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Interface Practices Subcommittee

SCTE STANDARD

SCTE 273-3 2021

Generic Access Platform Systems Integrator Best Practices

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Document Types and Tags

Document Type: Operational Practice

Document Tags:

☐ Test or Measurement	☐ Checklist	☐ Facility
☐ Architecture or Framework	☐ Metric	☒ Access Network
☒ Procedure, Process or Method	☐ Cloud	☐ Customer Premises

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1. Introduction

1.1. Executive Summary

This document is written in conjunction with the other Generic Access Platform (GAP) specifications and details the requirements placed on systems integrators tasked with performing functions such as design, installation, testing and deployment of a GAP system. Extended interoperability testing and validation is supported through the Systems Integrator role and related SCTE best practices documentation.

1.2. Scope

This document outlines the roles and responsibilities necessary to ensure interoperability of components installed within the GAP node housing when sourced from multiple vendors or for varied use-cases. It defines roles that may be performed by the operator or delegated to suppliers to ensure compliance with the SCTE GAP specifications and other regulatory requirements and ensure consistent operations of multi-vendor component parts.

1.3. Benefits

The GAP specifications provide interoperability definitions enabling a GAP system, often consisting of multi-vendor components, to be flexibly deployed in the outside plant for dynamic and varied use cases.

1.4. Intended Audience

This document is written for operators and suppliers who are designing and deploying systems to comply with the SCTE GAP specifications.

1.5. Areas for Further Investigation or to be Added in Future Versions

Future revisions could include additional functional scopes such as consulting, solution development, maintenance and support, and system upgrades.

2. Normative References

The following documents contain provisions which, through reference in this text, constitute provisions of this document. The editions indicated were valid at the time of subcommittee approval. All documents are subject to revision and, while parties to any agreement based on this document are encouraged to investigate the possibility of applying the most recent editions of the documents listed below, they are reminded that newer editions of those documents might not be compatible with the referenced version.

2.1. SCTE References

[SCTE 273-1] SCTE 273-1 2021, Generic Access Platform Enclosure Specification

[SCTE 273-2] SCTE 273-2 2021, Generic Access Platform Modules Specification

2.2. Standards from Other Organizations

No normative references are applicable.

2.3. Other Published Materials

No normative references are applicable.

3. Informative References

The following documents might provide valuable information to the reader but are not required when complying with this document.

3.1. SCTE References

No informative references are applicable.

3.2. Standards from Other Organizations

No informative references are applicable.

3.3. Other Published Materials

[GAP] The GAP, Ed Dylag, July 21st, 2021, SCTE Broadband Library
https://broadbandlibrary.com/the-gap/

4. Compliance Notation

shall	This word or the adjective "***required***" means that the item is an absolute requirement of this document.
shall not	This phrase means that the item is an absolute prohibition of this document.
forbidden	This word means the value specified ***shall*** never be used.
should	This word or the adjective "*recommended*" means that there *may* exist valid reasons in particular circumstances to ignore this item, but the full implications *should* be understood and the case carefully weighed before choosing a different course.
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may	This word or the adjective "*optional*" indicate a course of action permissible within the limits of the document.
deprecated	Use is permissible for legacy purposes only. Deprecated features *may* be removed from future versions of this document. Implementations *should* avoid use of deprecated features.

5. Abbreviations and Definitions

5.1. Abbreviations

5G	fifth generation
CBRS	Citizens Broadband Radio Service
CU/DU	central unit/distributed unit
FCC	Federal Communications Commission

GAP	Generic Access Platform
HFC	hybrid fiber coaxial
IP	Internet protocol
PHY	physical layer
PSU	power supply unit
RF	radio frequency
RFI/RFP	request for information/request for proposal
R-PHY	remote PHY
SI	Systems Integrator
SNMP	Simple Network Management Protocol
UL	Underwriters Laboratory

5.2. Definitions

Definitions of terms used in this document are provided in this section. Defined terms that have specific meanings are capitalized. When the capitalized term is used in this document, the term has the specific meaning as defined in this section.

Regulatory Requirement	A rule that a government entity imposes upon an organization
Systems Integrator	An entity performing one or more roles described in this document

6. Systems Integrator

6.1. Definition

The scope of the Generic Access Platform is to define a mechanical housing that provides physical support for electrical and mechanical components, and protection from the outside world for those internal components. The enclosure standard [SCTE 273-1] defines sufficient mechanical and electrical details such that it can be similarly constructed by housing manufacturers. The modules standard [SCTE 273-2] defines the requirements for interoperable modules that can be installed into the GAP Enclosure. The Systems Integrator *should* read and understand the requirements of both standards [SCTE 273-1] and [SCTE 273-2]. Traditionally the design, manufacture, validation and warranty of an outdoor system was the responsibility of the manufacturer of that system, who had end-to-end control of the individual components selected. Since the GAP standard allows manufacturers to make either all or a portion of the components of a system (i.e. housing, power supply, backplane, service modules, etc.) and since the potential exists for the inclusion of systems from multiple manufactures it is necessary for a Systems Integrator (SI) to design, assemble and validate solutions for deployment. The Systems Integrator is responsible for ensuring multi-vendor systems operate as intended, ensuring regulatory requirements are met and ensuring operator specific requirements are met so the solution operates as intended when deployed. This document defines the areas of responsibility and provides best practices to ensure successful deployments. An operator may elect to perform some or all these functions or they may source some or all these out to one or more third parties to minimize resource requirements.

Traditionally, the Systems Integrator role was performed by the manufacturer building a system for deployment in the broadband network such as an HFC node, amplifier or wireless radio. The manufacturer was solely responsible for designing, sourcing, manufacturing and final production for components such as enclosures, power supplies and service delivery components that might have come from that manufacturer or from their own third-party suppliers. This supply chain simplicity meant that the ownership of delivering the final end design to support the system operator's service use case(s) fell upon a single entity. Since GAP defines a standard enclosure, PSU, backplanes, and service/compute modules, it is likely that these components will come from different vendors in the future. This means the

operator will need to decide how much of the full systems integration they will need to take on themselves or how much they will want to offload to third parties. This document is intended to serve as a guideline list of the individual roles that make up the Systems Integrator responsibility, so the operator can understand the requirements of each and make more informed judgements.

6.2. Roles

This section contains descriptions of and requirements upon the various roles that make up the complete Systems Integrator role.

6.2.1. Multivendor design

Since a GAP deployment might contain multiple service delivery system components from multiple manufacturers, the Systems Integrator will need to be able to design solutions to ensure reliable and consistent operations. The Systems Integrator *should* be responsible for obtaining requirements concerning the services delivered (i.e. R-PHY, 5G, remote compute, etc.) and then providing a design for approval by the operator. This design *should* ensure that individual vendor components selected interoperate in a consistent and predictable manner to deliver the services as defined by the operator.

For instance, an operator might desire to deploy a GAP node that contains a cable modem module for transport, a CBRS small cell module for fixed wireless or mobility and a compute module to run the CU/DU functions for the 5G radio. For the multivendor design role, the SI will likely be tasked with obtaining the functional requirements from the operator and recommending the appropriate vendors to deliver the component functionality. This could include leading RFI/RFP activities, vendor selection and then delivering a final system design document to the system operator.

6.2.2. Component integration

Once a design is finalized and documented, the Systems Integrator *should* be responsible or integrating all of the components to ensure a functioning solution. The Systems Integrator should ensure that all communications paths function as intended, that there are no software or hardware incompatibilities and that the individual components interoperate and function as a whole system as defined in the system design.

Extending the example in section 6.2.1, once the design is complete, the SI component integration role is responsible for ensuring that the selected components are integrated and perform the intended function. For the edge radio example, this includes ensuring all modules function as intended for the final use case, interoperate, and do not interfere with each other in fit, power consumption or thermal output.

6.2.3. Regulatory validation

The Systems Integrator ***shall*** ensure that all Regulatory Requirements relative to the region where the system will be deployed are met. This includes testing the solution as a whole system if necessary and ensuring that certification of the entire solution is completed as required by regional and local authorities who have jurisdiction over the region where the solution is deployed. In addition, the Systems Integrator *may* be required to perform additional regulatory testing and certification as defined by the operator in the system design.

Since regulatory requirements will be determined by specific use cases (RF *may* require FCC, but other uses *may* only require UL), the location where the GAP system will be deployed, and by the system operator's defined requirements, the SI regulatory validation role ***shall*** work with the operator to ensure

all Regulatory Requirements are documented and confirm that all necessary regulatory testing and certification is completed

6.2.4. Multi supplier sourcing and management

Another role for the Systems Integrator *may* be vendor management and sourcing of individual components on behalf the operator. Since the potential exists for the final solution to include components from multiple vendors who potentially do not have a preexisting relationship with each other, the Systems Integrator *may* be requested to act as a single sourcing point on behalf of the operator to mitigate the need for the operator to source components individually and reship them back out for the integration and assembly process.

It is highly likely that GAP systems will contain components from disparate vendors. The SI multi supplier sourcing and management role is responsible for managing the supply chain for these components so that they can be sent to final assembly. It is important to note that this role *may* just be for initial delivery of a defined amount of systems or as part of a longer-lived program. Accordingly, the multi supplier sourcing and management role *may* need to work with suppliers to note any changes to components (e.g. a PSU module goes end of life or changes in specification) and work with the operator to determine if these changes need to be communicated to the upstream roles for design modification, retesting, etc. The operator *may* elect to outsource supply chain management and to a third party to manage or *may* elect to maintain those relationships themselves

6.2.5. System assembly, provisioning and testing

Once an operator has defined a solution design, it will have to be assembled from its disparate modular components. The process will require the Systems Integrator to ensure proper fit of components. This includes installation and assembly according to best practices along with any necessary module provisioning and validation to ensure that the completed system functions as defined by the operator.

At the final assembly stage of the process, the SI system assembly, provisioning and testing role *should* ensure the final GAP system is properly assembled in compliance with the design. This includes ensuring individual components such as power supplies, backplanes and service modules are properly installed and secured and any system security seals are applied. This role *may* also be responsible for performing any necessary system provisioning and/or final testing as defined in the design specification so that a final working assembly is ready for field deployment.

6.2.6. Asset management

Since all modules in a GAP system are required to have inventory information that is accessible by the system, it is critical that the final assembly have complete documentation of the modules that comprise it. The Systems Integrator *should* be responsible for properly documenting the inventory of assets installed including information such as module manufacturer, country of origin, MAC address(es), IP addresses if provisioned, SNMP community strings, and authentication information if applicable, along with the module serial number. This information *should* be provided to the operator in a format as defined in the system design.

Since the fully assembled system could contain multiple components with asset and inventory information described above, the SI asset management role will ensure that the proper detailed documentation as required by the operator is delivered for each GAP system

6.2.7. Warranty and system liability

Warranty and system liability for not only the individual modules, but for the entire finished system will need to be fully agreed to and documented. An operator *may* elect to take on some of this responsibility and liability themselves or *may* select a one or more Systems Integrators to fulfill these roles and responsibilities. It is therefore a critical that these be agreed to, fully documented and well understood to prevent downstream conflicts regarding the warranty of the components and system and/or liability for any legal claims that may arise.

As described in section 6.2.4, the operator *may* elect to source individual components such as power supplies, backplanes and modules directly themselves and manage the vendor relationship or they *may* have a Systems Integrator perform the sourcing role. Accordingly, the operator *may* elect to maintain warranties on individual components themselves or contract with an SI to provide a warranty for the entire GAP solution. Additionally, since the components may arrive at different times for assembly phase, it *should* be clearly stated as to when the warranty starts and stops, potentially at a component or complete system level depending on the expectations of the operator. The critical path here is that warranty agreements need to be documented and understood by all the previous roles so that unnecessary liability conflicts do not arise

6.2.8. Direct to site shipment

An operator *may* elect to have either complete or finished systems shipped to a central depot or direct to the end site for installation. If requested, the Systems Integrator *may* be responsible to ensure that proper shipping and logistics processes are followed to ensure secure, complete, on-time arrival of functioning components or full systems.

Some operators maintain their own warehousing and depot location(s). Some operators have material shipped direct to site for installation. The SI direct to site shipment role may be required to gather finished GAP systems from the above roles and ensure they are sent to the appropriate location for final installation.