

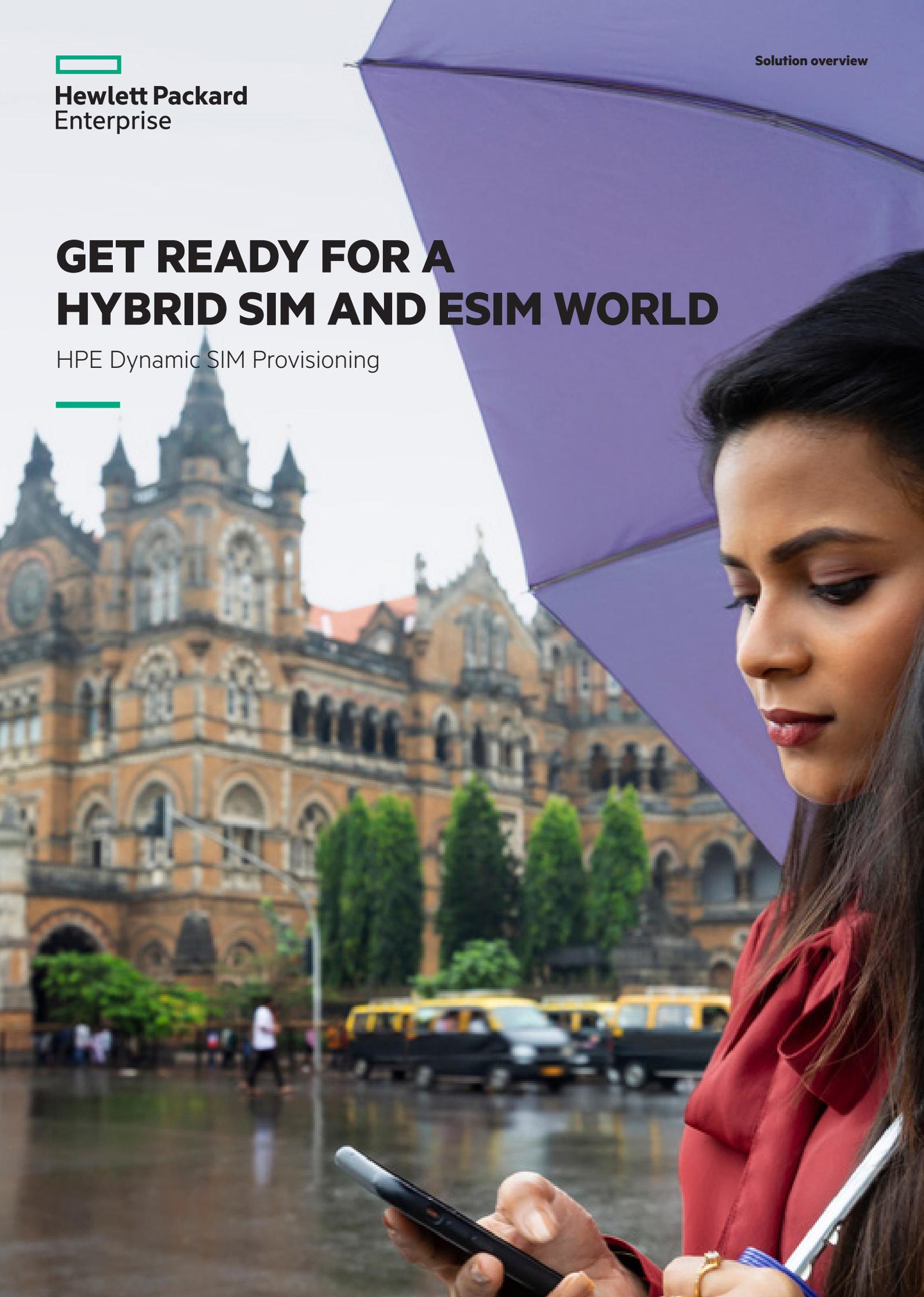


**Hewlett Packard
Enterprise**

Solution overview

GET READY FOR A HYBRID SIM AND ESIM WORLD

HPE Dynamic SIM Provisioning



Our live HPE DSP customers in highly competitive prepaid markets are on average activating every year two thirds of the total number of active subscribers. As the back-end provisioning is done only at first time attach of the new prepaid card, they save key resources until the last minute in huge quantity.

In this new hybrid work of SIM and eSIM, on one side it is important to reduce costs and improve margins by simplifying your traditional SIM supply chain, but also have the agility and new capabilities to support the launch of eSIM-based devices.

ASSIGN NETWORK RESOURCES WHEN NEEDED

To increase average revenue per user and average margin per subscriber, communications service providers (CSPs) must maximize their network potential. Until now, a preprovisioning method was used for subscriber identity module (SIM) cards. It forced management of SIM card inventories by preassigning numbering plans and preprovisioning network systems—home location register (HLR), customer care, and prepaid or postpaid billing platforms—before activation or getting revenues. The same also applies to new growing segments like the Internet of Things (IoT), causing an even more significant impact on the inventory level while expecting lower revenue per active subscription.

DECREASE YOUR COSTS

Now there's an answer—HPE Dynamic SIM Provisioning (HPE DSP) product components. It decreases your total cost of SIM card ownership, and builds a control point to deliver efficiency and flexibility into your SIM supply chain. It also limits churn and improves customer retention and satisfaction, with room for value-added services.

With this Hewlett Packard Enterprise (HPE) solution, you can activate new SIM cards in real time by:

- Allocating International Mobile Subscriber Identity (IMSI) and Mobile Subscriber ISDN Numbers (MSISDNs)
- Associating the SIM with HLR/home subscriber server (HSS) and other business support systems (BSS)/operations support systems (OSS)
- Attaching an offering or tariff when it's used the first time

This frees up valuable and costly resources, so they're not "blocked" unnecessarily, since only revenue generating active subscribers get provisioned on the network and resources required for them are allocated at that same time.

You can also further reduce SIM card related costs. For example, subscribers with no or low traffic can be considered as sleeping SIMs and be temporarily decommissioned from the HLR/HSS and other BSS/OSS, depending on the subscriber's contract terms and conditions and local telecom regulation in place. They can be placed in dynamic SIM provisioning inventory until they reconnect to the network. This avoids the cost of maintaining SIMs in OSS/BSS when not active or in the case of a new SIM for a prepaid customer. It can also limit churn, as a customer is invited to reuse the existing CSP SIM card with immediate activation.

BENEFIT FROM UNIVERSAL SIM

With HPE Dynamic SIM Provisioning Solution, you can implement the concept of universal SIM—SIM cards distributed with a generic profile preloaded and by updating the profile over the air at activation. This removes the need for specialized SIMs in inventory. It also simplifies launching new services and reduces time to market. And your subscribers can dynamically select their number or subscription options at their first connection with your network, a unique opportunity to capture customer attention and offer more personalization on the fly once the card is inserted into the device and the first attachment is being processed.

Dozens of CSPs around the globe use HPE Dynamic SIM Provisioning Solution—for tackling various use cases—for real-time activation, large ones activate several millions of SIM cards per month.

ALLOCATE RESOURCES ONLY TO ACTIVE SIMS

Only active SIM cards, those using network resources above a given threshold—are allocated to OSS/BSS resources with HPE Dynamic SIM Provisioning Solution.

BECOME LEANER

Gain wider marketing control of SIMs, devices, and services while simplifying your SIM card supply chain and reducing SIM inventory costs in the supplier or retail chain:

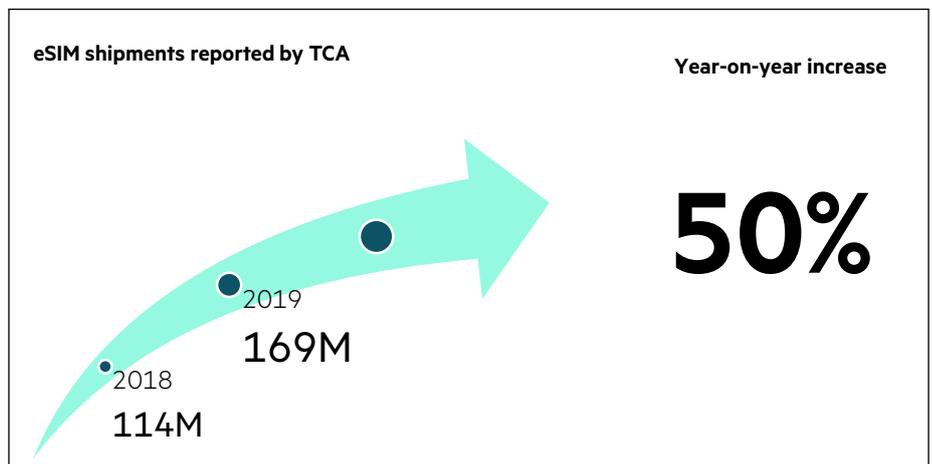
- Avoid MSISDN/IMSI costs for inactive SIM cards and control consumption, as MSISDN/IMSI pools are a scarce service provider resource.
- Avoid unproductive HLR/HSS and BSS/OSS capacity costs, improve network resource use, and maximize network efficiencies by associating the SIM with the appropriate HLR/HSS.
- Reduce the number of SIMs needed to support a marketing plan by reducing the number of different SIM card product lines and allocating a tariff at first use.
- Avoid duplicated geographical stock by removing static dependency on geographical numbering or HLR/HSS planning.
- Automate, personalize, and increase agility during the SIM activation process.

You also can participate in new opportunities, such as premium number monetization—vanity and gold/platinum numbers—and support with specific activation processes different type of subscriptions and devices for example LTE SIM cards in 3G, 4G, or now 5G only devices, or data-only devices, etc. With HPE DSP, you can also implement new processes required—as part of SIM/ID registration, as requested by Telecom Regulator—during the SIM activation process.

GET READY FOR ESIM LAUNCH

In the coming years, more and more devices being Consumers or M2M will make use of eSIM technology. MNOs need to be ready to support these new type of devices that will bring with them new use cases and new requirements in terms of additional integration with new platforms such as GSMA compliant SM-DP+, SM-DP or SM-SR.

The supply chain with eSIM is obviously changed as MNOs no longer “purchase” eSIMs—device makers are doing this now. MNOs need on the opposite to continue to order “profiles” and manage carefully how their resources like IMSIs are allocated to these profiles. HPE DSP has been extended to support these new use cases and new integration points for helping a smooth introduction of eSIM.



Source: Trusted Connectivity Alliance (TCA) [website](#)

FIGURE 1. 2019 in review: eSIM industry insights (Source: TCA)

HPE Dynamic SIM Provisioning Solution supports the following scenarios:

- Number and resource management—SIM numbers
- SIM Ordering process—Manage Input/Output file exchange with SIM card vendors
- Dealer management—Accounting and SIM ordering
- SIM over-the-air (OTA) management—remote file management (RFM), remote application management (RAM), OTA, over HTTP(s), and SMS
- Sleeping SIMs—Identification, deprovisioning, and reactivation
- E-registration—ID scan, biometrics
- Point of Sale (PoS) SIM personalization—WARM/active SIM management by PoS personnel
- eUICC/subscription management—GSMA subscription management, self-care portal, and eUICC lifecycle management
- Multi-international mobile subscriber identity (IMSI) roaming—Dynamic IMSI management, IMSI switch, roaming and fallback applet

“Global momentum continues to build for the unique ability of the eSIM to deliver flexible control and dynamic security over a connected device’s lifetime. Following a first view of eSIM shipment volumes in 2018, Trusted Connectivity Alliance (TCA) members have reported 169 million eSIM shipments for 2019—marking a significant 50% year-on-year increase. In addition, Trusted Connectivity Alliance estimates that 5.05 billion SIM units shipped worldwide in 2019.”

– Source: TCA 2019 in review eSIM industry insight, June 2020

TABLE 1. DSP use cases

Use case	Example	Business issue	DSP contribution
Prepaid/postpaid campaigns consuming too many MSISDNs	Regulatory body scrutinizing use of MSISDNs	Shortage of MSISDN or higher number fee	MSISDNs only allocated to active cards; overall pool, allocated by Telecom Regulator, is managed
Geographically-driven resource allocation	MSISDN plans and HLR specialized per region	Large SIM card stock and un-optimized network resource	MSISDN and HLR selected based on geographical information collected
Un-optimized SIM distribution chain	SIMs stolen before being delivered to stores	Revenue losses due to fraud, customer complaints	SIMs enabled after distribution
Planned massive introduction of SIM cards	IoT introduction	Cost of the SIM inventory is too high	SIMs produced without the cost of MSISDN and HLR licenses
Number selection as a market requirement	“Lucky number” or vanity number selection	With preallocated numbers, subscriber choice is limited to the current stock	Number allocated dynamically at the time of the first attachment
Sleeping SIM cards	Customers on production HLR below activity threshold	Network resource is unused	Sleeping cards are deprovisioned from production HLR and hosted in DSP until the next activation
LTE or 5G introduction	Carriers migrating to 4G or launching 5G	Universal SIM activation as a new topic for the carrier	Seamless introduction of (U)SIM
MVNO introduction	Carriers opening their networks to MVNO	Cost of managing the network in a MVNO growth mode	Cost only occurs when SIMs are activated
E-registration	SIMs need to be linked with a verified ID to be activated	Manual process	Automated registration
eUICC introduction	Launch of LTE smart watches or M2M eUICC for Connected Cars	Requires the integration with new eUICC subscription manager platforms or service providers—new more agile processes required	Preintegrated with eUICC subscription manager platforms as per GSMA specifications. Flexibility of workflow can accommodate eUICC new business needs
Replace SIM card with eSIM use	User upgrading handset with new eSIM capable handset	“Migrate” profile in physical SIM Card to eSIM into new device smoothly	Orchestrate the actions with the new eSIM subscription manager platform as need be
Board fleet of eSIM M2M devices of an Enterprise customer	An enterprise with a fleet of 100K smart meters eSIM capable want to get them connected to a specific MNO	MNO needs to provide self-service tool (UI and API) for M2M Enterprise to do this by themselves in a friendly manner and efficiently	Supports new GSMA ES4 and ES6 interfaces to trigger GSMA SM platforms (SM-DP/SM-SR) and provides API/UI to Enterprises
Direct new users/devices connecting first time to specific portal	Users with mobile data devices like laptops or tablets when attaching first time should be directed to specific subscription portal	Identify specific devices attaching to network and need to be processed with a specific flow of activation	Detect device capability and based on business rules, run a specific flow accordingly
OTA SIM Management platform	Refresh old OTA platform not supporting HTTP or ES6 for new eSIM	Old OTA SIM Management platform does not comply with new market needs	Provides an OTA SIM Management capability state of the art which enables to cater for latest use cases





REVIEW THE COMPONENTS

This solution is modular and customizable. Changes can be carried out quickly in line with your requirements. And if changes are made in one subsystem, the whole architecture will not change. Further, the solution is highly scalable and future-proof to meet tomorrow's needs.

The HPE Dynamic SIM Provisioning Solution has cutting-edge components that enable seamless SIM provisioning and activation:

- Web Graphical User Interface (GUI) manages the entire provisioning system and user management module to store users' information, providing real-time reports on inventory status.
- Workflow Manager inherits HPE Service Activator (HPE SA) technology, which includes HPE Workflow Designer, HPE Workflow Execution Environment, and built-in plug-ins for different components. All DSP modules are built with off-the-shelf workflows that can be rapidly customized to the case, with no changes on the architecture.
- Production System Adapters interface with the operator production system for activation inward.
- Inventory maintains a required repository of resource information.
- Workflows are built to match client requirements—points-of-sale activation, automated activation, B2B portal, and more—based on detection, allocation, provisioning, and handover templates.
- SIM Updater (SU)—now provides an OTA interface wherein users can build the OTA commands they need to be executed in a specific set of SIMs based on search criteria like IMSI ranges, SIM form factor, SIM vendor etc. The OTA commands can work on both physical and embedded SIMs. The OTA commands can be executed based on user-specified triggers, or within the custom workflow of the SIM activation or provisioning sequence. The DSP SU UI also reports the status of each OTA operation/campaign. SU also supports loaded, or deleted applets from SIM cards, and creating application instances.
- First Time Attach (FTA) provides real-time subscriber authentication during initial detection and delivers an initial subscriber profile to the visitor location register (VLR) during the provisioning process.
- HPE TAS USSD/MAP/SMS Gateway—HPE Telecom Application Services Messaging Gateway runs on industry standard servers and operating system, can run in a virtualized environment, and supports NFV infrastructure. Messaging connectors are used to send and receive messages to and from users via protocols, such as Short Message Peer-to-Peer (SMPP), Direct SMS over MAP, and Unstructured Supplementary Service Data (USSD). USSD Gateway connector provides a messaging-based channel to convert USSD messages from MAP into HTML, for easier USSD application development. HPE TAS Messaging Gateway supports both ITU-T and Hybrid stack (ITU-T TCAP on ANSI SCCP). Both USSD request and notification messages are supported. It provides high availability with N+1 redundancy. The HPE TAS Messaging Gateway as an optional component of the DSP solution enables the following:
 - One-way, or two-way, communication with end users, as required
 - Avoid DSP SIM Updater flooding the customer SMSC with binary SMSs, by using SMPP feature of the TAS Messaging Gateway
 - Support of Long SMSs
 - USSD options allow users to communicate preferences
 - Fallback to customer SMSC can be configured, if the First Delivery Attempt via MAP fails
- Connectivity Management Platform—This HPE CMP implements a self-serviced and automated management of the IoT/M2M SIM subscriptions. It has capabilities to create and enforce differentiated subscription packages to meet the specific needs of M2M.



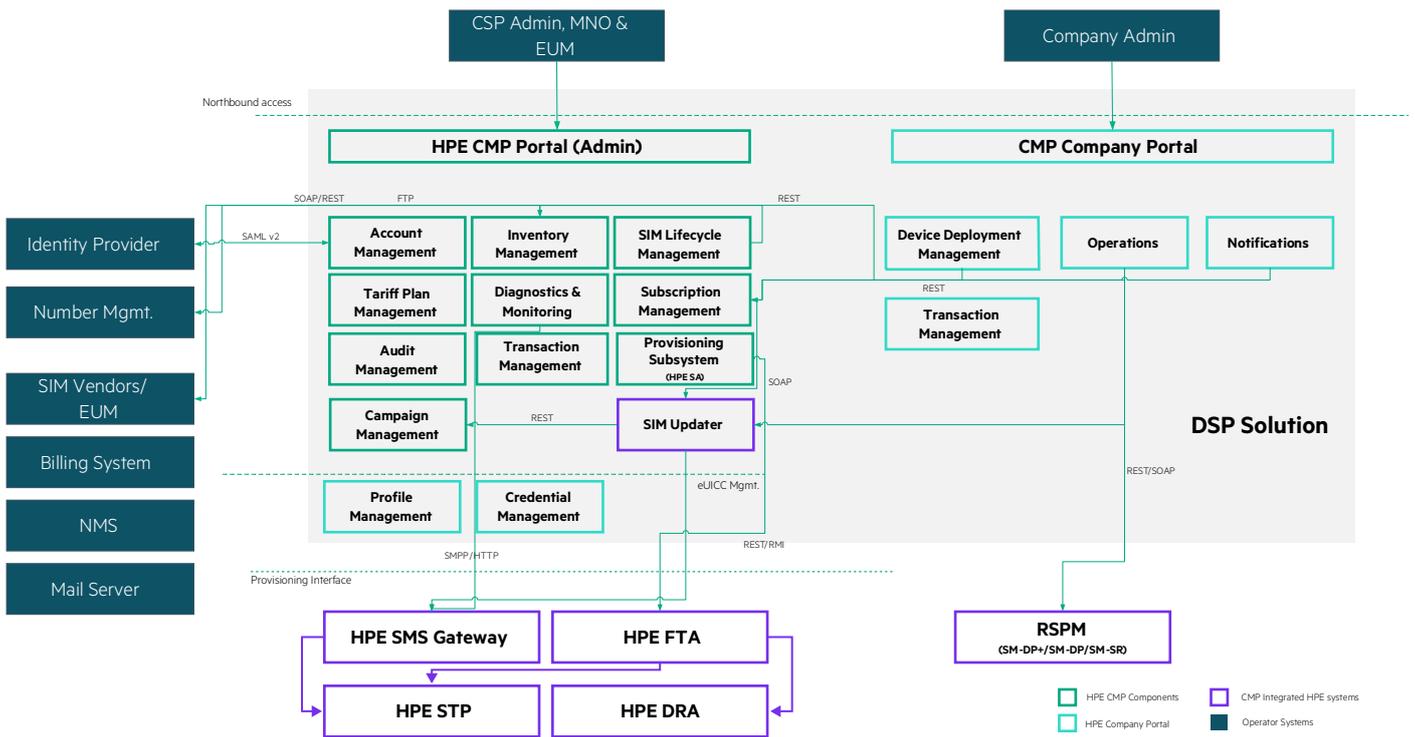


FIGURE 2. HPE Dynamic SIM Provisioning architecture

GAIN THESE FEATURES AND BENEFITS

Quick, easy implementation—Proven technology solutions and business processes deliver the necessary dynamic SIM provisioning functionality to quickly and easily achieve flexibility and unrestricted service activation. The HPE Dynamic SIM Provisioning framework leverages an existing and planned technology infrastructure to reduce overall investment and deployment effort, and increase ease of your SIM supply chain.

Proven components

- Hundreds of thousands of SIM cards are activated every day with HPE Dynamic SIM Provisioning.
- About 100 communication service providers have successfully deployed and trusted HPE SA to implement their fixed-line telephony and mobile telephony services.
- SIM Updater 3GPP 03.48 EF updates are validated against large SIM card products from leading vendors, many SIM card vendors.

Agnostic to network/SIM vendors—Our solution is based on standard, third-party products and is not bound to any SIM card or network equipment provider.





Adapted customer experience—This solution does not force the use of SIM applets to provide HPE Dynamic SIM Provisioning Solution or any hard-coded communication method. It's flexible enough to support user interaction based on SMS, USSD notify, USSD menus, portal, IVR, S@T, and SIM applets that are integrated into the workflows, based on cases and need for interaction.

Single vendor for hardware, software, and services—With Hewlett Packard Enterprise, you get a single vendor for hardware, software, and services to implement a cutting-edge DSP solution.

Future-proofing and road map—The HPE Dynamic SIM Provisioning Solution platform ensures you of future readiness of proposed solution components. eUICC profile lifecycle management is supported as an optional feature and GSMA interfaces towards eUICC profile subscription manager platform (SM-DP+, SM-DP and SM-SR) are available, including to the HPE Remote SIM Provisioning Manager (RSPM).

Risk reduced—With HPE professional services, your project risk is lowered and maintenance cost reduced.

RELY ON A PROVEN EXPERTISE

Since 2008, we've implemented HPE Dynamic SIM Provisioning products to CSPs around the world, based on standard and SIM-agnostic approaches.

We're uniquely positioned for dynamic SIM provisioning as a trusted system integrator for IT and network transformation, leveraging our rich portfolio of leading products:

- Service and subscriber provisioning, leveraging HPE SA
- Mobility management with HLR/HSS products
- Messaging gateways

Our solution is SIM card vendor agnostic:

- Works with any SIM card from any vendor
- Is based on network standards and does not necessary rely on a client application or applet
- Evolves without any impact on current and future SIM cards and supports an adaptive user interface:
 - Any type of user interaction scenario
 - SMS and USSD notify for simple allocation
 - USSD or S@T menus for number selection
 - SIM applets only for vanity number interaction
- Hewlett Packard Enterprise delivers a fully owned, end-to-end solution, without any impact on an existing product environment:
 - First Time Attach (for SIM detection and authentication)
 - DSP application, including a DSP Workflow Manager
 - Plug-in concept for the provisioning interface
 - Built-in number management database
 - HPE Telecom Application Service—Message Gateways, DSTK SIM applet, and S@T embedded support
 - Can support advanced OTA SIM Management use cases with the deployment of the SIM Updater optional component



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