Consultation response form

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Your response

Question	Your response
Question 4.1 Do you agree with our assessment of how customers buy cloud infrastructure services and how cloud providers seek to acquire customers?	*Is this response confidential? – N* Ofcom's cloud services market study is a well-designed report which has captured cloud market in a simple, structured and detailed way. It highlights market journey so far along with capturing key areas of focus towards a more customer centric market. While method described by Ofcom largely aligns with how customers are traditionally buying cloud infrastructure services, clients are also actively pivoting towards creating more strategic approach before deciding one or multi cloud provider/product. There are procurement patterns regarding multi-cloud adoption which varies by size of enterprises (Fortune 100, Mid segment,start-ups, etc) and their existing cloud strategy roadmap. Clients have constantly learned through their cloud journey so far and showing higher interest towards one Hyperscaler or cloud player due to associated long term benefits. Skills is playing an important role in this decision since training talent continuously and in multi-cloud direction requires high investment and cultural challenges. Hyperscaler- System Integrators partnership model is working well for client's 'run the business' initiatives to gain better discounts through SIs while for innovation clients are working directly with cloud providers and their preferred strategy partners for making sourcing decisions. There has been an uptick towards adopting cloud agnostic approach to get available options/patterns on table for various workloads before aligning them with key guiding principles towards final options. Before diving into a cloud provider specific financials, clients are actively seeking business case on a cloud agnostic approach linking cloud outcomes to business OKRs. There is also a fast emerging vertical integration through an industry cloud wherein

	cloud players are providing built-in industry capabilities and eco-system which can accelerate cloud adoption.
Question 4.2: Do you agree with our characterisation of the market outcomes in supply of cloud infrastructure services?	*Is this response confidential? – N* Market structure characterization is largely in-line with the past trend and how hyperscalers and other cloud providers are placing their bets. Past 5 years has been an interesting market cycle where cloud market witnessed fast IaaS led growth and AWS gained larger market share and high velocity. As of Q4'22 AWS has captured around 34% of the market, followed by Microsoft Azure at 21% and Google Cloud at 11%(Source: Synergy Research Group). However, this landscape can be expected to change due to new market dynamics and way clients are procuring cloud. Before 5 years, enterprises were learning about cloud adoption and experimenting about the best fit and in many cases quick win even if done in silos. This cycle moved towards increased PaaS adoption and continued growth of already established SaaS markets. Pandemic witnessed a sudden surge of demand leading to a strong run in the cloud adoption driven by agility and scalability benefits pursued through cloud by enterprises. Hyperscalers got a strong lead in the cycle and expanded client coverage through aggressive early design-ins and pricing strategy. This is now followed by an economic recession with rising inflation, lower ad spends and demand slowdown while cloud bills shocks still persists and enterprises are pivoting towards strong cost optimization focus as quick wins. Market has witnessed a good swing over past 5 years as part of the lifecycle and enterprises are now making more informed decision towards cloud adoption including alignment with single preferred hyperscaler and strategic IaaS, PaaS and SaaS approach. Financial Operations (FinOps) in becoming a strong for cost optimization and cloud bills are being scrutinized minutely. Enterprises are exploring business case for ex. moving data to cheaper storage tiers and moving workloads to

cheaper instances depending on use cases to identify areas of cost savings.

This is expected to impact profit margins of AWS which is also witnessing aggressive pricing by Google and Oracle. Microsoft on other hand is growing strong due to its alignment with an enterprise product approach and PaaS focus areas along with focus on land and expand steps for capturing client's cloud portfolio. Microsoft also has the upper hand when it comes to profitability because it has a captive cloud on which to run its massive software estate along with software marginal economics. Data cloud market is also witnessing strong growth by Google and Azure along with other ISVs which will impact ROCE and market structure of cloud players.

There are voices being raised regarding anti-competitive practices in EU against Microsoft by cloud players. Cloud players have complaints regarding Microsoft's very anti-competitive posture in cloud and leveraging a lot of their dominance in the on-premise business as well as Office 365 and Windows to tie Azure and the rest of cloud services and stone walling client's option to explore more.

Google Anthos is providing multicloud spanning across on-prem and cloud data centers and across multicloud environments including: AWS, Azure whereas Azure provides seamless interoperability between Azure and MS Solutions (Windows, Office, BI, .NET) easy for customers to begin their cloud journey capitalizing on customers perceptions, "locked in" to Microsoft (Azure, Apps, etc.)

On the other hand, Azure solutions are tightly Integrated on Azure which creates "lock-in", making it difficult for clients to change their technology strategy and limits application choices.

Therefore, there will be push and pull variables in the cloud market leading to new business models.

| Question 5.1: Do you agree with our analysis of potential barriers to switching and multi-cloud? As part of this: | Barrier to switching and multi-cloud varies depending on customer segments. DNB(Digital native business), start-ups are build on multi-cloud using best solution and price since they |

a) Please provide your views on the extent to which, and in what ways, egress fees are a barrier to switching and multi-cloud. Please also provide your views on the extent to which egress fees currently charged relate to the incremental cost of providing egress. **b) Please provide your views on whether specific business practices of cloud providers, particularly the hyperscalers, exacerbate technical barriers to switching and multi-cloud.** **c) Please provide your views on how committed spend discounts are set and the impact these discounts have on the incentives of customers to multi-cloud.**	follow a siloed demand driven approach. Large enterprises on the other hand comes with legacy or monolithic approach which is already aligned towards one particular cloud provider with bit of other cloud services given their past relationship with these vendors. While enterprises wish for hybrid multi-cloud approach, they are incentivised by hyperscalers for early lock-in towards a single player with bit of flexibility to experiment services for innovation (ex AI/ML use cases) If we look at egress fees, it is around 6% of cloud storage costs as per an IDC survey. While there are examples when enterprises has repatriate data on-premises or shift to a service provider that doesn't charge for egress, this is not a top priority area. There are more zero-egress cloud object storage services emerging such as MariaDB with a single pane allowing users to see their databases running in different clouds and managed service providers are also creating solutions to minimize data transfer costs for their customers. They use a data abstraction layer and caching to store frequently accessed data close to the user's application and reduce round-trips to the cloud. This is done using low-cost direct connections or peered interconnects. Cloudflare and Wasabi are another players offering object storage with no egress fees or API request charges. Given it is a pain point, there will be more options emerging in this space. Overall, egress fees will also mellow down based on new competitive products and work arounds. While committed spends will remain a lucrative option both for cloud players and clients, it will witness more informed decision by clients rather than being locked with one player.
Question 5.2: Do you agree with our analysis of potential barriers to entry and expansion?	I believe the analysis mentioned reflects the reality of the potential barriers to entry and expansion. When cloud compute market started around 2015, AWS was very aggressive for providing high credits and incentives for clients to start using their services. They even provided complimentary application assessment services through their partners at a time when these consulting services commanded high charges by other players.

	This consultative selling helped in early run in capturing market share and growth. Microsoft is now fast catching up through its software approach and Google using it data and analytics capabilities to gain market share. Hyperscalers are actively scaling their industry vertical integration through its existing services getting pre-built features for the industry. Recent stable revenue of Azure shows dominance growing in the market and Google cloud becomes profitable reflect in faster revenue recognition.
Question 5.3: Do you agree with our analysis of the hyperscalers' relationship with ISVs? As part of this, please provide your views on whether our analysis of the hyperscalers relationship with ISVs applies to both larger and smaller ISVs.	Hyperscaler- ISV partnership is co-operation and competition relationship. ISVs are finding niche/focus areas for targeting a pie of the market or creating a new set of market. Hyperscalers on other hand are starting bottom up with infra and scaling their way up into storage, business use cases and even into connectivity products. It is their preferred strategy to partner with ISV for co-creation of value through end use cases. ISVs on other hand need IaaS to grow their platform and focus on their PaaS priority. Once value is created, market force will change towards value capture where hyperscalers at times are becoming primary competition for ISVs. Relationship of HY – ISV Is a function of ISVs' product lifecycle. In early phase, ISVs create value and ride on hyperscalers scalability, agility and sometimes exclusive agreement followed by Hyperscaler rolling out products competing in the space since they can provide more integrated services. There is competition to get that first workload lock-in since that sets the stage for more integrated services and projecting higher business value and ROI to clients. This is also providing an opportunity to smaller or incumbent cloud players to partner and create an alternative options for customers. For ex. Oracle has announced significant price cut to their storage prices focused on their autonomous data warehouse in partnership with Databricks which will compete with Snowflake product. Partnership eco-system for ISV and cloud player will play an important as each one of them expands to create and capture value across the value chain.

Question 6.1 Do you agree with our assessment of how well competition is working in cloud infrastructure and what are the potential implications of a lack of competition?	Market structure described in the paper largely aligns with the reality on the ground. AWS has a stronger footprint in cloud infrastructure given its early lead in the market. However, Azure and GCP are fast catching up with AWS over past 2 years. Microsoft has shown 22% revenue growth last year and Google has 26% yearly growth and even becoming profitable.
	During recent Q1'23 results, Amazon CFO Brian Olsavsky told investors that AWS customers are continuing "optimizations" in their spending and guided to a notable slowdown in growth from the segment,
	"As expected, customers continue to evaluate ways to optimize their cloud spending in response to these tough economic conditions in the first quarter,"
	Each hyperscaler is now creating a services eco-system against purely competing through infrastructure pricing. This is largely due to customers learning more about cloud principles and aftermath of cloud bill shocks. Enterprises are now focusing on Cloud Target Architecture driven strategy rather than pure lift and shift in silos. This has got new set of variables in market for providing full stack capabilities to client rather than IaaS. Therefore, competition is not one sided rather it has evolved to more consultative way. Hyperscalers are now being asked to showcase financial outcomes besides technical capabilities for the services. These discussions are taking center stage as clients formulate their cloud strategy. Smaller players and ISVs are getting their due recognition if they can showcase value and higher integrated approach.
	Industry is also moving towards an industry cloud and each player is building its vertically integrated capability. This will change market demand to industry aligned platforms including space for smaller players who has more focused capability in one of those industry. For ex, IBM Cloud for Financial industry is gaining equal interest from clients including those who would like to continue with their IBM cloud driven eco-system. There is a fast growth in telecom industry cloud where Azure, AWS and GCP are eyeing huge scope for Network virtualization and Enterprise IT in telecom value chain.
	Going forward, we can also expect a change in how cloud is consumed right from today's

EC2/compute buying approach and opting serverless functions. Yes, these serverless services do cost more and is not applicable for all functionalities however we can expect more innovation in making them economical. Given how AI is emerging, there will be far more API driven development which will change compute consumption patterns. This story has been augmented with recent discussion around Amazon moving its workloads for Prime services from serverless to traditional EC2 services. There are lot of fast changing equations as new economical outcomes are discovered based on usage trends.

While AWS was leading through compute driven approach, their systems doesn't provide the best user experience. This is where Azure has better capability having developed business facing applications. As cloud adoption improves, user experience will play a critical role on how it is being introduced into the overall tech portfolio. Google is known for user centric culture due to their internet native applications. GCP services in data and AI are rated higher compared to other cloud players. Given role of data will only grow upwards, Google cloud has fair chance to continue its 26%+ yearly growth. While they started late in enterprise segment from 2019 after onboarding Thomas Kurien, they have created sales foundation for an enterprise centric approach compared to their earlier technology oriented selling.

ISVs are also forming partnerships to bring SaaS and PaaS alignment with IaaS alignment from cloud players.

Another interesting fact is recent growth % in Q1'23 wherein Oracle has witnessed 45% growth and SAP/Salesforce ~24% which provides constant change in market dynamics towards a healthy competition.

Therefore, there is no lack of competition and market is providing enough entry points for other players to build their footprint through their own unique approach.

| **Question 8.1 Do you agree that egress fees are an area of potential intervention? How might such an intervention be approached?** | Existing market structure which is concentrated with 3 hyperscalers does provide an impression that egress fees is causing a locking mechanism and barrier to multi-cloud adoption. Egress fees is one of the variable for cost recovery of |

	upfront investments done by hyperscalers to provide scalable and agile cloud OpEx model to customers. However, bringing in regulatory interventions will deter any possible innovation in area of multi-cloud adoption. There are products being innovated as an alternative to reduce data lock-in which will help expand the ecosystem. Moreover, market dynamics will also bring reduction in egress fees models just like it happened for ingress fees.
	Cloud adoption by enterprises has also matured over past 4-5 years wherein clients taking more top-down and portfolio level strategy to blueprint their cloud landscape. These blueprints are providing decisions towards single primary hyperscaler to leverage the benefits of ease of integration, negotiation and operating their hybrid cloud(on-prem + cloud). Egress fees will not be the top concern in this scenario.
	Egress fees also does not figure out in top cost factors given clients are not exhausting most of their free tier transfer usage. Egress is also commonly seen in few industries which are data transfer heavy and telecom may be one of them. An intervention may be explored if cost patterns in a specific industry witness unusual cost patterns due to egress fees.
	At this juncture, there is no need for possible intervention.
Question 8.2: Do you agree that interoperability and portability are areas of potential intervention? How might such an intervention be approached?	Interoperability and portability are normally a function of time for new emerging technology including cloud. Possible way of any intervention can be around an open eco-system (APIs, integration, potential blocking of services, etc) however given the hybrid cloud space is evolving, market is already evolving towards focus on interoperability and portability. New products are being created for single pane of control towards more integrated solution. For example, client is currently single cloud shop on Hyperscaler X and solutioning an edge business use case. They will evaluate best of services and not limit only to existing hyperscaler services. While market innovation is managing these parameters, possible intervention can be focused on any anti-competitive scenarios (abnormal pricing, fair play, creating a closed eco-system in a particular solution area)

	Taking an example of market changes, Oracle is set to cut storage pricing bringing it closer to object storage and add major updates to its cloud data warehouse service, Oracle Autonomous Data Warehouse, in an effort to take on competing services from hyperscalers and ISVs. This include a 75% reduction in storage pricing along with the adoption of Databricks' open source Delta Sharing protocol literally removing cost as a barrier to entry for Autonomous Data Warehouse or exit from a competing solution such as AWS RedShift. Oracle has come up with its answer to Google BigQuery Omni, which lets you query data on AWS or Azure and bring the results back to the BigQuery data warehouse on Google thereby moving to enable querying of data on AWS, Azure and elsewhere. Such market factors will lead to incumbent provide better pricing and solutions while competing with hyperscaler fast growth which will eventually create more options for the customers and innovation in the eco-system.
Question 8.3: Do you agree that committed spend discounts are an area of potential intervention? How might such an intervention be approached?	Committed spend discounts is a perfect approach for locking mechanism and sometime predatory pricing to avoid growth of smaller cloud players market share. Given it also benefit clients for predicting their usage, committed spend is right way to utilize the economies of scale through public cloud. It is a pure game of ideal capacity vs the urgency of requirement. Given there can be inefficiencies in On-Prem infrastructure where resources are often lying idle, it provides a way for clients to optimize their infrastructure inventory without any CapEx. One area of intervention can be enablement of FinOps for industry to help educate and guide clients for truly capturing the benefits through this model and reduce any extra cost spend. There is an opportunity for smaller cloud players to engage clients in a consultative approach and co-execute their capacity and cost planning to highlight that opting for committed spend may not be always right approach. These discussions can also open doors for multi-cloud discussion to explore services outside of existing cloud vendor thereby benefitting the industry players.

Question 8.4: Do you agree that transparency of billing is an area of potential intervention? How might such an intervention be approached?	Cloud billing is definitely a focus area as client embark and accelerate their cloud adoption. It is also related to culture and governance challenge, something where hyperscalers along with their partner need to proactively educate clients. Cloud works on a very different model compared to old school On-prem processes leading to drastic increment in cloud bills. Cloud bill shocks is a growing pain points and before it becomes a driver for repatriation or create cloud reluctancy, therefore it requires potential intervention. These interventions can be in shape of governance and FinOps mechanism as part of cloud framework. Cloud players and partners need to embedd role and importance of Cloud Centre of Excellence(CCOE), FinOps and Governance(including skills) as part of early analysis and roadmap discussions. There should be ball park mechanism or benchmarks for various services which can be provided by cloud players based on their past patterns in respective industries. This will only help client to make better informed decisions and expanding the trust towards stronger committed discounts.
Question 8.5: What, if any, potential unintended consequences do you anticipate might be associated with the interventions set out above, and how might they interact with each other if implemented?	Each enterprise lays out its business strategy as they ride through market forces. Hyperscalers were instrumental in bringing cloud innovation and provided opportunity for born-on-cloud and start-ups to scale their idea without worrying about underline IT infrastructure. As market evolves, there were expectations of a revenue recognition by hyperscalers against their huge investments, something which they are pursuing now. Cloud landscape is fast evolving and market drivers are also forcing hyperscalers to course correct such as ingress fees removal, discounting policies and incubator funding. As these changes bring in new innovative services(Edge, AI, Private 5G networks, etc), bringing regulation in the industry will slow down innovation and will lead to pivot in go-to-market strategy of cloud players. Customers today are getting high benefits due to this competition through early adoption proof of concepts, opex funding models, skill support, certifications, etc as they embark their cloud transformation journey.

	While dominance of three hyperscalers may look heavy towards one side, there are new models and products (multi-cloud control pane solutions, storage products to prevent egress fees, etc) being launched to solve the problems created with the fast growth which will also help in evolving cloud value chain. Regulatory interventions will lead to creation of further loopholes for continuing to avoid competition and will only add to complexities of client cloud adoption. Clients have been through fast learning journey over past 5 years and realizing that pure lift and shift through early discounts in not the de-facto answer and now getting more selective in evaluating cloud patterns and cloud operating model. This will also dilute lock-in pricing approach and move the adoption towards a value creation play.

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