



A DIGITAL ECOSYSTEM FOR FUTURE-PROOFING 5G STRATEGY

Abstract

Communication Service Providers (CSP) all over the world are investing heavily in rolling out 5G infrastructure. 5G is set to disrupt the lives with its diverse applicability across domains. Importantly, the industrial use cases of 5G extend across all domains that one can think of. To make the most of this exciting journey, CSPs have to partner with vertical service providers to offer B2B2X services to enterprise customers. To future-proof their 5G strategy, CSPs have to develop and operate a digital ecosystem that enables seamless collaboration with partners cutting across domains to drive rollouts of innovative B2B2X offerings. They also need to ensure that these services can be designed with flexibility so that they can cater to the needs of enterprise customers of varying sizes and focus areas.

The vision, goals, architecture and design choices for the digital ecosystem are critical success factors for the organization's 5G strategy. This is where a system integrator (SI) steps in. With the technical and functional knowledge gathered through collaboration with various CSPs as well as the experience gathered through cross domain engagements, the SI stands in good stead to take the lead role in the concept to operationalization of the digital ecosystem. As important it is for the CSP, having a clear 5G strategy is crucially important for the SI as well. Discussed here are how the SI can help CSPs in standing up and operating the digital ecosystem. Also discussed are the strategy, key differentiating capabilities and the plan of action that the SI needs to prepare for, in order to help them stay ahead of the competition in the 5G journey.

Introduction

Communication service providers (CSP) around the globe are investing heavily in getting 5G deployments underway. The distinctive features of 5G promises to disrupt every walk of life, from providing a better personalized experience at a supermarket to highly mission critical applications such as performing remote surgeries. Unsurprisingly, all the players in the telecom world, big and small, are prioritizing their readiness plans as the 5G storm is set to hit in the months to come. However, this is a fine line that the CSPs have to tread cautiously, keeping in mind the experience with the 4G rollouts. With 4G, operators have largely relied on connectivity services to recover the huge investments. They have generally struggled to generate additional revenue streams from 4G services. Operators cannot expect

to recover the huge 5G rollout costs by offering connectivity services alone. Interestingly, the ubiquitous applicability of 5G shouts for major disruptions in the non-telecom industry segments. Manufacturing, Healthcare, Retail, Smart cities, Smart Homes, Media and Entertainment, Education, Transportation and Logistics are some of the diverse sectors where 5G use cases are already being actively pursued. According to Omdia research report¹, about 75% of 5G services would be deployed in non telco enterprises. Interestingly, it is also important to keep in mind that these enterprises are actively pursuing Multi Access Edge Computing (MEC) deployments for a fair share of these 5G use cases. Just as excited as the operators, the vertical service providers

and the application service providers are also keenly preparing their 5G strategy so as to maximize their share of the pie. The role played by System Integrators (SI) is vital in this context. System Integrators come with extensive cross domain knowledge and technology expertise. They also typically enjoy wider business connect with vendors and third party organizations through partnerships and participation in joint venture initiatives. SI can leverage their expertise and drive the development of a 5G digital ecosystem solution that enables CSP to bring together all the partners to a common ground to collaborate and build innovative 5G offerings. Discussed here is the strategy, architecture and roadmap for System Integrators to pursue as they look to play a prime role in the 5G journey.

Embracing the B2B2X model

B2B2X model refers to a communication service provider's B2B offering that can be offered to any customer. The customer, very often, would be an enterprise customer in any of the non-telecom segment that was referred to in the above section. Quite clearly, for this model to be sustainable, a strong collaboration between all the delivery partners is essential. To cite an example, a large university might be looking at a smart learning offering that can elevate the

learning experience of its students. The CSP can partner with a smart learning solutions provider firm that can offer this solution. The smart learning firm would leverage the 5G network slice as a service offered by the CSP to develop solutions that provides functions such as immersive learning experiences using augmented reality/ virtual reality, personalized trainings, remote workshops and so on. The partnership agreement between the CSP and the vertical service

provider (smart learning provider) would be based on network slice QoS levels and other applicable terms and conditions as intended by the parties. A seamless collaboration model is required to make this partnership flourish. In this example, the B2B offering that is launched as part of this partnership is the smart learning solution. The end user of the solution is the university, the enterprise customer in this case.

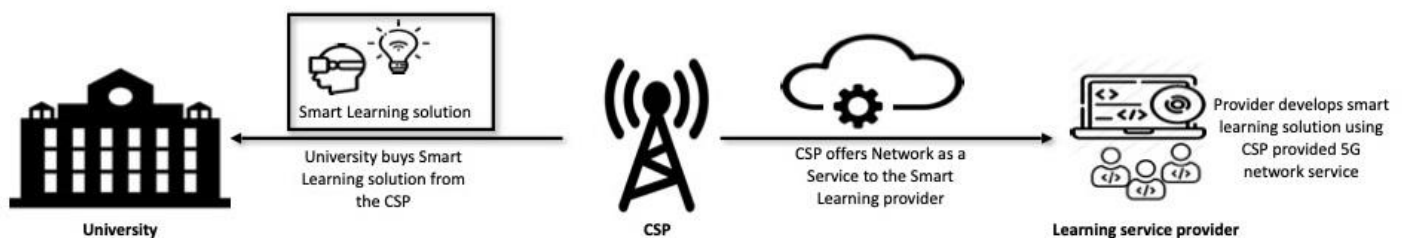


Figure 1: B2B2X model

The need for digital ecosystem

The 5G market share for communication service providers would significantly depend on how innovative they are in establishing a multi-dimensional digital ecosystem comprising of vertical service providers from the different industry segments, application service providers offering hosting services, technology providers and system integrators. The paradigm shift in thinking towards a B2B2X model is on top of every CSP's 5G strategy, however the efficiency with which some of the existing teething challenges are addressed will differentiate the successful ones from the rest.

Challenges in establishing a successful B2B2X model

B2B2X model is a not so familiar terrain for CSPs that have traditionally focused on offering connectivity based services. Senior management of most major organizations have already embraced this strategy for some time now. However, IT systems, processes and operating models in CSPs are slow to adapt for various reasons. In the past, this lack of agility in responding to the new opportunities had led the CSPs to concede ground to the more dynamic players like OTT service providers. Similar trend is visible even in some early enterprise 5G rollouts where CSPs are not being engaged in a primary supplier role. Table 1 illustrates the typical challenges faced by CSPs that needs to be tackled on priority as they embark on the B2B2X journey.

Table 1: Challenges faced by CSPs that impact 5G journey

Challenge	What is impacted?	How is it impacted?
Legacy IT systems running on dated technology platforms	Partner onboarding	Significant uplift requirement for systems and processes slows down the onboarding process
Slow transition to virtualized networking workloads	Rate of adoption	Network virtualisation is critical to ensure API based integration, zero touch provisioning, automated monitoring and closed loop automation capabilities.
Inefficient data management and slow adoption of AI/ML based decision management systems lead to longer turnaround times for operations.	Rate of adoption	Reactive fault management practices impact the overall desirability of the model.
Lack of flexibility in defining service models dynamically. Catalog design and service modelling patterns are designed to work with predefined constructs that limits run time flexibility in service definition.	Scope of adoption	5G use cases are ubiquitous cutting across industries. Ability to dynamically compose services is a key aspect for establishing a successful B2B2X model.
Manual tasks and approval steps are inherent in the orchestration process	Rate of adoption	Impacts the usability and desirability of the engagement model.
Lack of flexibility in pricing, revenue sharing, reconciliation and settlement processes	Partner onboarding	Transparency in pricing and settlement processes is critical for partners to gain confidence in the operating model.
Need for a dynamic operating model to handle user mobility related complexities associated with typical 5G MEC use cases	Scope of adoption	Multi Access Edge Computing use cases are integral to the 5G business context. The operating model needs to prepare and adapt to cater a much wider scope of mobility based business scenarios.
Complexity associated with the management of a distributed ecosystem comprising of multiple partners and vendors coupled with the massive demand for ramping up technology and cross domain skills	Rate of adoption	A level playing field comprising of diverse partners and vendors is vital to establishing a successful 5G ecosystem. Inability to forge an efficient and sustainable engagement model will severely dent the organisation's prospects.

The solution

So, evidently, CSPs need a platform that facilitates seamless collaboration with partners of varying size, focus and objectives to future-proof their 5G strategy. The key functions that drive the architecture of the platform can be stated as below:

- Seamless onboarding of partners of all kind – vertical service providers, enterprise customers, application service providers and so on.
- Cloud native microservices based BSS/OSS stack that supports network slice designing, zero touch provisioning, automated monitoring, AI/ML based closed loop automation and API based integration to third party systems including the telco's IT stack.
- Flexible, simple and transparent pricing, revenue sharing and settlement processes that ensure that all payments are booked on time with minimal manual intervention. The process should leave all collaborators happy and wanting for more.
- Ability to compose service models dynamically from elementary models. This is a critical aspect that should drive service catalog API design. As the 5G use cases keep evolving, ability to mix and match service models to create new value propositions will turn out to be a game changer for the operators as well as the collaborating partners.
- A digital marketplace powered by gamification principles makes the platform appealing for repeat businesses. The platform should be designed with the objective of maximizing the returns for all collaborators and a well-designed marketplace fuels that common goal.
- API support for data access across collaborators. With the power of 5G, IOT use cases find lot of traction and wide applicability. This leads to data proliferation at the operator end thereby opening the horizon to countless monetization opportunities. Hence, API management is another critical aspect for the platform to take care of.

System integrators - Pivotal partner in the CSP 5G journey

The big question in front of CSPs' top management is to devise the right strategy for standing up the partner ecosystem that addresses the above stated objectives in a cost effective and time bound manner. Like the 5G monetization options, CSPs cannot go alone in building the platform. Owing to the rich experience with different telco operators as well as with other industry solutions, coupled with proven technology knowhow and the ability to ramp up development teams in short time frames, system Integrators (SI) can play the lead solution provider role in developing the platform.

Solution Architecture

The fundamental building blocks of the platform can be designed from the functional goals that were mentioned above. It is important to keep the design as modular as possible. It should be possible to bundle the solution components as desired depending on the project context. A 5G specific lightweight cloud native microservices based OSS stack is core to the architecture. The components of this stack manages the interactions with the operator's 5G network services.

Infosys NGOSS (Next generation OSS)² is a suite of offerings that provide exactly these capabilities. It's modular, extensible architecture helps in incrementally developing the solution in multiple stages. Also, NGOSS solution API conforms to TMForum Open API standards that helps the platform to seamlessly integrate with different operators' network service layers non intrusively. NGOSS solution has been designed keeping in mind the varied needs of a 5G ecosystem. The cloud

native architecture is designed to scale on demand according to the specific business factors such as order patterns, orchestration complexity and such parameters. A key characteristic of NGOSS solution is the support for configuration based service composition, a critical aspect for ensuring zero touch service provisioning experience. Quite evidently, the OSS/ BSS stack is central to the realization of the overall solution. Infosys NGOSS provides all the desired OSS/ BSS capabilities mentioned in the above section such as 5G slice design, service composition, zero touch provisioning, automated monitoring, AI/ ML based closed loop assurance and so on.

Now that the 5G network centric components of the platform is looked at, the focus shifts to another key goal – partner onboarding. A web application with a set of configuration driven portals is the right fit here. It is very important for the design to focus on making the portals as domain agnostic as possible. This is because the breadth of 5G use cases is wide and partners and customers across domains are expected to be part of the ecosystem.

Marketplace can be designed as a data driven microservice that consumes data from other components in the platform to serve the enterprise customers.

An interesting and vital part of the solution is the contract and settlement module. This is a key functionality of the platform. One key shortcoming that hinders cross collaboration in a CSP ecosystem is the lack of transparency and digitalization in contract management, pricing, revenue sharing and settlement processes. The solution proposes an enterprise private blockchain based solution for addressing all of these concerns. Typically, settlement

activities such as managing adjustments, rebates, credits in a multi-participant ecosystem are mostly handled using manual interventions and is often a major barrier towards establishing a harmonious ecosystem. Smart contracts in the blockchain network are an ideal choice designed to solve problems of this kind. The most mature open source offering for enterprise blockchain network is Linux Foundation's Hyperledger Fabric that can be leveraged to build this system.

One essential goal of the platform is ensuring that repeat business is achieved. Gamification concepts are widely being applied in applications across domains to keep customers loyal. Gamification Engine in this platform can be implemented using a set of microservices that focus on managing loyalty points and score partners for the services offered. Scoring algorithms can employ techniques that encourage partners to collaborate with other partners to come up with composite innovative services.

As important as ensuring repeat business is it to generate new revenue streams. The platform targets to achieve this goal using an API management module. The role of API management module is to widen the scope of coverage of platform usage by making best use of the huge volume of data made available through the 5G network. It is best advised to offload API management to a packaged solution, such as Mulesoft Anypoint Platform or similar. Core features such as security, lifecycle management, rate limiting, storage and telemetry come bundled with such products. Rounding off the platform capabilities is the need for microservices that can host value added services that often emerge as byproducts of normal software development schedules.



Non Functional Requirements

No architecture definition process is complete without assessing the nonfunctional requirements. The solution components would be built as microservices adhering to cloud native principles. The services should be designed to scale out on demand. Containerized workloads would be deployed on a managed Kubernetes cluster such as AWS EKS or GKE or Azure AKS or any other managed platform as desired. For inter service communication, event driven asynchronous messaging model should be preferred for better availability. Integration

with existing BSS/ OSS stack might be inevitable in most solutions due to the way the operator's IT stack is setup. Iteratively, the dependencies with slow moving parts in the architecture have to be brought down.

DevSecOps aspects such as Infrastructure as code, pipeline as code, automated testing, code quality checks, vulnerability scans and so on should be bundled as DevSecOps toolkit in the solution. Identity Access Management (IAM), Secure Token Service (STS), MTLS certificate lifecycle management, credentials management, policy management are some of the

key security concerns that needs special focus. The solution might be to leverage an open source identity access management solution such as KeyCloak with additional functions built in as required. The solution should also include an observability stack that handles logging, metrics and tracing. Elasticsearch-Fluentd-Kibana (EFK), Jaeger, Prometheus and Grafana are popular open source solutions that work very well with cloud native architectures.

Putting it all together, the solution architecture can be envisioned as in Figure 2.

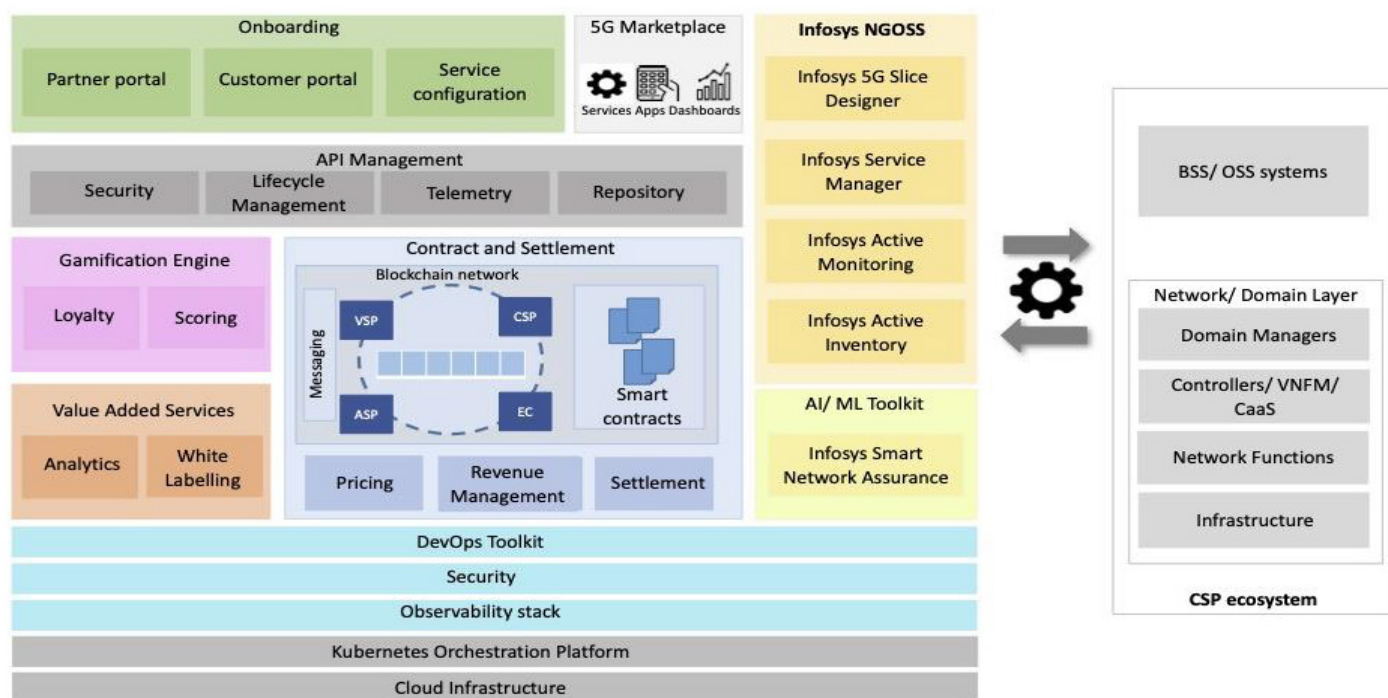
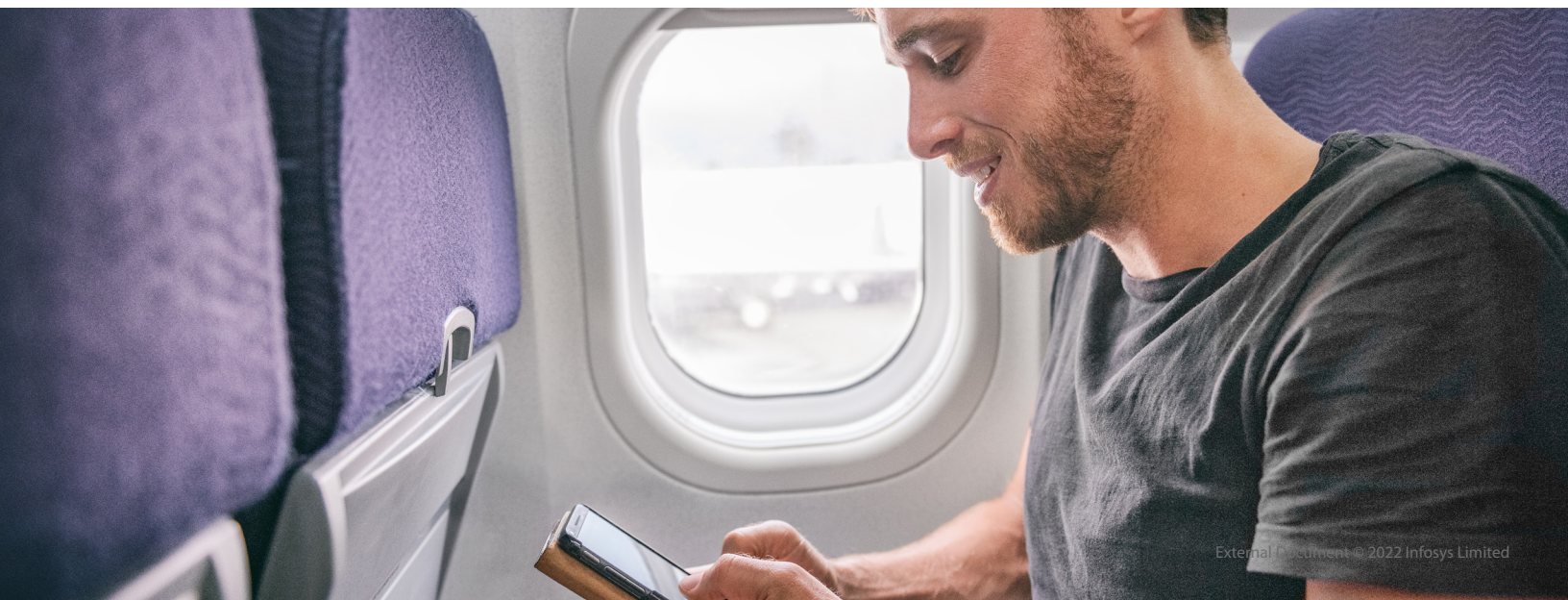


Figure 2: Solution architecture for Digital Ecosystem



Each of the solution components are further detailed below.

Lightweight 5G ready OSS stack (Infosys NGOSS)

Infosys NGOSS² was briefly introduced in the above section. It comprises of offerings such as Infosys 5G Slice designer, Infosys Service Manager, Infosys Active Monitoring and Infosys Active Inventory that provide the capabilities to quickly define network slice designs from reusable templates, dynamically compose service definitions, perform zero touch provisioning and monitor systems and network in real time. Partners will use the stack to design the network slices and compose services for their integration with the operator offered 5G services. When an enterprise customer orders a service, the service manager will spring into action and perform the provisioning and activation functions. The service manager interfaces with the domain controllers using prebuilt adapters. Monitoring solution ensures that all the system components are operating as expected. In cases of faults or anomalies, the orchestrator in the service manager will be notified to take corrective actions in accordance with the configured policies.

AI/ ML Toolkit

AI/ ML based Closed Loop Automation is a vital component of the OSS solution that helps to maintain the desired execution states when things go awry. The Infosys NGOSS² solution also has inbuilt adapters to interface with external AI/ ML toolkits. AI/ ML toolkit will comprise mainly of AI/ ML models, dataset adapters, customizable workflows, data preprocessors and postprocessors as well as custom dashboards and reports. The toolkit should comprise of AI/ ML models that aid smart decision making in network slice provisioning, workload placements and predictive fault management. Infosys Smart Network Assurance⁴ (ISNA) could be one such toolkit that can be integrated into the solution to offer predictive network assurance capabilities. Infosys Smart Network Assurance⁴ solution is an AI/ ML based closed loop assurance

solution that gathers insights from network data and provide capabilities such as issue prediction, autonomous recovery from failures and so on.

Onboarding partners and customers

As mentioned above, this is a web application that provides the capability for partners to self-register and onboard themselves to the platform. The application will have microservices for managing profiles, configure services, and build composite services. The portal also provides the frontend for partners and customers to record their contract terms, pricing and revenue sharing preferences. Integration with the service catalog API is a key design aspect to consider in this module. One of the important goals of the solution is to create service definitions dynamically to handle different business requirements without going through build and release cycles.

Contract and Settlement

This blockchain based solution revolves around the key concepts of distributed apps, smart contracts, transactions and channels. The key design principle to be adopted here is to ensure maximum reuse

by generalizing the implementation of these key concepts. The framework design should identify the transactions, participants and the respective contract that should be honored to make each transaction valid. The smart contract which is basically a digital representation of the rules and policies to be verified by each of the participants will have to be generic to support variants of a single transaction. For example, the pricing model for the usage of a network slice instance for a particular partner may be influenced by QoS criteria, duration of usage and so on. The contract should be written to be reusable to support different criteria for evaluation depending on the parameters chosen by the partner and the CSP. The same design principle extends to all the different transactions that define the pricing structure such as subscription based, rental, freemium, revenue sharing rules, settlement criteria and so on.

Figure 3 demonstrates the basic working principle of the blockchain network with the help of three sample scenarios. Each scenario represents transactions involving different number of participants. The model can be easily extended to cater to real world business scenarios involving different participants.



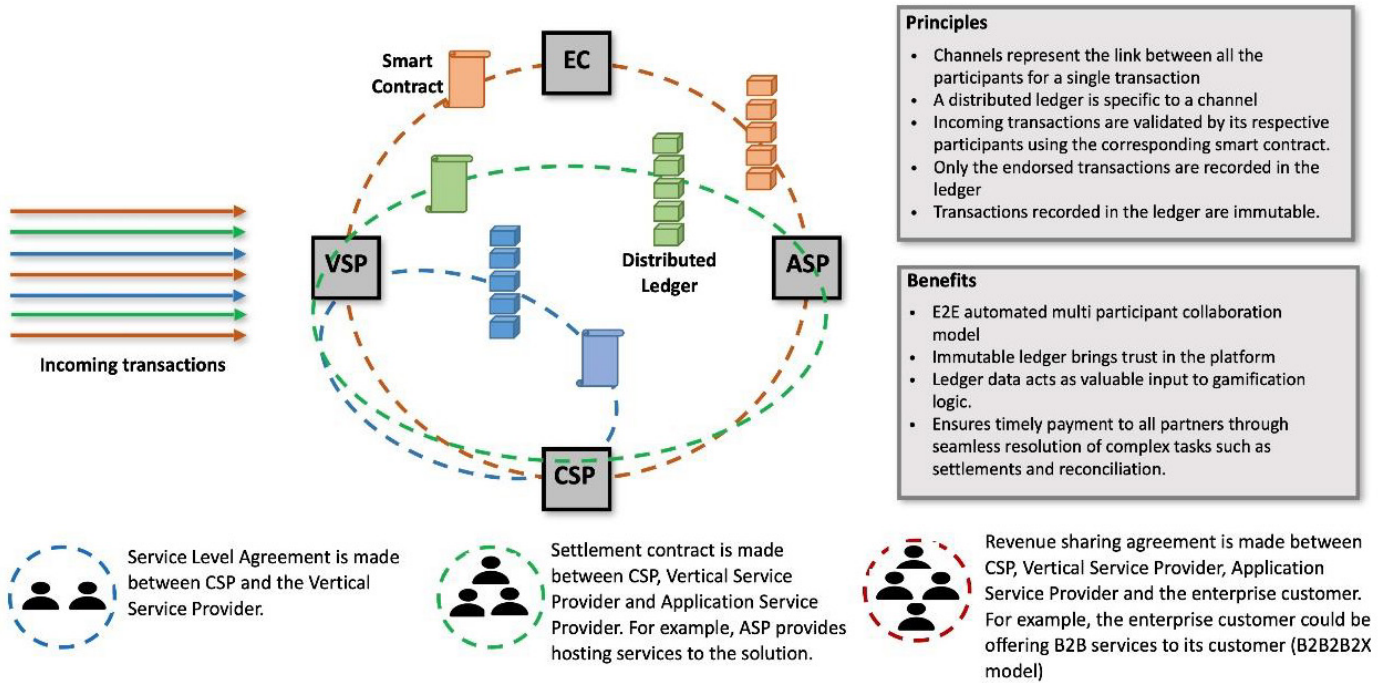


Figure 3: Basic working of blockchain network – Three different scenarios of collaboration

The Hyperledger fabric framework offers total flexibility to the designers in architecting smart contracts and transactions in whichever way they want. So as highlighted earlier, the design consideration is to ensure that the same set of smart contracts, transactions, channels and participant applications can be reused across different partners for different use cases. Hyperledger Fabric also supports event based integration schemes for inbound and outbound communications with the blockchain network.

Gamification Engine

There are a lot of pies to be had on the 5G plate, but one has to stay ahead of the curve. So it makes all the more sense for the operator to include design elements that help achieve repeat business from its partners. The strategy is to apply gamification principles in the platform design so that vertical service providers will

find value in coming back to the platform for their operations. Along with the vertical service providers, the enterprise customers, who are the end consumers in most cases, should also be lured in to the platform by providing loyalty points and rewards. The flexibility offered in dynamically defining pricing models are critical to applying this design effectively.

API Management

As highlighted earlier, the recommendation is to use a packaged solution for API management. However, an efficient API strategy is vital to make this data accessible to third party application developers to effectively build useful applications for targeted use cases. The system integrator can guide the operator in defining the right API strategy for the organization. The SI can also work closely with the operator in developing the APIs.

To emphasize the need and value that API management brings to this solution, let us look at a simple example (see Figure 4). Suppose that all the outlets of a retailer chain has sensors and cameras installed at gondolas within the store to track browsing patterns of the shoppers. They might be interested in products that the shoppers spent some time on, indicating that they were interested in the product. The operator can process these data streams and publish them over a well-defined API, which provides an opportunity for monetization. The retail chain can probably partner with a marketing firm that it can authorize to access this API. The marketing firm can develop an application that uses this API and correlate the data with actual store wise purchases data provided by the retailer. The insights generated by the application can be used to come up with store specific campaigns for the retailer.

Similar use cases can be thought of in other domains as well. The point to note is that the marketing firm in this example is a potential partner for the CSP, making it a new revenue stream for both organizations.

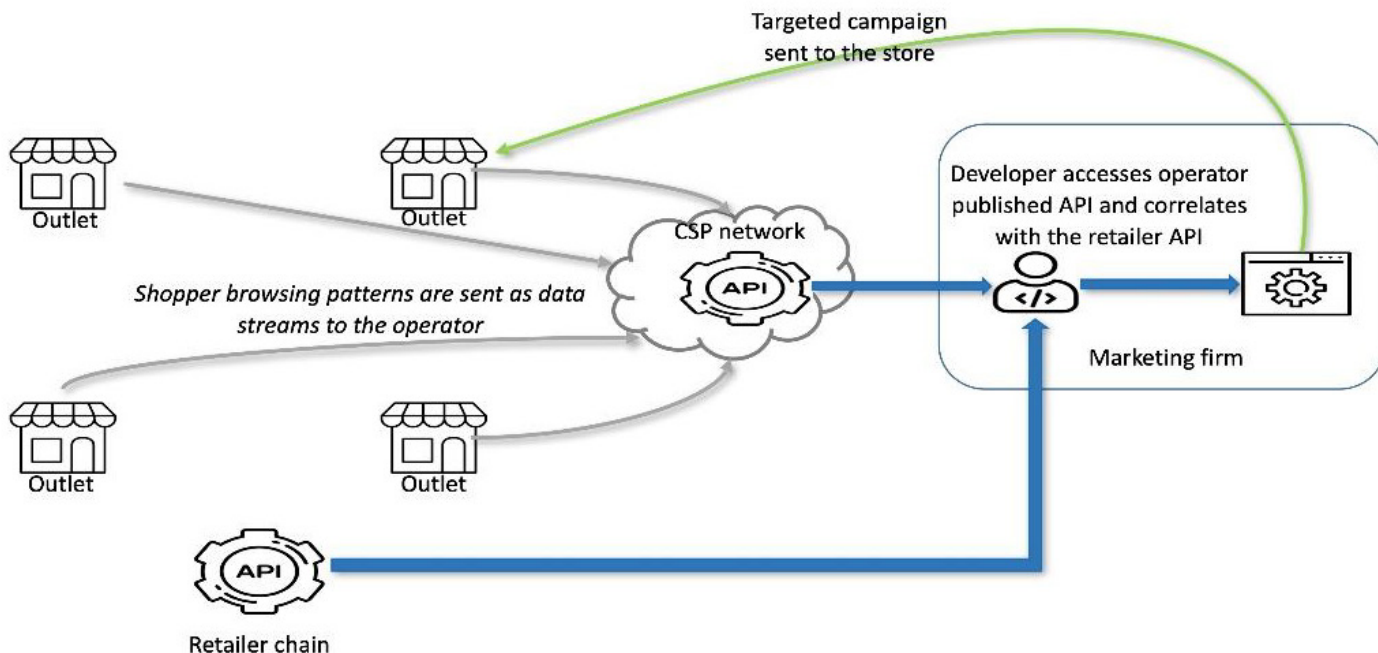


Figure 4: API monetization example from retail domain

Value added services

Value added services are most likely to become applicable once a solution is in operation for a while. But it is a good idea to think about their existence while designing the overall solution. Large volumes of data ingest particularly from Massive Machine Type Communication (MMTC) use cases will trigger the appetite for analytics services. There is also the likelihood of partners approaching CSPs to offer white labelling services for functions that are already fairly mature at the CSP side.

Marketplace

The marketplace functionality will provide the platform the complete ecosystem feel, providing enterprise customers with the option to mix and match services offered by different vertical service providers, CSP as well as other third party apps to compose the right business solution that they need. The output from the gamification engine would be visually available on the Marketplace, enabling

the customers to make a much informed choice. For example, the historical activity of transactions for a particular partner can be collected from the distributed ledger provided by the blockchain solution and aggregated and scored by the gamification microservices. This can be made visually available on the marketplace enabling the customers to potentially compare different providers offering similar services. It also, incentivizes the providers to offer more services with better value proposition.

Event driven architecture

The solution should follow an event driven architecture with the loosely coupled microservices reacting to the events that

they subscribe to. The advantage with this model is the support for scaling the services on demand as well as keeping the services decoupled from one another. Also, in a distributed architecture, too many synchronous calls can degrade the system availability. Figure 5 illustrates the flow of events for a typical service provisioning flow. The partners and customer are assumed to be already on boarded to the platform. The focus is on highlighting only the events flowing through the platform and other integration schemes such as synchronous API calls and integration with the domain controllers are abstracted out for simplicity.



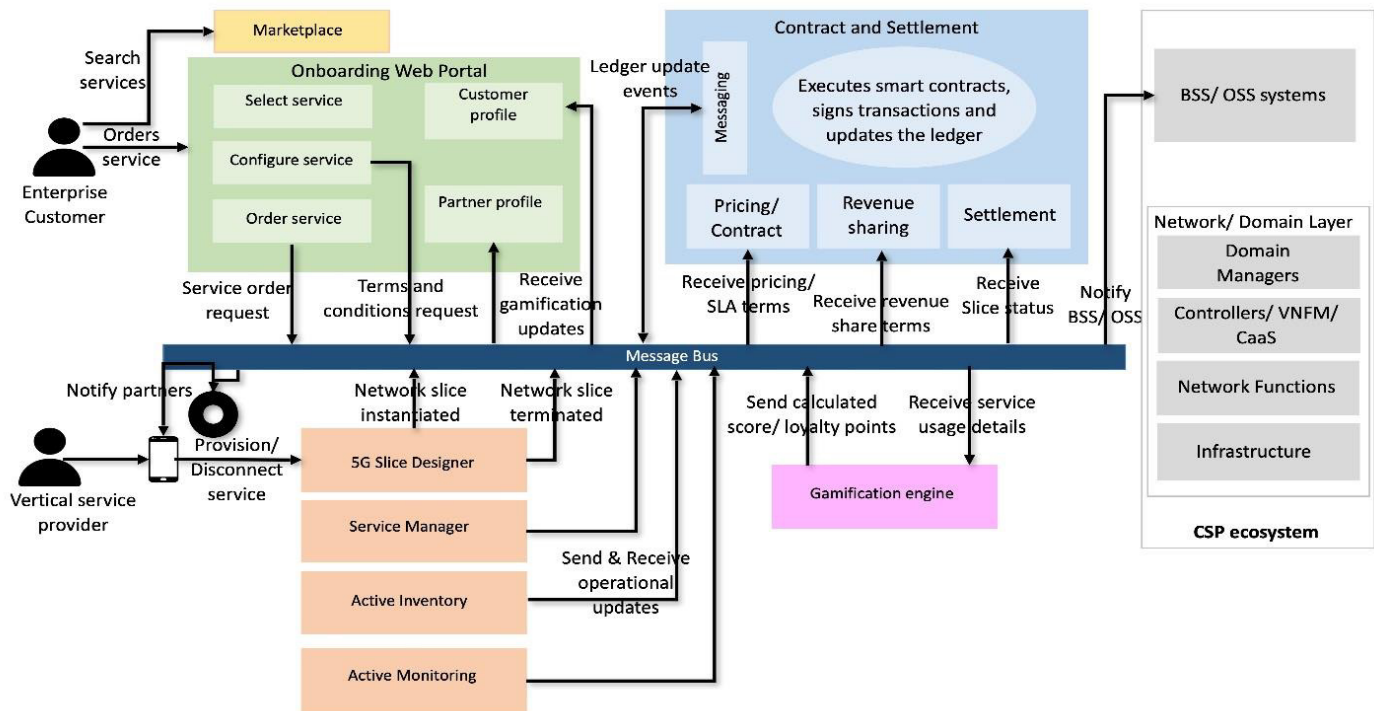


Figure 5: Events flowing across the microservices for a service provisioning flow

Benchmarking and solution auditing through continuous architecture governance

It is very important to continuously evaluate the evolving architecture against the solution's vision and goals. Governance mechanisms need to be in place to validate the value realized by the solution. Any deviations from the perceived goals should be called out and corrected.

Figure 6 provides an indicative view of the solution's value proposition that needs to be evaluated during the design and build phase.

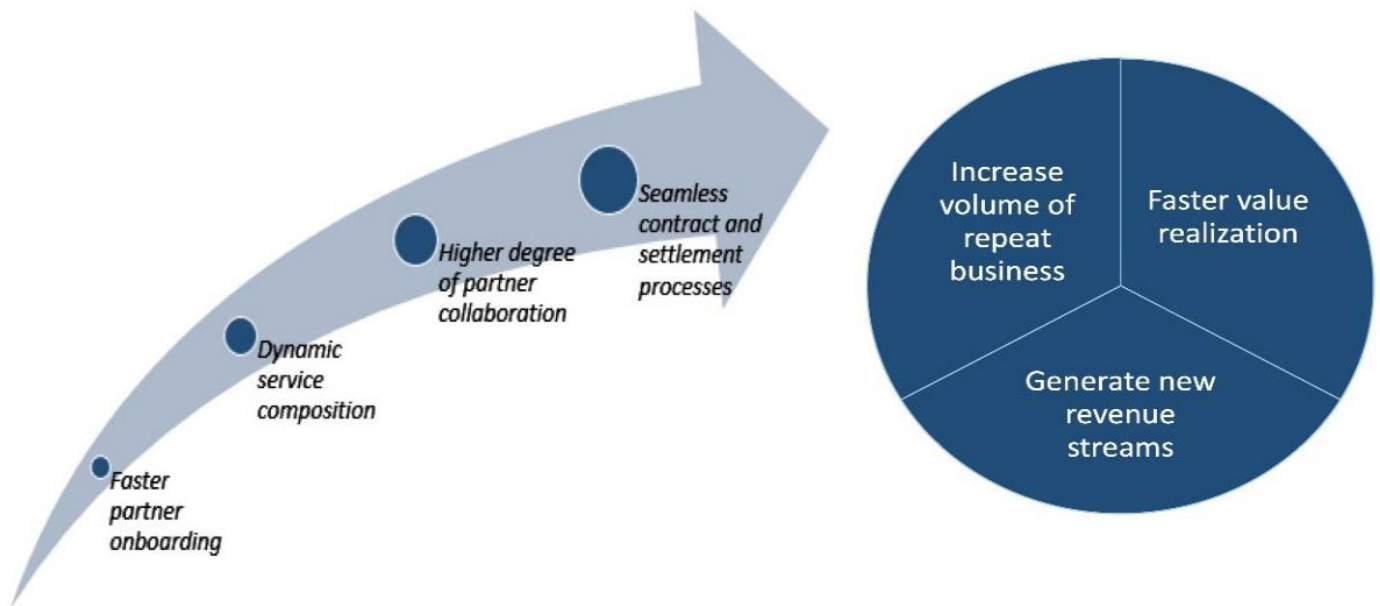


Figure 6: Solution's value proposition. Key indicators that drive the design and development phases

Data from a Gartner Survey³ indicates that customer retention and repeat business is heavily influenced by the amount of work undertaken by the customer to get things done. According to the survey, 96% of respondents who spent considerable effort in getting their request serviced were unlikely to return to the same provider. Though the survey was carried out for an altogether different setting, the findings resonate well in this context as well. The more work a customer is required to do to get things done, the less likely they are to return for subsequent business. Faster onboarding, dynamic service composition, seamless contract and settlement processes are key indicators in this regard. Architectural governance should ensure that the design enforces all

of these capabilities to be carried out with minimal manual intervention as possible to improve the customer experience. Benchmarks should be defined to validate compliance in a tangible manner. For example, the design goal is to complete partner onboarding and dynamic service composition without requiring a build-release cycle of the solution. This can be achieved only iteratively through design refinements. Even then, there could be specific service requirements that needs a code build. A target of achieving 80% of service rollouts without build changes, over a period of six months or so, is a reasonably good benchmark to aim for. Similarly, the smart contracts for settlement processes also will evolve iteratively. Initially, manual intervention

would be required to solve settlement issues with partners. It is impractical to propose a standard benchmarking target across implementations owing to the varying degree of complexity and heterogeneity involved in settlement processes across organizations. However, the aim should be to bring down the settlement timelines to a matter of days instead of weeks as it happens today in some of the typical telco settlement processes. Similarly for validating gamification effectiveness, monitor metrics such as loyalty points redeemed and application ranking. A low ratio of loyalty points redemption by customers or a higher ranked application on marketplace generating lower business indicates that it is time to revisit the logic within the gamification engine.

What can System Integrators do to accelerate this journey?

Like the CSPs, this is a crucial time for system integrators as well to prepare and be ready to seize the 5G opportunity. In order to stay ahead of the competition, there are a few things system integrators must do in this context.

It is quite important for the SI to consider different dimensions while devising its plan of action. A three stage approach is proposed to guide this journey forward.



Figure 7: Multi stage 5G strategy for System Integrators

Prepare: Ensuring solution readiness

In the prepare phase, the SI should focus on building the proposed solution components and stand up the platform.

Lab readiness and micro development teams

As the first step, in house lab environments should be setup to start building prototype of the platform. It is essential to consider the whole platform as a suite of products. This helps to organize micro development teams with directed focus to work on each of the solutions. A natural split would be as follows:

- Next generation OSS stack enhancements
- Onboarding portals and Marketplace
- Contract and settlement
- Gamification engine

In the case of Infosys NGOSS², the next step would be to enhance the existing solution to support advanced features. A key inclusion that can enhance the value proposition would be support for digital twins that offer capabilities such as what-if scenarios emulation, preproduction tests automation and design validation. Also effort needs to be accounted for enhancing capabilities such as dynamic service composability and closed loop assurance which are paramount to the successful adoption of the solution at a wider scale.

Intellectual Property asset creation and building working prototypes

It is a no-brainer that working prototypes help build confidence and increase the prospect of winning new deals. Also, it helps the organization to create intellectual property assets and proactively pitch for multiple opportunities with different clients. It is also important to ensure that the prototypes are engineered well to adapt to different customer contexts seamlessly.

Collaborate: Enhancing the solution footprint

In the collaborate phase, the SI should look

to engage with third party organizations as well as industry wide institutions to co-create solution elements and enhance the overall solution footprint

Partnerships with third party vendors

SI should look to engage with appropriate third party vendors for procuring off-the-shelf products that offer certain niche capabilities. For example, for API management, SI can look at forging partnerships with companies offering API management offerings. Such partnerships allow SI to pursue joint bidding for a potential customer pursuit. The SI can add value in defining the API strategy for the organization, co-create APIs as well as build integration to the ecosystem's contract and settlement solution for enabling API monetization.

Co-create industry wide solutions, making the solution standards compliant

The SI should look to collaborate with industry wide institutions such as TMForum (tmforum.org) to co-create industry wide solution elements. The SI should play an active role in the definition and implementation of Open API. This is an important guardrail as far as keeping the solution design aligned to open standards is concerned. The partnership also helps SI to get acquainted with the industry trends as well as get a firsthand view of the various operational scenarios encountered by different operators.

Productize: Packaging the solution for faster rollouts

This is the final phase where the emphasis is on packaging the solution into a commercial product for rollouts.

Hardening the platform

It is important to look at solution hardening from application software, infrastructure and network perspectives. One of the key steps in this phase is to evaluate the vulnerability scan reports for the open source components of the solution to identify any applicable candidates for hardening. Hardening the solution helps in eliminating residual or

redundant code as well as improving the security and maintainability of the platform.

DevSecOps improvements for end to end automation

DevSecOps model for the project should be established during the planning and design phase. A cloud native microservices solution definitely needs a robust CI/ CD lever to be sustainable. As is the case with any software development, the DevSecOps models also would undergo multiple iterations and revisions along the way. The idea in this final phase is to ensure that the DevSecOps model is mature enough to give confidence to prospective stakeholders that the solution is carefully engineered and easy to extend. It is important to wear a customer's hat while evaluating the deployment model. The goal in this phase is to bring in necessary improvements to the DevSecOps model so as to eliminate manual tasks as much as possible. Customers would normally be apprehensive about the operational overhead that can get associated with a new solution deployment. So it is very important for the SI to have all the bases covered as far as solution deployment, ongoing maintenance, change management and monitoring aspects are concerned. The solution should have the option to be packaged as a turnkey platform as a service that can free the customer stakeholders of the need to evaluate and sort out hosting concerns.

Branding the solution

Finally, the marketing team needs to be on board to build branding and promotional content for the solution. SI should also plan to define smart pricing and operating models for the solution at this stage. The operating models have to be thought about in such a way that it appeals to small and medium sized organizations as well. The unique selling proposition of the platform breathes on E2E automation, agility in defining new services and the seamless collaboration experience that it offers. So, it is all the more important for the intrinsic platform design, build and operational elements to exhibit these virtues evidently.

Conclusion

According to GSMA, by the year 2025, 5G is expected to account for as many as 1.2 billion connections worldwide. Thanks to its varied and widespread applicability, it is beyond speculation that 5G will spur the emergence of new market players and innovative business models in the months and years to come. For CSPs and System Integrators, this is a crucial phase that promises a gamut of opportunities. The 5G journey is exciting, but has its share of hurdles to overcome along the trail. An appetite for innovation supported by smart decision making is the need of the hour. The digital ecosystem is positioned to catapult this journey forward in the right direction.

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