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eUICC subscription manager deployment options

Contents

Introduction

eUICC technology—thanks to GSMA standardization efforts and pro-active move from industry players in particular OEMs but also chip makers—is maturing and adopted in consumers and M2M devices and tomorrow in IoT devices with the new specifications SGP32 work at GSMA. These eUICCs need to be managed by new eUICC subscription manager platforms. Several types of players of the new ecosystem might need to manage these eUICCs in 4G & 5G public or private network environments. Originally, they only had the option of equipping themselves with new platforms on-premises or rely on an external service provider that would provide them with such management capabilities as a service. Google Cloud and Oracle OCI have also recently launched to the market GSMA SAS SM certified Data Centers or Regions, bringing even more options.

With the evolution of the GSMA SAS SM specifications, there is now more space potentially given to Cloud Providers in the eco-system, and some kind of intermediate option that can be considered. In the last couple of years, Microsoft and AWS have pro-actively certified some of their data centers with GSMA so that they can host applications from industry players which would like to deploy their eUICC subscription managers.

This document covers some of the numerous aspects that should be considered to decide between these options: on-premises, leverage on cloud service providers or aaS. Which option is best for a company?

These new eUICC subscriber manager platforms can play various roles such as SM-DP+, SM-DS for consumers, SM-DP or SM-SR for M2M, and the deployment model chosen from one player to another might vary depending on his role in the ecosystem and its priorities.

Executive summary

eUICC is becoming a mainstream technology and participating in the development of the Internet of Things' new world. New management platforms need to be deployed to support the remote management of these eUICCs. In the early days the largest traditional SIM card vendors were proactive in securing their own data center as per GSMA recommendations and provided these new management capabilities as a service to other players of the ecosystem. This was the main model available. But, in few years the landscape has evolved new players willing to enter this space have more options in front of them to choose from. They can equip themselves, control their own platform, and deploy on-premises such capabilities or leveraging on GSMA certified Cloud Providers, as opposed to rely on a third-party service provider or traditional hosting providers usually coming from the world of SIM Manufacturing.

This document looks at multiple aspects to be considered and concludes that, indeed, more and more players due to their size, positioning, and value proposition will want—from the beginning or on mid-term—to make the move to have such capabilities under their direct control. We believe that the various models will co-exist, but of course, the development of one versus another could also change if the context would be redefined in the coming years. HCLTech with its SIM/eSIM remote management solutions offering as shown on Figure 2—made of HCLTech Dynamic SIM Provisioning (DSP), Connectivity Management Platform (CMP), and Remote SIM Provisioning Management (RSPM) software platforms—is helping mobile service providers to embrace this new eSIM technology and manage end to end the subscription lifecycle of their subscription being consumers or M2M and SIM or eSIM based.

Choice points

The various options have pros and cons and need to be assessed by companies before a decision is made. Therefore, it is critical as a start to not only have a clear view of short-term plans but also mid- and long-term plans.

The options can also be seen as complementary over time. One can start with a aaS model-tapping into the capabilities provided by a third-party company already GSMA SAS SM certified-while volumes are low, and to avoid missing a specific launch date, and then later, or in parallel, build its own capabilities in-house, with a full on-premises platform or an approach where it leverages on cloud service provider's capabilities to deploy the application at CSP's premises and deploy the HSM and control the Key Management processes in its own premises and once ready plan a migration.

The figure 1 below is describing the 3 main options available today. Table 1 lists the criteria to take into account when assessing these options.

More Deployment Choices for SP/MNOs

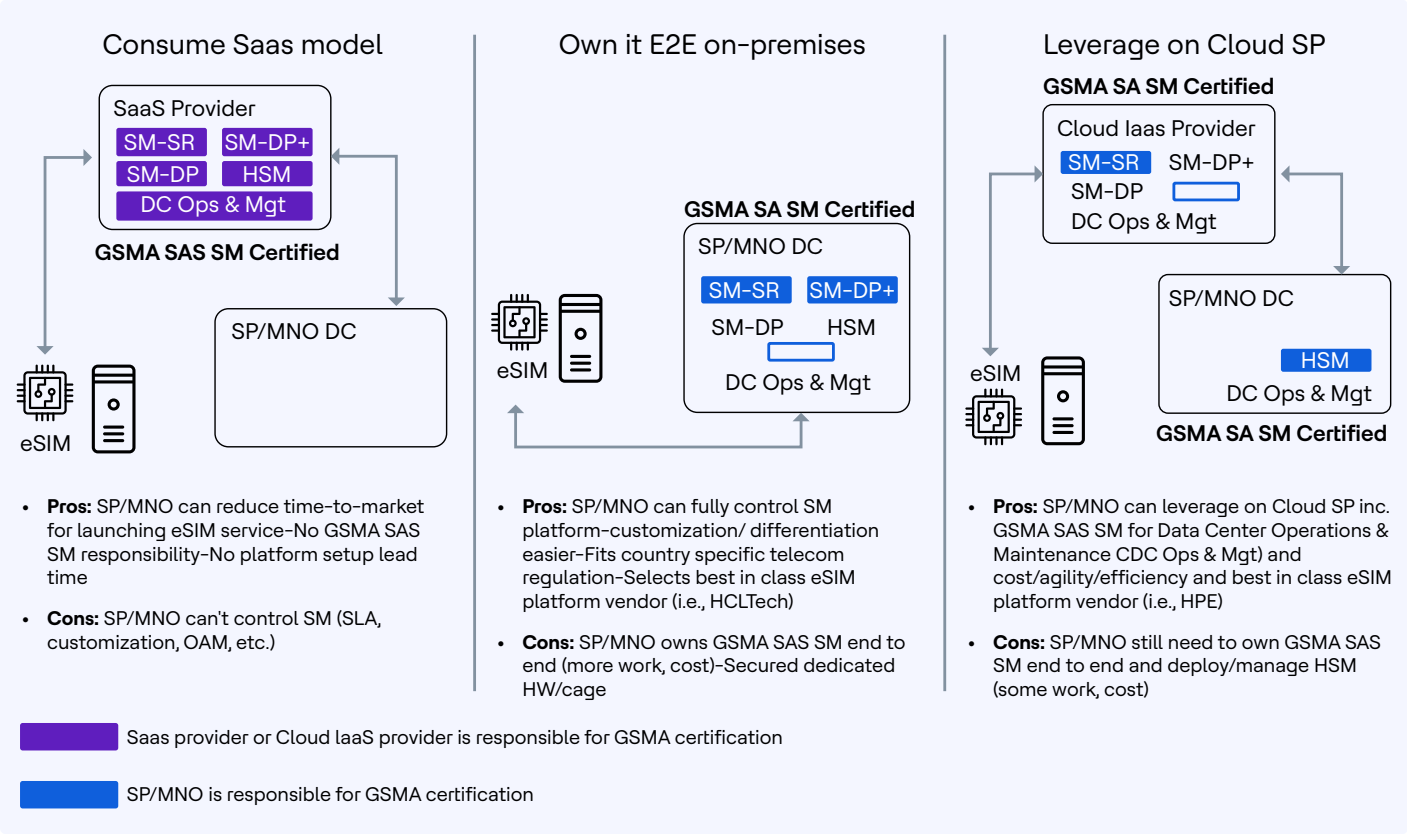

Figure 1. eSIM deployment choices for SP/MNOs

Many criteria could be looked at such as shown in Table 1.

Criteria	Description
Volume of transactions expected	The volume at launch and its YoY growth is obviously an important factor.
Skills required	New skills are required to understand this technology.
Security policies and data center capabilities	The eUICC subscription manager site needs to be GSMA SAS SM certified to use the GSMA CI.
Use of GSMA CI or other CIs	Which CI should or could be used depending on some local context and value proposition?
Company profile	Is the company tier 1 operator, a group operator, or a small MVNO in a small country?
Overall strategy between make and buy approaches	Does the company have a clear buy or make approach in place?
Strategic level of embracing eSIM technology	Is the company a follower or an innovator in the market?
State-of-the-art of platform vendors market	What is the landscape of platform vendors, their capabilities, references, and functionalities?
State-of-the-art of aaS service provider market	What is the landscape of the aaS service provider, number of players, differentiators, SLAs, and pricing?
Specific requirements going beyond GSMA standard	Does a plain GSMA compliant platform or aaS fit my specific requirements? If not, how could my specific requirements be managed by the platform or service supplier?
Competitive aspects	Is my company looking at creating some differentiation, thanks to the functionalities of this new platform or service, or is it ok to use the same aaS offering like my competitors?

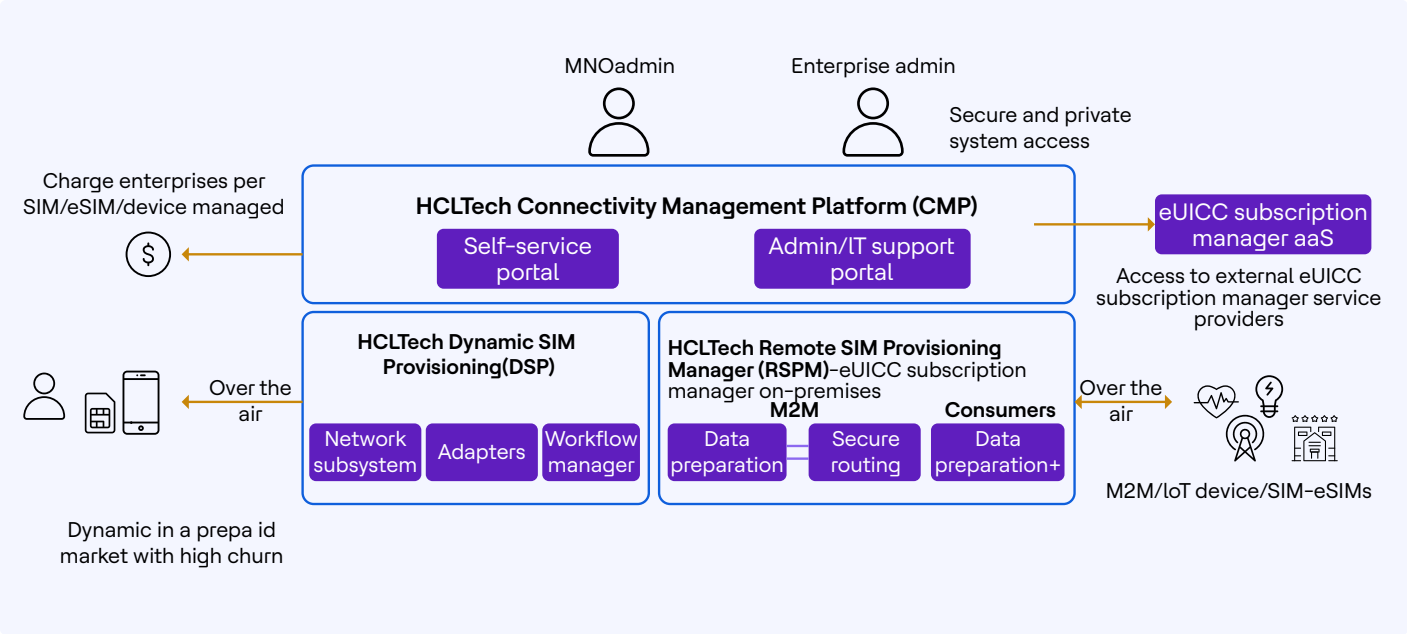

Figure 2. HCLTech SIM/eSIM management solution overview

Volume and growth

Clearly, the volume expected at launch and the growth expected in the next three years, in particular, have to be forecasted and taken into account in the decision. A company operating in a small market of only a few millions of potential subscribers focused on prepaid market—not being a leader on its national market—is not in the same position as a group operator with already more than 100M active mobile subscribers and a dedicated business unit targeting M2M market. The former is more likely to go hosted as opposed to the latter. eSIM Subscription Platform are not seen as critical by most operators as of today, due to the small volumes they have to handle. Some mature markets in North America, Western Europe and selected Asian countries have already a good penetration rate of eSIM capable devices, while in the rest of the world, this is not yet the case.

Internal skills and resources

Deploying and operating an eUICC subscription manager needs a minimum of resources and skills to be successful. A light MVNO might not have such skills and might be finding it challenging. However, companies who have a strong technical background and skilled or agile teams in IT and network departments would not face major challenges in tackling the introduction of such new platform with the help of a proven supplier. If the company wants to have its own platform GSMA SAS SM certified, it would also require a minimum of security skills available in-house or support of Security consulting external teams with expertise in GSMA SAS SM certification or similar security certification like ISO or PCI DSS. Now, that CSP offer access to Data Centers that are GSMA SAS SM certified, the burden for MNOs to certify end to end their own eSIM service is also reduced and therefore this is no longer a big concern.

Security requirements and GSMA certification

GSMA has defined some security requirements, which needs to be matched for successfully obtaining the GSMA SAS SM certification. While these requirements might be close to the ones already followed by some large companies or companies where security policy is high on the top management agenda, others might see this as a challenge. Also, this can raise concerns for an on-premises approach, and therefore push them to use the service of another company that already has this GSMA certification.

The first companies that made a move were mostly traditional SIM card manufacturers with experience on GSMA SAS UP certification. However, clearly, the skills to produce SIM cards are not the same as the skills required for running a real-time telecom platform as a service, and new type of players from other area have now join the pack. In the early days of the eSIM market, only a couple of sites could claim a full certification. Also, with the arrival of Cloud Service Providers and some changes in GSMA SAS SM, the picture is now very different and several MNOs and new innovative Service

Providers have managed to get their sites GSMA SAS SM certified, clearly demonstrating that this is very much an achievable goal for most companies.

As of March 2025, there are close to 10 Mobile Network Operators and Connectivity Service Providers—including Vodafone Idea India powered by HCLTech technology—which have gone for an on-premises approach and got it GSMA SAS SM certified, all the others went for a hosted model, or in fact decided not to certify their site in few cases. It is likely that this number of mobile operators investing into their own capabilities will go up in the coming years due to some local telecom regulation adopted in some countries but also as the overall number of eSIM capable devices produced and sold will reach a threshold point which will make it more attractive for Group MNOs or large MNOs to have their own setup.

As per March 2025, there are more than 42 sites listed under the GSMA SAS SM list, located in 16+ different countries (15 in Europe, 8 in USA, 6 in China and the rest in other countries), owned by 30 different companies. Most of these sites offer both SM-DP+ for Consumer eSIM and SM-DP/SM-SR for M2M eSIM and an increasing number of them owned by Cloud Service Providers—such as AWS, Google Cloud and Microsoft—are focused on the Data Centre Operations & Management i.e., a secured environment to deploy and run your eSIM SW platform.

Some companies while following the GSMA SAS SM security requirements might decide for various reasons (national security, commercial), not to get their site GSMA SAS SM certified, in particular in the context of consumers' segment and using a local CI. For M2M, this choice has potentially more impact. Again, this choice might be an option only for very large players that can influence the ecosystem and are not concerned about interoperability between eUICC subscription manager service providers or some of configuration of eUICC in consumers' devices hitting their market. Over time, one will see the emergence of a combination of the best of worlds with software platforms from experienced telecom platform vendors being run into best-in-class hosting/cloud provider's environment, this is even more true now that major Cloud Service Providers like Microsoft and AWS—and Google™ but in a less visible manner—have decided to pro-actively get some of their data centers being GSMA SAS SM certified.

Company profile

With the introduction of eUICC, the mobile industry is going through some major changes, and in a couple of years, the landscape is likely to be different from the one that we know today. Some business relationships that have been existing for many years are being modified, like the one between SIM card vendors and Mobile Network Operators (MNOs) on the purchase of eSIM hardware. As with eSIM, a growing volume of hardware sales of the SIM /eSIM card vendors is likely to be done with new players as opposed to MNOs. eUICC manufacturers known as EUMs are likely to sell to OEMs or new aggregators; this is not a minor change as covered in some articles for M2M and consumers segment. Large semiconductors producers—like , Qualcomm®, ST Microelectronics and NXP—are also looking at addressing this new eSIM market and competing with traditional SIM card vendors, bringing a new way to look at this market. The evolution towards Integrated UICC (iUICC) or iSIM will further emphasize the role of semi-conductors/chip makers players and enable tighter hardware integration and the launch of even smaller connected devices.

New players are appearing, for example, dedicated M2M service providers, Service Providers or MVNEs, or large players in the OEM segment like Avnet Silica. These players will need to equip themselves in eUICC SM capabilities—either tapping into hosted services or deploying their own systems for the largest and most ambitious ones.

eSIM devices boarded on an MNO networks could be coming from multiple OEMs, using various eUICC coming from multiple EUMs, as a result, it could be good in this open market to consider a platform that is agnostic to OEMs and to EUMs—and a supplier key to run pro-active inter-operability activities to validate new devices, new eUICCs and profiles.

Large group mobile operators or alliance of mobile operators could certainly have a **centralized** approach and validate the investment due to their scale of an on-premises approach.

New players who wish to position themselves as eUICC vendor agnostic are going to emerge over time and enter the market providing an alternative to the traditional SIM card vendors which launched since few years eUICC SM service offering. Figure 3 shows an example of this new ecosystem that is likely to emerge with the introduction of eUICC.

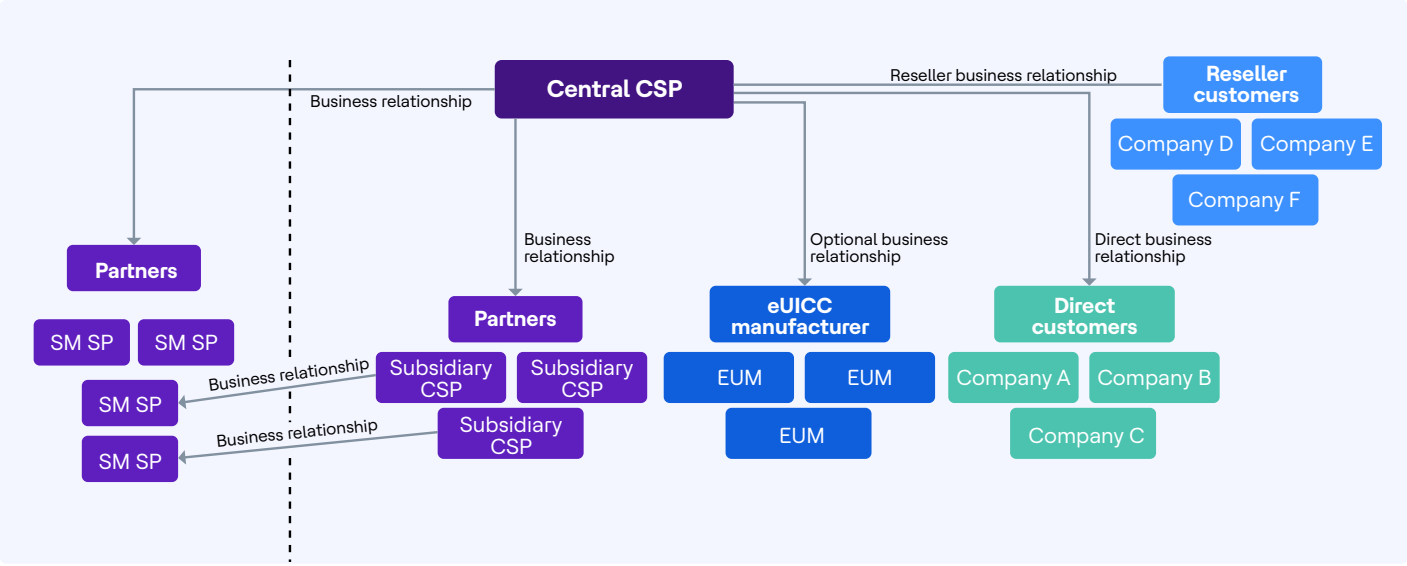

Figure 3. New ecosystem for eUICC

National regulation

The telecom regulation varies from one country to another, for example, SIM/ID registration also known as Know Your Customer (KYC) or having the UICC manufactured and profile loaded in-country exist in several countries. With eUICC new capabilities, it is important to understand if these regulations are still valid or how they can impact the market development. For example, some of these regulations could limit the use of hosted SM services located in foreign countries and mandate the deployment in-country of the eUICC SM platforms. TRAI in India engaged with the industry players, as an example, via a consultation on M2M/IoT, which touched on eUICC introduction. In Europe, with the upcoming GDPR regulation, and following the shock of the Facebook/Cambridge Analytica data breach, some higher scrutiny is likely to be put on any hosted services, especially when located outside of country or worse Europe. A company that decides to invest on-premises could potentially use this as a differentiator toward its customers.

Some specific countries like India, Turkey or Saudi Arabia and few others have passed some bills to enforce in country deployment of eSIM Subscription Platforms. These regulations when the market is large are not too problematic, but if the size of the country is small then it can really be an issue for the local MNOs to launch and deploy eSIM Services with a good business case. Some Telecom regulators could be tempted also to block the use of software platform—not developed in country—and again, this might be an issue for the local mobile operators which cannot source their technology from proven international technology company and get only a limited choice of local suppliers. This move from Telecom Regulator could clearly jeopardize the eSIM market development locally and leave this country lagging behind the rest of the market. For M2M, some telecom regulators are imposing that the profile used on the M2M devices in use on their national networks must be of a local MNOs—meaning that the M2M eSIM device cannot be on roaming for more than several months and the active profile on this eSIM device must be one of the local MNOs. Not to forget that in China, as of today, the use of eSIM is allowed for smart watches but not smart phones yet for consumer devices.

Strategic level of embracing eSIM technology

Some mobile operators are in a me-too approach or are being pushed to embrace eSIM technology due to external forces, for example, large OEMs launching eSIM devices. For some others—usually new entrants, there is a clear vision and willingness to leverage eSIM technology to develop new value-added services and use cases to enable new digital user experiences or for example to extend their existing M2M segment.

For the first set, a hosted approach is more likely to fit their needs, while for the second group of companies, an on-premises platform might better fit their plans to have a full control on a such strategic initiative.

Platform vendors' current players and capabilities for on-premises and in CSP DC

If an on-premises approach or leveraging on the Cloud Service Providers' capabilities is preferred, then candidates should look to existing platform vendors. There are a growing number of platform vendors coming from various background on the market—traditional SIM card vendors, proven telecom software platform vendors, new players, and such. These platforms should be listed as GSMA compliant products on the GSMA InfoCentre site—access to site is restricted to GSMA members only—following their deployment and use in a GSMA SAS SM site.

They should review the vendor's profile and their offer considering some of the points mentioned in Table 2.

Table 2. Vendor profile

Criteria	Description
Profile	Are they a known or proven telecom software platform supplier?
History	What is their background?
GSMA POC involvement	Did they participate in some GSMA POCs—like the one done for M2M on SM-SR swap process?
GSMA specifications compliancy	Level of support or compliance of GSMA specifications.
Additional features or differentiators on top of GSMA compliancy	Additional value or functionalities developed on top of GSMA specifications that can create differentiation with generic-hosted eUICC SM services. For example, set of APIs available beyond GSMA standards, which can enable a tighter integration with customers' IT/NW systems.
References or customers	Do they have live references of their platform?
Segments supported	Do their platforms support M2M and consumers' GSMA eSIM standards?
Existing supplier	Are they an existing supplier? Is there a contract in place?
Proof points of interoperability work	Was the platform validated against multiple EUMs, OEMs, or other SM platforms?
Commercial models	What are the commercial offerings available? CAPEX versus OPEX?
Future-proof	What is the road map for this platform?
Complementary products or solutions	Do they have complementary platforms that can be used as part of an end-to-end solution? For example, Entitlement Server for consumers or Connectivity Management Platform for M2M.
Local delivery resources	Are there local delivery resources available?
Need for a System Integrator	Can they deliver the project by themselves or do they need a System Integrator?
Deployment environment supported	Can the platform be deployed as a VNF VM, or as a container or on bare metal server? Can the supplier software be deployed into one of the existing Cloud Provider GSMA SAS SM certified site?

Hosted service providers' current players and capabilities for aaS model

If a hosted approach is preferred, then candidates should look to existing service providers. The GSMA website is listing the current GSMA SAS SM certified sites, and the list keeps being updated as new companies are certified or previously certified failed or declined to have their certification being renewed. After a first period where only traditional large SIM card vendors were listed with one or two sites, we can now see new types of companies being listed such as MNOs located in countries where Telecom regulators requested in country deployment, semi-conductors like players, tiers 2/3 SIM vendors, small SW vendors and focused connectivity service providers. This list will continue to expand in the coming months to widen the range of choices in the market, and it is expected that this new technology will also attract new players as volume grows—coming from new horizons. Figure 3 pictures a setup where two MNOs are being services by two eUICC SM SPs—either for redundancy or put some commercial pressure or geographic aspect—and shows how one MNO interacts with the eUICC SM SP to trigger transactions on its hosted service provider. Table 3 below lists a set of criteria to assess when searching for an eSIM aaS service provider.

They should review the profile and offer of these service providers considering some of the following points.

Table 3. Hosted service providers' criteria

Criteria	Description
Location of data centers	Where are the hosting centers located? Does it align with my needs?
Cloud provider/Hosting provider	Is the eUICC SM SP leveraging on a known third-party cloud provider/hosting provider or using its own data center?
Application provider	Is the eUICC SM SP leveraging on a known third-party application or software provider or using its own software platform?
Redundancy aspect	Does the supplier have a geo-redundant site? If yes, where?
Profile of aaS provider	Is the eUICC SM SP a known cloud provider or is this a new business it is entering into?
GSMA SAS SM certification	Which level of certification did the eUICC SM service provider achieve?
Interoperability	Which level of interoperability did the eUICC SM SP achieve with other SMs?
GSMA specifications or standards compliancy	Which versions of GSMA standards are supported?
Use cases supported	Is the same eUICC SM SP capable of providing a service for M2M and consumer segment? How about SM-DS for consumer segment? or integration with OEM lookup servers? How are various customers managed using the hosted service?
SLA	What is the SLA provided by the eUICC SM SP versus the ones required?
Integration aspects	Which standard set of APIs are offered for integration? Are there some additional interfaces in addition to the authorized GSMA ones?
Customization possibility	Is there room for some customization of the service?
Data privacy and usage	How does the hosted service provider analyzed and monetized toward other parties collect the data? Are they fine to expose or share this data beyond what is planned by GSMA specifications?
Cloud provider/hosting provider technology use	Is it possible to use Hosting Provider locally? or in an appropriate geo? or is it possible to find a Cloud Provider that has managed GSMA SAS SM O&M Center scope certification to go beyond "hosting"?
CI used by aaS player	Which Certificate Issuers (CIs) are supported or required by the eUICC SM SP: GSMA one, others?
Road map	What is the road map of the eUICC SM SP?
Commercial models	What are the commercial models offered: setup fees, capacity fees, hosting fees?

Setup offered	Do they offer various setups: dedicated logical instance, dedicated physical instance, and such?
Competition aspects	Do they service some of my direct competitors?

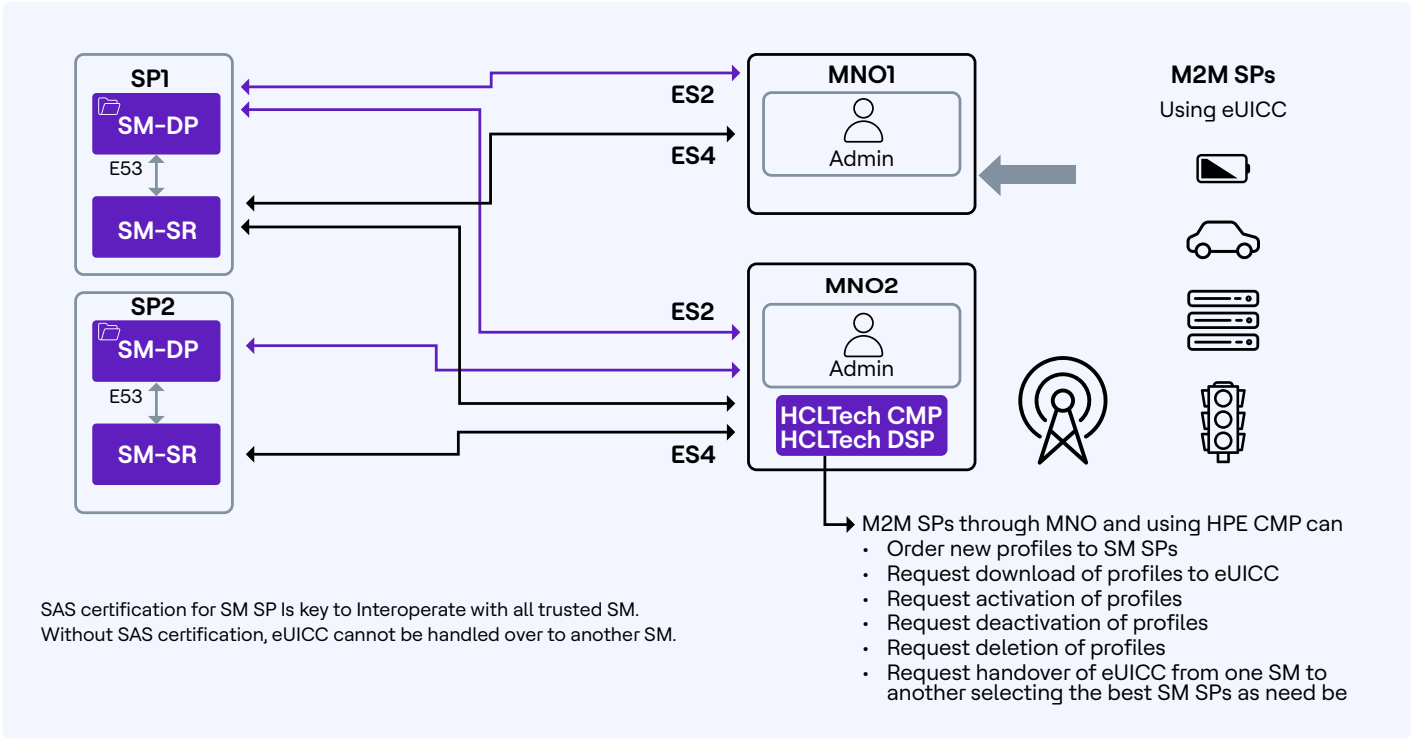

Figure 4. Example for M2M ecosystem with hosted model

Growing role of Cloud Providers

With some recent evolution/clarification of the GSMA SAS SM, it has become possible for Cloud Provider to enter in this space. Past announcement from Thales which decided to tap into a Google Datacenter in Belgium for hosting some of its SM applications or Microsoft France that decided to certify four of its data centers in France and then additional ones in the US under O&M Center scope and AWS which also certified several of its data centers are clear signs that the eco-system is evolving. It is interesting to note that few players and even very recently G&D with AWS which started to offer eSIM aaS based on their own data centers or using a hosting provider and deploying a secured cage—have or are in the process of migrating their eSIM service to one of the big 3 Cloud Providers—most likely as they realized that this was not in their core competencies to do so by themselves or/ and some costs efficiency and agility considerations, and of course MNOs could do the same. The HSM could be offered by the cloud provider if their HSMaaS is certified by GSMA SAS SM auditors or it could still be deployed in another physical secured property and managed by the MNO or the eSIM Service Provider as per GSMA SAS SM specifications, but this first step does bring more options to either Service Providers which wish to offer an eSIM aaS model to the market or also to MNOs in particular large ones or Group operators with multiple properties—which want to have a dedicated eSIM platform but deployed into a best in class Cloud Provider site.

Competitive aspects

One angle to look at that is also the possibility to create differentiation on this capability or not. If one feels that there is no need or possibility to create differentiation on this eUICC subscription manager, then a hosted offering—shared with many players including your own direct competitors—could do the job. On the contrary, due to the importance of the user experience during the end-to-end subscription process for the consumers' segment as well as the criticality of the enterprise segment, an on-premises platform—100% controlled—can be a key differentiator versus the competition. One might want to check if there is some competitive and overlap aspects to consider—for example, if you are a M2M/IoT device maker looking for an SM-SR SP, do you want to be serviced by an eUICC SM SP that is also selling device to the market? Similarly, if you are an MNO, do you want to be serviced by an eUICC SM SP that is also servicing some of your direct competitors, or offering connectivity services to some of your potential customers and therefore taking away some business from you etc.?

Conclusion

Companies that need to equip themselves with new eUICC subscription manager capabilities have now more choices with the involvement of big well known Cloud Service Providers, new innovative service providers and several pure eUICC subscription manager software platform in addition to traditional players coming from the SIM manufacturing historical business. They can go for a full aaS model provided by a third-party or a full on-premises setup or have a dedicated platform but with the applications part deployed in CSP DCs. Based on some of the previously mentioned points, the project team engaged on this initiative should evaluate if there is a natural fit for one specific model or if the three models-pictured in Figure 1-could be considered and compared side by side.

Now, it is important to keep in mind also for the eUICC subscription manager as defined by the GSMA specifications—while being a mandatory and critical component in the chain—is not enough to cover the end-to-end subscription activation of new eSIM devices being M2M, Consumers or soon IoT and that there are other components to enhance or acquire to come up with the end-to-end solution.

The team engaged in this selection process should therefore make sure that the end-to-end solution is well defined so that the initiative is successful.

In M2M, business processes between the various players are critical and GSMA published a document to help the future players to better understand these soft requirements. Usually, a Connectivity Management Platform—located at MNO—would interact with the eUICC subscription manager platforms (SM-DP/SM-SR) for end-to-end M2M eSIM scenario and similarly, an Entitlement Server is likely to interact with the eUICC subscription manager (SM-DP+) for end-to-end Consumer eSIM scenario.

HCLTech, via its recent CTG acquisition, with its long history of real-time telecom software platform and solution provider covering network as well as OSS/BSS area of mobile operator/service provider is helping its customers to successfully launch new services leveraging on this exciting new eSIM technology on 4G & 5G public and private mobile networks.

With its HCLTech Remote SIM Provisioning Manager software suite—GSMA compliant products: SM-DP+, SM-DP and SM-SR and used by some of the largest MNOs in the world in their own data centers GSMA SAS SM certified, HCLTech is a leading supplier of eUICC subscription manager solution. HCLTech has also complementary solutions for helping MNOs and Service Providers to deploy an end-to-end solution—with its HCLTech Device Entitlement Gateway and HCLTech Dynamic SIM Provisioning supporting OTA SIM Management use cases and Connectivity Management Platform needs for M2M/IoT. HCLTech offering and partnership with best-in-class Cloud Service Provider provide various options to customers willing to embrace eSIM technology. With its strong and local Services teams—including specific security services for helping MNOs to get ready for the GSMA SAS SM certification, HCLTech is the right partner to help its customers to adopt eSIM technology and get the most out of it whichever deployment model is chosen—on-premises or using best in class Hosting or Cloud Provider with various commercial models available like CAPEX or OPEX based ones.

About the author

Olivier Poulain is been part of HCLTech telecom vertical industry business unit, CTG, for more than 20 years. He is responsible for Solution and Product Management activities on SIM/eSIM remote management. Olivier has over 25 years of technical, marketing, consulting, product management, and business development experience in the telecommunications sector working at Inmarsat, Motorola, HPE and then HCLTech.

Glossary

Acronyms and abbreviations	Description
aaS	as a service
API	Application programming interfaces
BSS	Business Sub-Systems
CI	Certificate Issuer
CMP	Connectivity Management Platform
CSP	Cloud Service Provider (i.e., Microsoft, Google, AWS)
DP (+)	Data preparation (Plus)
DSP	Dynamic SIM Provisioning
eSIM	Embedded SIM (marketing name of eUICC)
eUICC	Embedded Universal Integrated Circuit Card
EUM	eUICC manufacturer
GSMA	GSM Association
ID	Identity
IoT	Internet of Things
M2M	Machine to machine
MNO	Mobile Network Operator
MVNE	Mobile Virtual Network Enabler
MVNO	Mobile Virtual Network Operator
NFV	Network Functions Virtualization
OEM	Original equipment manufacturer
OSS	Operations Sub-Systems
PCI DSS	Payment Card Industry Data Security Standard
RSPM	Remote SIM Provisioning Manager
SAS SM	Security Accreditation Scheme for Subscription Manager
SAS UP	SAS for UICC production
SIM	Subscriber Identity Module
SLA	Service-level agreement
SM	Subscription manager
SP	Service Provider
SR	Secure routing
UICC	Universal Integrated Circuit Card
YoY	Year over year