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Ericsson Service-Aware Policy Controller (SAPC)

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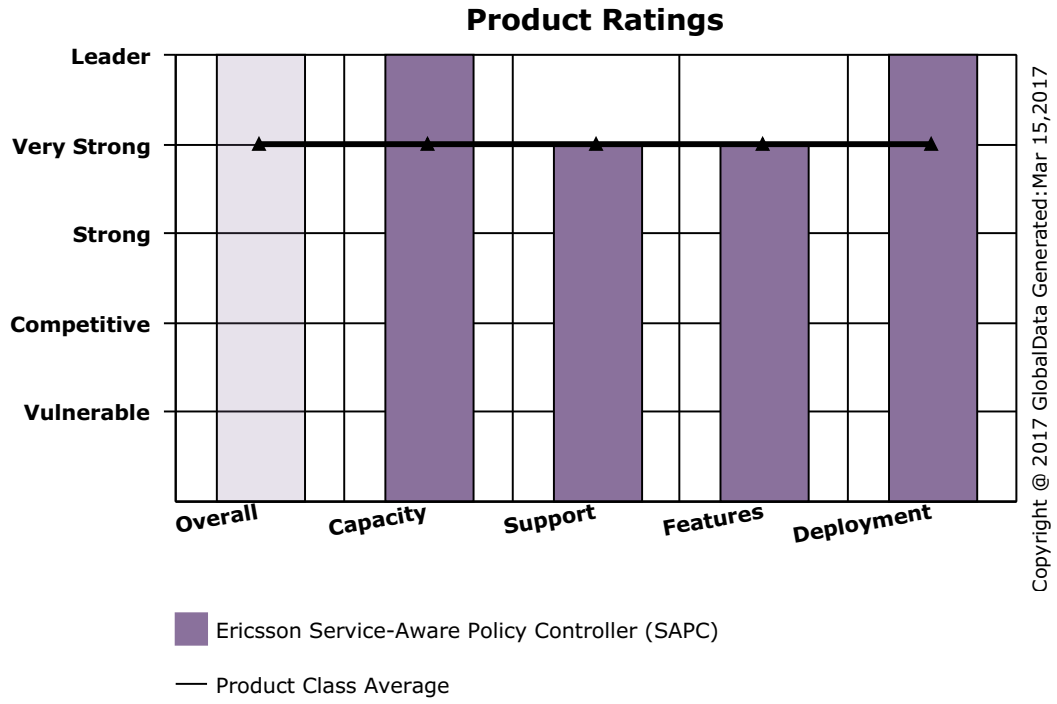
PRODUCT ASSESSMENT - POLICY CONTROL

SUMMARY



Competitive Strengths

• The SAPC leads the market in offering extensive network-wide policy control reach, enhanced to support carrier grade VoLTE/WiFi calling.

• Ericsson's SAPC stands out in delivering user experience benefits to operators in areas like user interface clarity, training-ease, real-time customer interactions, and management ease.

• Ericsson offers distinct automated SAPC software upgrades, delivering total cost of ownership (TCO) benefits and the ability to offer performance improvements and bug fixes efficiently.

• SAPC offering benefits from strong RAN, small cell/WiFi and backhaul integration options that ease interworking with the policy controller and extending mobile policies.

• SAPC offers triple geographic redundancy and high availability VoLTE implementation, addressing operator concerns regarding maintaining quality of service (QoS) for emerging VoLTE services.

• The SAPC's rich deployment history validates the product and enlarges Ericsson's capacity to capture a wider range of operator development priorities.

Competitive Weaknesses

• The SAPC's wide range of solution packages and deployment options, while generally desirable, could increase the complexity and length of sales engagements.

• SAPC must continue to evolve to meet growing operator demands for end-to-end (E2E) network apps such as 5G service management and SDN-based service chaining.

• Ericsson continues to rely on third-party platforms for analytics capabilities reducing its range of in-portfolio policy and analytics integration options.

• Ericsson does not participate in third-party performance testing enabling rivals with third-party validation to assert more objective scaling claims.

Current Perspective

LEADER

The Ericsson Service-Aware Policy Controller (SAPC) is a leader among compared policy control solutions. The SAPC is a key component of Ericsson's Service-Aware Charging and Control (SACC) solution within an offering that also includes deep packet inspection (DPI) capabilities and charging systems. Ericsson's SAPC includes extensive wireless access network and backhaul integration in addition to the company's own online charging system (OCS)/offline charging system (OFCS), policy control enforcement function (PCEF)/deep packet inspection (DPI) and subscriber data management (SDM) products. These capabilities provide the SAPC with an unparalleled IP network reach supported with strong 3GPP interface compliance and wide, although unnamed, third-party interoperability credentials. Ericsson continues to optimize its policy assets to provide high availability, carrier-grade end-to-end support for VoLTE services and NFV/cloud adoption. Over 170 customer engagements serve to validate Ericsson's technology, providing the company with deep experience and ongoing exposure to the evolving requirements of the policy control market.

However, Ericsson could prove vulnerable to extended sales cycles as operators investigate the SAPC solution packages and deployment options best suited to complex NFV and cloud implementations. Part of the challenge for operators is mastering the policy processes and internal organization needed to scale virtualized cloud-based services. The overall complexity of network and business complexity plays to Ericsson's strengths on the professional services side which could add cost and length to the policy control transformation process. Adopting and extending the deployment range of the SAPC platform can become increasingly predicated on operators mastering non-policy control technologies such as service and network orchestration solutions. Finally, while the company may well be in tune with actual market timing, the company had deferred the release of some 3GPP policy interfaces such as S9 and Sd trailing some rivals.

STRENGTHS AND WEAKNESSES

Strengths

• The reach of the Ericsson policy controller extends to nearly the whole IP network. The SAPC supports multiple northbound and southbound interfaces and strong NFV/cloud integration, focused across all components on maintaining customer QoS under maximum load situations. A strongly supported, network-wide policy solution is a key requirement of operators rolling out, for example, distributed mobile broadband, 5G/IoT, network slicing, enterprise applications, and carrier-grade VoLTE services (complete with public safety

Weaknesses

• The SAPC solution offers a wide range of solution packages, such as IoT, distributed mobile broadband, enterprise, and MVNO apps, and diverse deployment options, such as single VNF server, scalable VNF server, compact vEPC, vEPC-in-a-box, and vEPC-in-HDS options, which requires managing a variance of sales cycles. As operators grapple with diversifying the deployment range of their policy control assets, the increased complexity of some implementations (e.g., new enterprise verticals) can stretch the overall sales engagement.

and emergency call integration).

• The Ericsson SAPC excels in bolstering the operator user experience in areas such as user interface clarity, accelerating training cycles, improving real-time customer interactions, and management ease. The overall ease of use in adopting, upgrading, and applying the SAPC user interface gives Ericsson a clear differentiator as operators put increased business emphasis and investment in enabling their personnel to rapidly learn and work with policy control tools that reduce errors and streamline operations in complex hybrid network and digital transformation environments.

• The SAPC now delivers an automated upgrade process that helps reduce operator total cost of ownership (TCO) and improve update cycle efficiency, especially for top-tier operators with massive scalability requirements. This includes one-site upgrades that can be distributed automatically to other sites with similar upgrade needs.

• The Ericsson policy controller is strongly integrated with the company's extensively installed radio access network technologies, including tight links to underlying virtual evolved packet core (vEPC), virtual network function (VNF) server, radio access node (RAN) and backhaul equipment, as well as WiFi and other small cell technologies. The value-add of selecting a policy controller with deep and wide radio access integration addresses increasing operator demand for policy control approaches that streamline end-to-end adoption of virtualization and cloud technologies.

• Ericsson provides exceptional geographic PCRF redundancy. Supporting both internal SPR and front-ending to external databases, SAPC provides triple redundancy for static user profiles and dynamic user usage information, and Ericsson is also adding additional high availability for VoLTE/WiFi services. Vodafone's March 2016 selection of the Ericsson technology for delivering new cloud-based VoLTE and WiFi calling in the Netherlands validate Ericsson's capacity to combine commercial deployment of IMS and EPC with policy control to accelerate the launch of such new services.

• Ericsson offers prospective customers a strong record of customer engagement. The SAPC has a

• As operators scale their NFV and cloud implementations, adoption of the SAPC platform becomes increasingly dependent on the varying competence of each vendor to extend network and service orchestration to policy control processes. As a result, some SAPC environments may become hostage to operator orchestration adoption challenges that slow policy transformation efforts.

• SAPC does not include an adjunct policy analytics engine. While the company has provided a commercial event-based monitoring (EBM) interface for use with third-party analytics platforms, competing offerings from most major telecommunications suppliers and IT-based players provide an integrated solution, with dashboards and the ability to simulate or take action as a result of derived insights.

• Ericsson does not disclose performance information or participate in independent third party laboratory testing. The company argues that a lack of commonality across performance calculations raises the possibility of inaccuracies. Instead, Ericsson provides its own in-depth performance information to customers only. While performance validation will become less important as policy control moves to elastic environments, non-disclosure of performance information still creates an opportunity for competitors to exploit.

rich deployment history, including more than 170 customers (e.g., Swisscom, XL Axiata, and STC KSA announced at MWC16), serving not only to validate the technology, but also providing Ericsson with valuable feedback that can only be collected through live deployments. By consistently adding new customers and driving new services such as VoLTE and VoWiFi, including early market endorsements from Cable & Wireless and Vodafone Czech Republic, Ericsson is in a strongly competitive position when measured against rivals with fewer reference accounts.

Metrics

PRODUCT CONFIGURATION & CAPACITY

Rating	Leader
Product/Series Name/Release	Ericsson Service Aware Policy Controller (Releases 17A, 17B)
Hardware Platform	Hardware (HW) options supported for the SAPC application are COTS IT (Server and/or Blade) and Ericsson Blade System (EBS). The EBS utilizes a x86 architecture with optimized LINUX operating System. EBS hosts GEP (Generic Ericsson Processing) blades that the SAPC application uses for all its core policy functions. SAPC application runs as Virtulaized Network Function (VNF) on EBS and COTS-IT HW.* Commercial systems are deployed on COTS-IT HW for Fixed Broadband (BB) Policy since end of 2013. * Test Labs and Trial systems on COTS-IT HW for Mobile BB Policy are being deployed since Q2-2014 for customers moving to Cloud.
Maximum TPS for Single System	Information not provided. PCRF Performance figures are highy dependant of use case deployment and integration environment. Ericsson provides its customers with indepth TPS dimensioning/performance information upon request. For NFV/Cloud deployments: Elastic scalability on COTS and EBS HW.
Third-Party Performance Validation	On per release basis, Ericsson does its own SAPC scalability and performance validation covering more than 8 different traffic mix and policy uses case configuration scenarios.

Geographic Redundancy Support	Depending of the deployment model, SAPC supports the following geographic redundancy schemas • With Internal SPR , a (1+1) Hot-Standby IP Geo Redundancy is available , providing redundancy for user-static-profile and user-usage information. The solution was enhanced in Q4 2013 with full redundancy of [Gx/Rx/Sy] Session related information, allowing HA-PCRF-schemas for VoLTE services and OCS integration. New functions for session-synchronization and clean up procedures have been added. • As a Front-End towards a external database, a (N-Active + 1-StandBy) Geographic Redundancy is available. A triple redundancy schema (1+1+1) for static user-profile and dynamic user-usage information is fully integrated and verified with the Ericsson UDC solution. Collision detection mechanisms when accessing/updating user data in Centralized User DB from multiple front-ends have been introduced. • Full (Gx/Rx/Sy) Session Redundancy for Hot-Standby (1+1) IP Geo Redundancy is market available and being integrated within VoLTE and Mobile BB customer solution contexts.
Related Components from the Same Vendor	SAPC has been end-to-end (E2E) integrated and verified with a large amount of Ericsson solution components. The following list includes Ericsson products that SAPC is pre-integrated with: 3GPP/LTE Packet Gateways: GGSN/CPG/EPG; Ericsson SGSN-MME; 3GPP2 Packet Gateways: cdma2k PDSN; TDF (SASN); Multi-Service Proxy (MSP); Fixed-BB BNG; WiFi GW ; IMS Solution (P-CSCF); BSS Products (Ericsson Charging Systems, Ericsson Product Catalogue Manager, Ericsson Revenue Manager); UDC products (CUDB and AAA Server); Ericsson/Akamai Mobile Cloud Accelerator; OSS-RC/ENIQ and ENM; Analytics System (EEA); Activation (EMA); SDN (Services SDN). Through these integrations , SAPC has becomes a fundamental part of a large set of Ericsson solutions such as : Service Aware Charging and Control , Virtual EPC, Fixed Broadband Policy Control, Integrated Policy&Charging, VoLTE&VoWiFi, SDN Service Chaining, Dynamic Experience Management, Full BSS transformation (incl. Product Catalogue

	integration)

STANDARDS & INTERFACE SUPPORT

Rating	Very Strong
Compliance with 3GPP	R11 supported in all policy interfaces. Full market available.R12 partly implemented and market availble in 2016.R13 planned for 2017 release.
Support for Diameter Routing Agent	SAPC Supports 3GPP DRA feature for Gx interface.Ericsson DRA product (called Diameter Signalling Controller) is released and integrated and verified with SAPC/PCRF interfaces.
Support for Gx interface	Support of 3GPP Gx up to R11 and parts of R12. SAPC provides a "Flexible Gx-protocol" feature to integrate any Gx vendor-specific implementation, as well as specific additions (Gx+) for value added functionality for interworking with Ericsson EPG and SASN. Ericsson has done a number of Gx-IOT's with 3PP PCEF nodes: Packet GW, Standalone DPI and specialized proxies enabled with Gx i/f capabilities.
Support for Subscriber Profile Repository	SAPC supports: Embedded SPR, Single External SPR, Multiple External SPR, Combined (embedded and external SPRs). SAPC to External SDM Interworking can be based on SQL, LDAP and SOAP technologies. When deployed with Ericsson Charging System or with Ericsson Revenue Manager, SAPC uses the BSS/Charging User Profile Repository as an external SPR (no need for embedded SPR), as well as to all types of User Charging Status attributes. When deployed with Ericsson CUDB, SAPC can use it as an external databased, following the data consolidation strategy leveraged by network DB nodes like HLR, HSS or AAA. Solution enhanced with Ericsson UDC with the addition of Collision Detection mechanisms and (1+1+1) High Availability SPR redundancy schema in Ericsson CUDB.
Support for Northbound Interfaces into BSS	REST API for Policy and Subscriber Provissioning. Flexible Log files (SFTP) and highly configurable SOAP/XML Framework for notifications of "user policy events" to Customer Care Dashboard and other Business Intelligence Systems (like historical and analytics system).

	SOAP/XML operations for provisioning, profile management and web-login methods used from Customer Care, Self Care and Captive Portals. WebServices for PCC Capability Exposure to ease integration with web-based applications. LDAP/SQL/SOAP with External SPR, and Provisioning Gateways . SFTP, and SNMP for Performance Management, Fault Management and Log Management with OSS. DIAMETER/Sy and LDAP/WebServices with OCS nodes. SMPP and SNMP for SMS and e-mail notifications.
Support for PCRF Roaming	Roadmap for VoLTE Roaming based on PCRF S9 interface is aligned with SAPC VoLTE leading customers. Support for HR-LBO solution for VoLTE Roaming is available.
Support for PCRF to Online Charging System (OCS) Communication	Available since 2012 based on a pre-3GPP-Sy implementation, and with 3GPP Sy R11 compliancy since 2013. To date, Ericsson has carried out more than 40 Sy integration projects worldwide, covering integration with Ericsson Charging Systems and 3PP OCS vendors.
Support for Traffic Detection Function (TDF) in DPI or Other Media Devices	Market requirements for Sd interface closely monitored. Alternative options already commercially deployed covering customer needs for TDF. The 3GPP Sd interface planned for 2017.
Support for PCRF to IMS AF Communication	Available since 2010. Commercially deployed in some operators for advanced E2E QoS differentiation for OTT services, VoLTE/VoWiFi and Public Safety-LTE solutions.
Support for WiFi Access Control	Available for trials and PoCs. Used by some T1 operators to explore the ANDSF policy capabilities, including HS 2.0, RAN and Wifi QoS analytics reports and PCC integration (PCRF and SPR). Demo labs set-up in combination with Ericsson Radio Real-Time Traffic Steering functions. Commercial availability based on customer interest and terminal support. Policy-on-the-Device solutions (including access steering use cases) based on Entintlement Servers and aligned with lead UE vendors planned for 2017.
Support for CMTS QoS Control	Future release

FEATURE SUPPORT

Rating	Very Strong
Service Plan Support	SAPC is based on a flexible policy engine that operators can program independently to apply to a wide variety of use cases without requiring Ericsson support, and with capacity and stability that can-allow the support of commercial deployments with more than 1000 product-plans variants offered simultaneously. Examples of use cases that have been deployed commercially by our customers include Fair usage (with throttling, dynamic traffic prioritization via e2eQoS control), Tiered usage plans providing transparency and notifications to end-users, Bill shock prevention (with or without Sy), Application-based passes: Time-based and volume-based service plans, quota rollovers, Family Bundles (distributing quotas across multiple users of same family), Multi-SIM, Multi-Device Plans (shared quota across multiple accesses and devices), Multiple-PDP Ctx. with shared quotas, Mobile and WiFi-Integrated. Convergence and bundling, Tethering and VoIP detection, Content filtering and parental control, Turbo button, OTT and Walled-Garden services traffic acceleration optimization, Video Optimization, Cross services (Voice, Messaging, data) and promotions, Analytics and loyalty, Access Network Selection policies for multi-access WiFi and Mobile (ie: ANDSF, in trial phase), Data Roaming Network Selection partner (country-specific data passes), Device-based data offers for service bundles, white/black list and QoS device-based promotions, Google Free Zone, PCC capability exposure: QoS-Web Services policy i/f with OTT (Trial phase), VoLTE service offers: Basic, SRVCC, Emergency and Priority Services, including regulatory functions such as NetLoC.
Operator Service Plan Creation	Supported via policy creation GUI, that evolves into business-oriented GUI that is commercially available incorporating the latest graphic technology and targeted at improving time-to-market intervals. RESTFul API available for policy template parameterization in BSS/Product Catalog Managers and orchestration of virtualized SAPC instances from Cloud Management and Orchestration Systems
Mobile Device Policy Enforcement Support	Support for on device ANDSF policy enforcement with own Ericsson ANDSF Client

	(PoC purpose only), 3rd Party ANDSF SW Client providers. New solution for policy to the device called MASC (Modem Assisted Service Control) launched. Policy on the device based on Entintlement Servers planned for 2017 based on customer interests.
Access Agnostic Policy Support	SAPC supports protocols and interfaces for multiple deployed traffic PCEF's for same packet flow that are deployed across multiple access types: xDSL, WiFi, GPRS, UTRAN, LTE/EPC, cdma2k, FTTx, WiMax. Subscriptions types can be access-specific and/or converged. The policy actions can be coordinated across all access types, enabling advanced and innovative traffic management schemas, for example: shared quotas across multiple access or content-filtering policies. SAPC can manage Multiple Gx and Master-Slave PCEF configurations. Solutions are updated with the support of multi access Subscriber Aware SDN Service Chaining.
RAN Congestion Management	Via OSS-RC using cell congestion statistic files maps. New interfaces for WiFi and Radio Access Network QoS Analytics. New set of Mobility Based Policies announced and deployed with MME and RAN used to manage users' QoE in the context of real-time RAN Congestion management.
Interoperability Partners for PCEF/DPI	SAPC has been integrated and deployed toward a variety of multi-vendor, multi-access PCEF traffic nodes. Through ad-hoc IOT's activities and Customer integration projects, SAPC has integrated the support of vendor specific proprietary PCEF Radius and Diameter attributes. Multivendor verification references, made as part of deployment projects are not publicly disclosed by Ericsson.
Interoperability Partners for OCS/OFCS Charging	With 3rd Party OCS nodes, SAPC is live deployed using LDAP, WebServices and 3GPP Sy as protocols used for integration purposes. With Ericsson Charging Systems SAPC is integrated using a 3GPP Sy DIAMETER compliant version that includes Ericsson AVP's extensions. Multi-vendor verification of commercially available 3GPP Sy-interface is done with third party OCS vendors.
Customer Notification	Notifications can be policed, scheduled and sent

	to multiple destinations (like end-user addresses, customer care addresses, other BSS/OSS nodes). Notifications can be dispatched over SMS, email, and SOAP. Additionally, SAPC can arm/disarm the enforcement of systematic and one-time traffic-redirections in PCEF nodes capable of applying them.
Customer Service Plan Modification	Business Studio tool for service plan configuration, versioning and modification. Product Catalogue driven service plan configuration based on product offer templates. Self and Customer Care integration interfaces over LDAP and WebServices. High levels of service personalization (parental controls, Internet access timebands, shared quotas, bill shock alerts, roaming partner selection, etc.) via mechanisms such as Self-Care portals or USSD have been introduced commercially for SAPC customers. Additionally, in the context of the Ericsson Integrated Policy and Charging solution, integrated multiscreen self-care through the Ericsson MSDP platform can be used for personalization.
Sessions State Support	The (Gx/Sy/Rx) information state is maintained and coordinated with peers.
Location of Usage Tracking, Balance	In SAPC: via Gx+ or Gx from R9 onwards, In OCS : via Gy/Sy, Combined SAPC and OCS, In external SPR. For shared data offers a new set of individual and shared TrafficDataVolume accumulators and limits have been added alongside specific policy for flexible volume tracking based on conditions.
Analytics Support	Real time UE trace capabilities added for analytics and troubleshooting purposes. Event Based Monitoring (EBM) interface is commercially available and allows for a flexible configuration capability to stream out subscriber information that matches policy-related events and conditions as per Gx, Rx and Sy events.Radio Access Network QoS Analytics interface added for ANDSF, Mobility Based Policies, and SDN solutions in 2014.

DEPLOYMENT HISTORY

Rating	Leader
First Availability	2007

First 3GPP Release Supported	3GPP Pre Release 7
Live Deployments	More than 170 commercial deployments. More than 500 live deployed nodes (including NFV live deployments and new customer segments).
Fixed/Mobile/Converged Deployment Ratio	More than 170 customers, of which 90% are mobile-only. The remaining 10% are fixed-only or converged deployments.
Pre-IMS/IMS Deployment Ratio	Planned [(IMS) AND (non-IMS)]-live PCRF customers in 2014: 9 (+ 5 more in trial phase). 2014 Ratio would be approx: 10%.End Q3-2014: 3 commercial SAPC VoLTE customers for HD Voice Services
Top Public Customer References	China Mobile (China), SoftBank Mobile (Japan), Telstra (Australia, PNF & VNF), VHA (Australia), Swisscom (Switzerland, VNF), STC (KSA), Singtel (Singapore), Orange (Spain)
Largest Live Deployment	Network sizes range from 100K IP-Session to > 25 Million concurrent IP-Sessions. Largest network operators operated by SAPC are located in East Asia, Australia, South-East Asia and Latin-America.

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