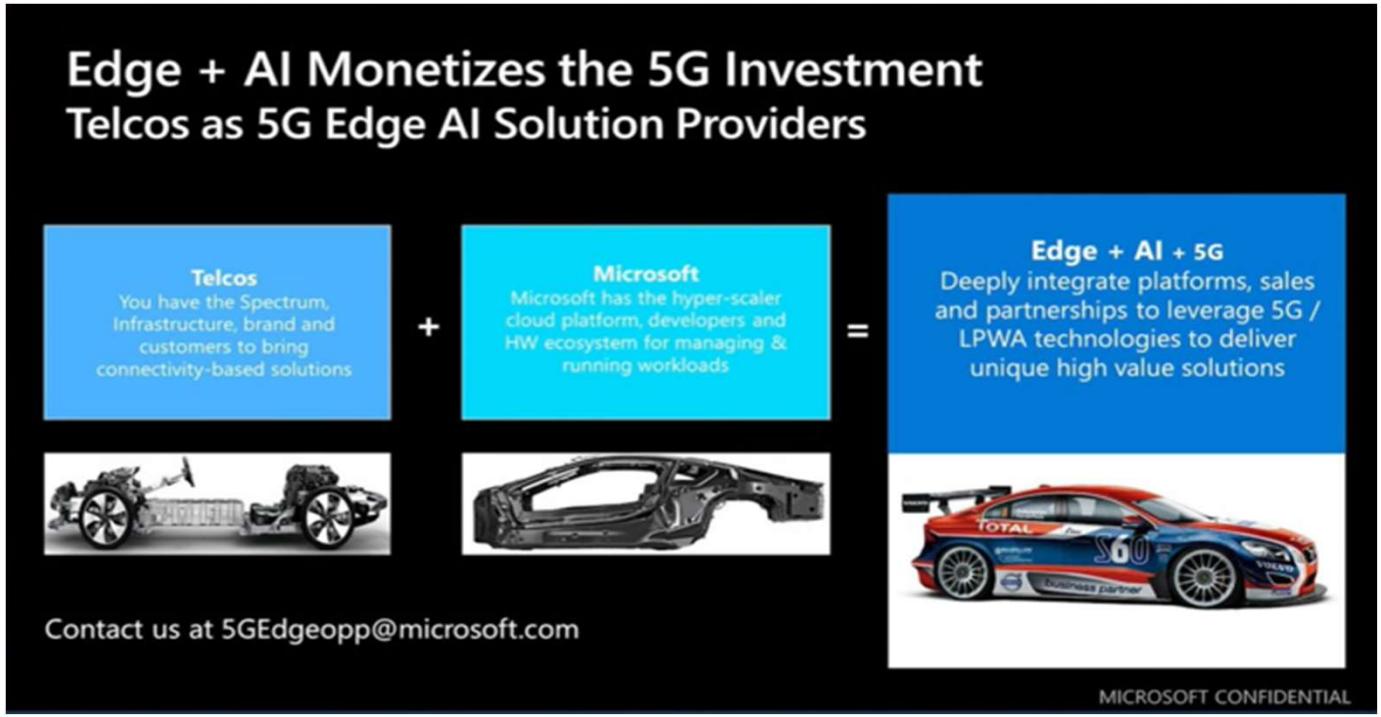
CSP+Hyperscaler = 高度集成垂直行业数字化转型解决方案

CSP

有频谱，品牌，客户， 能够提供连接解决方案

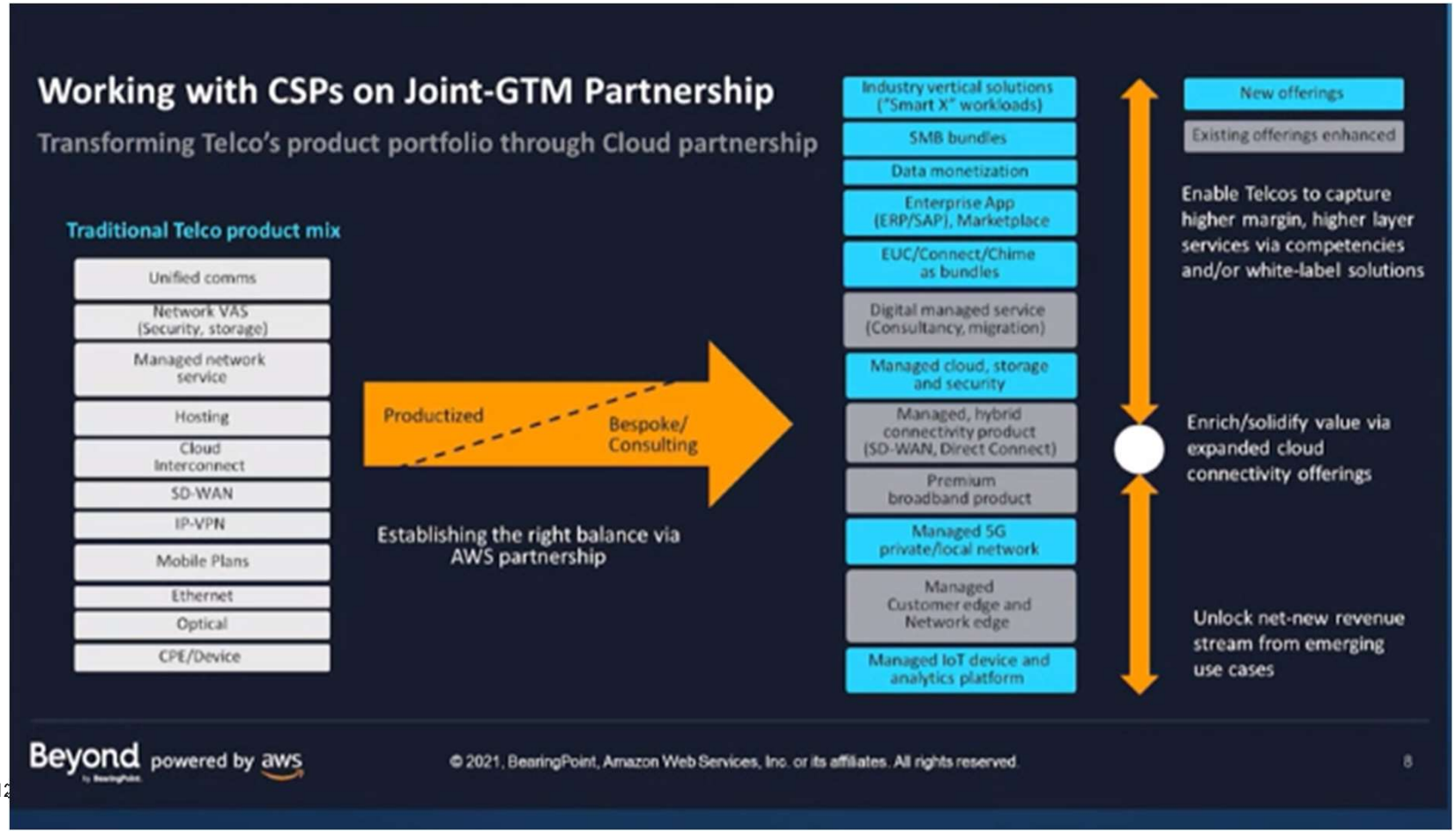
Hyperscaler:

有云平台，开发者与管理和运行任务的硬件生态系统



商业增长催化：

与Hyperscaler合作可以极大扩充CSP给客户提供的产品



商业增长解决方案案例1

Private 5G 石油钻井平台

Microsoft Sanjay Mewada , Chief Product Officer with Tampnet CEO on Private 5G network

背景

- Tampnet 是挪威提供离岸通信服务公司。全球最大给钻井平台提供高带宽通信服务， 网络包括光，4G， 5G。
- 每个平台由自己的local virtual packet core。因为要保障就是没有和外界联接也能够不影响内部运行。
- 机器人和设备需要的低时延通信。
- 传统是用Wifi。 现在将升级到5G。 使用Federated platform-based business model.

Hyperscaler 的角色 -- 提供可扩展性

- 不同与一般的运营商5G网络， 这里由上百万个mini mobile core。
- **微软负责提供所需的可扩展能力**

"But for private networks, we're talking about deploying and managing millions of mobile cores and dedicated racks. And it's all about scale automation, repeatability and manageability. So the hyper scalars can naturally provide the platform that can be deployed at scale at every enterprise location. And that runs the core network functions. The VLAN and allows the operator to deploy and manage remotely you know, imagine like manage Wi Fi solutions, they're not being offered by the operators." -- Microsoft

AWS delivering business outcomes for SMBs globally

Simplify IT environment

Migration of critical ERP applications to cloud with no down-time

Enable rapid market expansion

Havmor is a 75 years old ice cream brand and MNC with 3 manufacturing plans and serves 18 states across India backed by more than 40,000 distributors. In 2018, Havmor started migrating some non-critical workloads onto the cloud. As a transactional business with over 40 billing locations across India and a whole host of distributors using those billing systems, any downtime would translate to business losses.

DeepFoods is a food manufacturing family business created in 1977 in the US. In 2021, they started global operations with a software development office in India. They run full manufacturing and distribution in 9 locations around the globe with 2 in India. DeepFoods started using AWS for DR in 2013 and migrated all the ERP system on AWS in 2015. This allowed them to save time and millions of dollars when faced to ransomware in 2017.

Mitigate against business disruption

Rapid setup of DR site

Mitigate significant risk from Ransomware attack

Accelerated product development

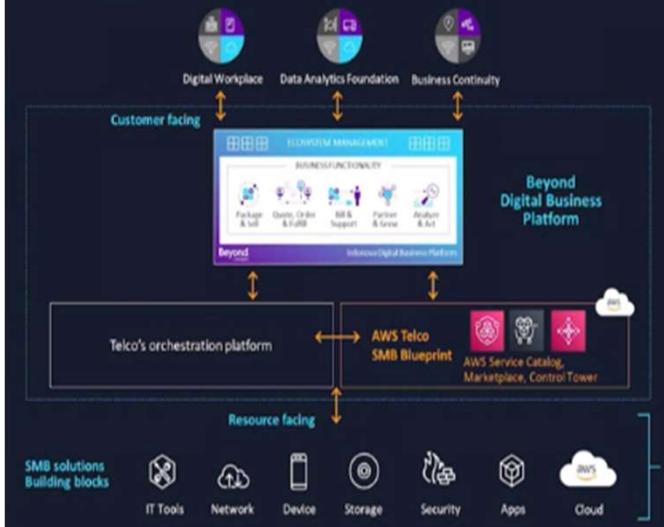
Cloud based analytics and AI/ML capabilities

Rapid product development and market reach

SiteMinder, a hotel guest acquisition platform, works with some of the world's largest hospitality companies. Building on Amazon Web Services (AWS), SiteMinder has been able to scale quickly and innovate with new technologies like machine learning to stay one step ahead and delight guests. According to CTO and co-founder of SiteMinder, Mike Rogers, "We went from nothing to a functioning BI team in a matter of months using things like Amazon Redshft. That sort of thing is where the AWS tech really shines."

Beyond powered by aws

End-to-end approach to enable Telco SMB solutions using advanced marketplace with pre-integrated solutions



Benefits for SMB:

- Easy to buy and consume outcome-based solution
- Seamless experience, including:
  - Single invoice
  - Simple ordering
  - End-to-end support across all parts

Benefits for Telcos:

- Faster time to market through access to pre-integrated solutions
- Rapid bundling of cloud & CSPs services
- Faster 3rd party on-boarding
- Automation of selling, fulfilling and monetization of multi-party solutions
- Scalable, 1:Many digitized operations

Benefits for ISV/SI partners:

- Expanded customer reach via Telcos
- Vast in-country channel distribution

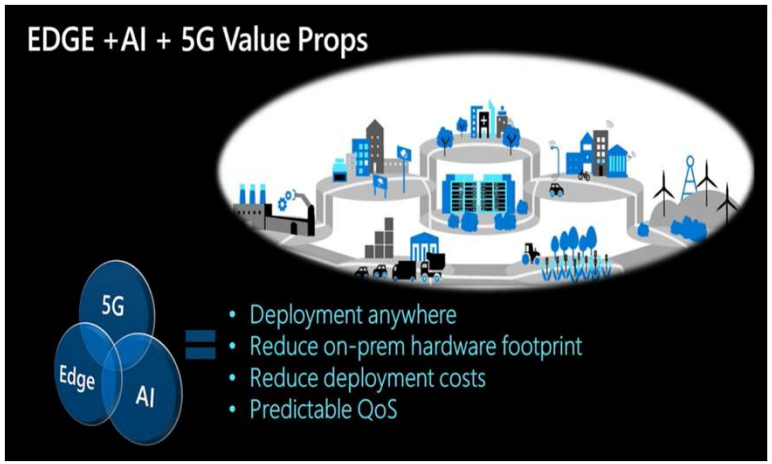
Beyond powered by aws

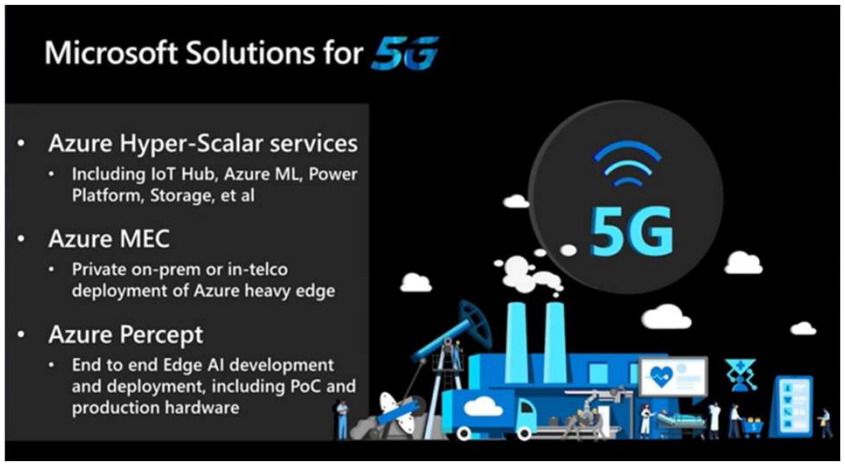
AWS provides back-end support

- CSP to setup a new “digital only brand” to attract digital savvy verticals is a new trend.

- Amdocs partner with AWS to provide BSS as a SaaS solution to CSP who wants to setup a new digital brand.

商业增长解决方案案例4
Microsoft Edge+AI+5G





5G LPWA - Edge AI over a low cost network

Mounted Behind Cooler

Real-time AI events (no video)

Azure Percept gateway
NB-IOT – To Azure
USB – From Cameras
120v Wall Power

Microsoft Azure

ADLS Storage + Analytics

Azure Regional DC

Top RGB Camera

Bottom RGB Camera

Real time inventory levels sent to cloud
Cost savings on more efficient restocking deliveries
Auditability of planogram compliance

EDGE + AI + 5G Scenarios

Private 5G Network for Human Safety Monitoring

On-prem 5G to provide ULL worker safety capabilities

5G Gateway or Sensors
Analyze sensor data in near real time
Send alerts when anomalies
Send over 5G to Private Edge Zone

5G

RAN HW

<10ms
Latency (3G PP Rel 6)

Azure Private MEC

Logging data for analysis

Microsoft Azure

Azure DC
Storage + Analytics

Feedback loop (1-3) that requires quick reaction

Action

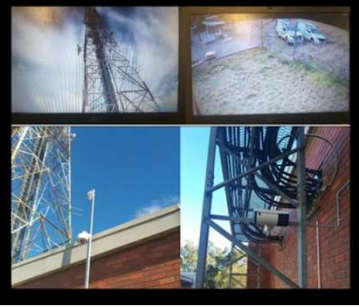
'Event-based trigger' to send alert to floor supervisor / safety actions to resolve / prevent unsafe issues on the floor

Workers in the floor
- Remove workers from unsafe events
- Shut down machines

Key Goals and Approach

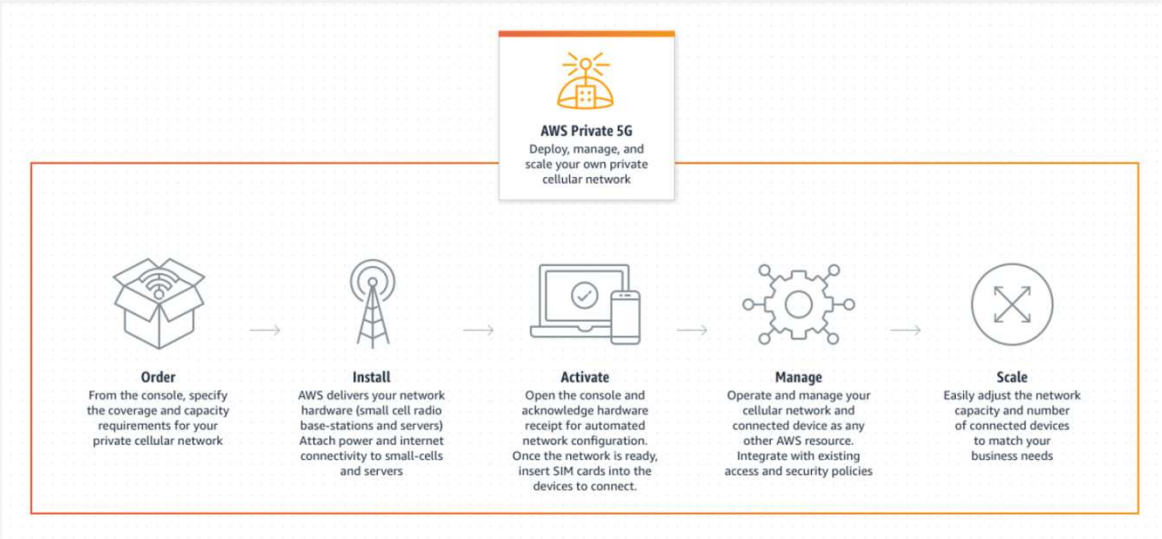
TELSTRA
PoC with PowerCo

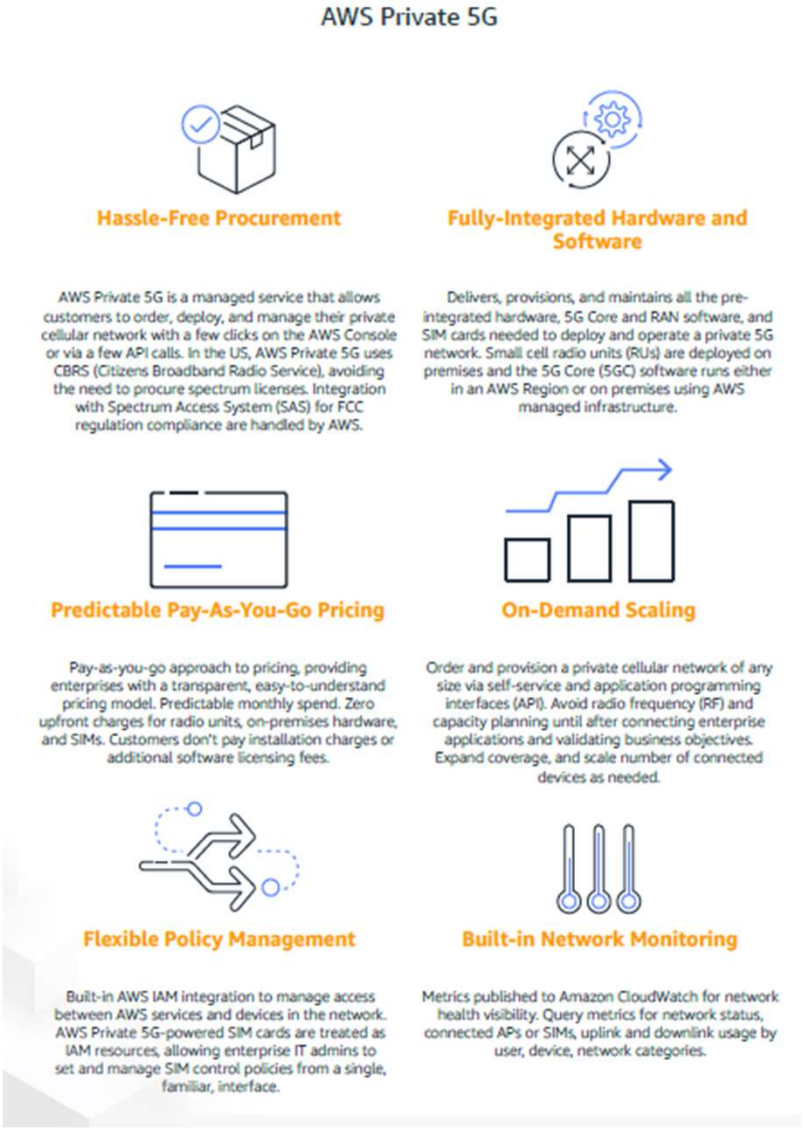
- Provides an **ecofriendly** platform for monitoring rare and endangered wildlife
- Digital twins of the tower, the facility, and its equipment provide **greater efficiency** and **less downtime**
- Edge **AI Vision** can leverage 5G to stream video to heavier cloud-based AI models
- **Azure public cloud** powers live AI model updates, AI model training, and integration into business systems through real-time digital twins



Hyperscaler直接和垂直行业挂钩

- Hypersclaer 已经开始提供Private 5G Solution。





CSP 对Hyperscaler的警惕和担心

担心

- Hyperscaler是不是能够提供Carrier-Grade可靠性和安全性？ 有公司比如Verizon和T-mobile USA坚持把网络核心功能和业务留在自己的私有云里，包括5G Core。 最近AWS八天内两次Outages强化了这种担心。
- CSP 和Hyperscaler有可能是一个不平等的合作， 如果保障利益分配平等合理。 例子， 所有的CSP在疫情中获利有限， 但Hyperscaler通过CSP提供的连接，大大获利
- Hyperscaler把CSP高价值部分(软件）拿走了
- Carrier Grade 和 Cloud Grade 文化冲突。监
- 新的vendor-locked in
- 即是竞争对手又是合作伙伴。

> “The good thing about working with a company like Microsoft is they push us on business models they used to platform business model we are not used to that and they push us on innovation and development. They also push us on speed, programmable interfaces, etc. And no matter what we do, if you want to capture the value in this new era, these industries then then we need to work ecosystems and they need a totally different way to work than we have done as a telco in the past.” “Microsoft really helped us to ensure that it's built in a scalable way and not disoproxil So we can't scale it into all industries and into our cost.”
>
> ~~ Telstra Kim Anderson

Hyperscaler 对 CSP 的正面影响.

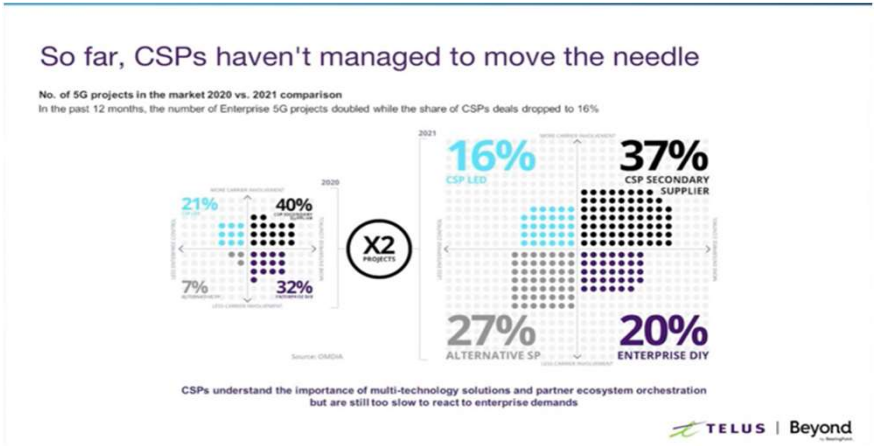
- 商业模式 (Business Model)
- 平台思维 (Platform Thinking)
- 第一天就要考虑可扩展性 (Thinking about Scalability from Day One)
- DevOp 敏捷开发(DevOp Agility)

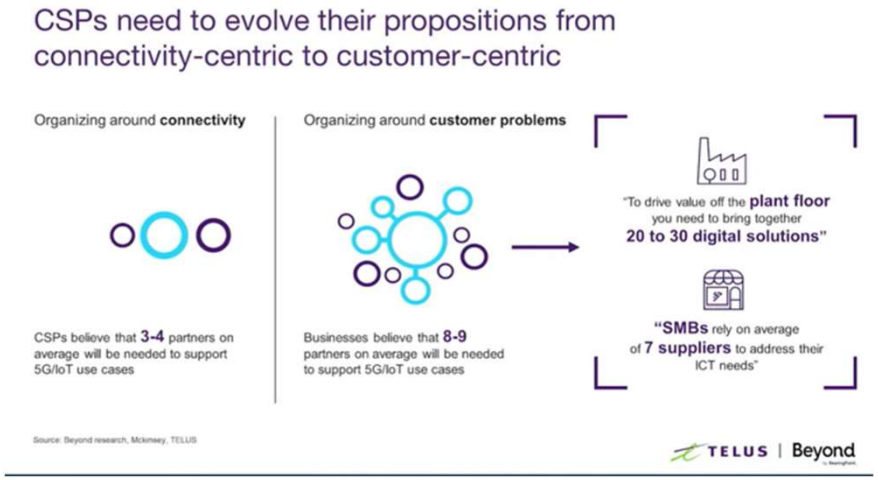
垂直行业数字化转型蛋，谁能拥有客户？
Beyond CEO Angus Ward 的观点

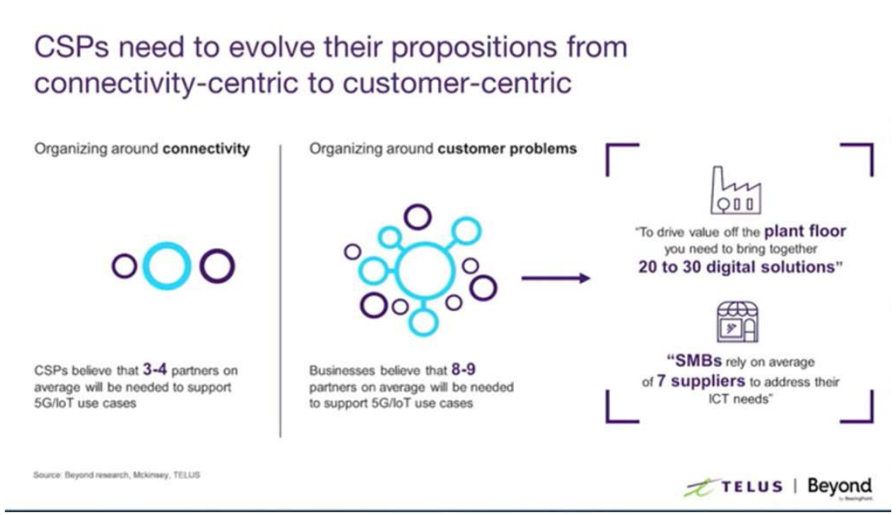
- 数字化转型蛋糕在增大， 但CSP份额在减少
- Alternative Suppliers 份额在增大
- 谁是Alternative Supplier?
  - 云提供商
  - IT服务提供商
  - 关键软件提供商
  - 关键硬件提供商
  - 系统集成商
  - 。。

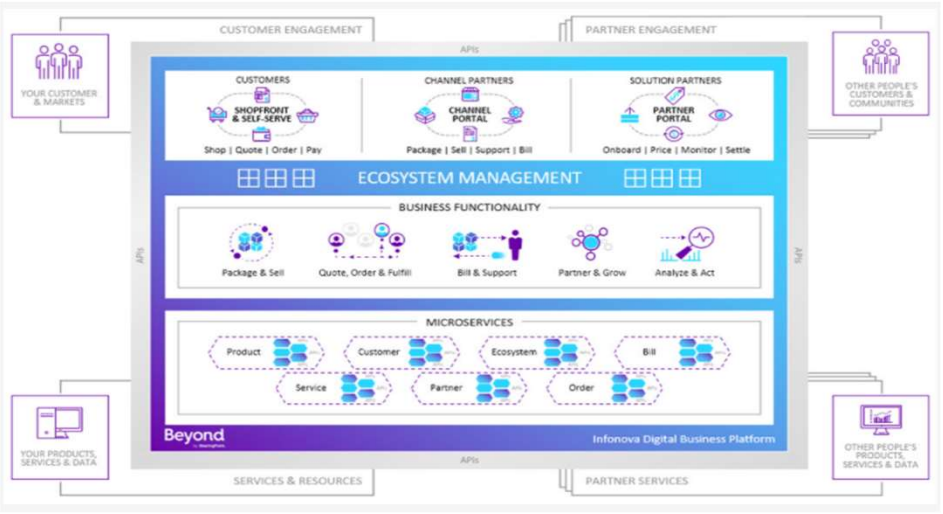
Vertical Digital Transformation requires lot more solution than just connectivity.

- 垂直行业解决方案需要8-9各合作伙伴。
- 客户会被其他的解决方案提供商拥有而不是运营商， 如果运营商不能快速提供客户需要的价值。









CSP 必须要建立一个平台，这个平台有满足大部分企业数字化转型的底座同时能够快速构建针对各行业的特色。这个平台必须是开放的不但是 User Friendly而且还是Partner Friendly。

Hyperscaler于CSP深度合作的观察与思考

观察：

- 这种合作基本上是不可避免（Unstoppable），只是合作程度深浅的问题。如果合作证明能够帮助CSP更快，更省，更好进行数字化转型。基本上可以预测这种合作和速度会不断加速。
- 目前深度投向hyperscaler的CSP是那些前一段时间SDN阶段走得比较前边并具有相对软件开发能力得运营商 比如AT&T一直是领跑者，Telstra是提供NaaS的领跑者。难得他们悟出“造船不如买船，买船不如租船”？
- 与此同时还有很多CSP把重点还是放在自研上，希望能从TelCo转变为TechCo， 50+%的员工是软件或数据工程人员。这些CSP经过几年的努力后也会选择放弃而选择采用Hyperscaler的解决方案?
- 微软和ATT联手5G Core是史上第一次Tier-1运营商有足够多的信任把把自己的核心业务托付于云供应商。这个合作不是go-to market strategy. 也不是针对未来某种新的业务， 而是现有网络核心，现有业务，现有客户。
- 这种合作不仅仅是两家公司，而是一个生态 。目前AT&T 5G Core 有来自15家厂商的85个CNF。

思考:

1. ATT作为全球运营商中拥有顶尖开发能力的Tier-1运营商，放弃已经坚持了7年的“自主开发+开源社区”的模式，转变成依赖Hyperscaler提供Cloud Network平台的方式，对其他运营商往下的转型会有怎么样的影响?
2. 做出这个决定是由于财务压力还是更深层的技术路线图的调整?
3. ATT为什么不担心“Vendor Locked In”s?
4. 往下当Hyperscaler的运营商方案更家成熟的时候， 将会有很多运营商抄作业，从自己开发为主变成依赖Hyperscaler的解决方案?
5. 对ADN意味着什么?

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5. 对ADN意味着什么?
   - 架构
     - Cloud Native， 接受 Kurbernetics orchestration
     - VM based --》 Container based
     - 自治域也是container based。
   - 部署形态： 自治域部署在私有云，公有云，边缘云的灵活性。
   - 合作伙伴： 具有灵活性，可以加入到大生态圈里去（CSP， Hyperscaler， CNF/VNF vendors， OSS/BSS）
   - 数据底座： 能够使用Hyperscaler的数据湖服务

虽然Hyperscaler不可能功能上替代我们的资源管理能力，但ADN解决方案必需能够容易，方便的加入到主流Hyperscaler主导的生态中去， API要匹配。甚至预集成。


time for discussion