

THE ADVANCED IMPLEMENTATION OF THE IETF PCE PROTOCOL



PCE Architecture has been designed to reduce network resource consumption while improving scalability through inter-domain and controlling distributed path computation.

PRODUCT TARGET

As MPLS and GMPLS are now largely deployed, new technical solutions are required as carriers face limits in optimizing and managing these larger scale automated networks. Some of these challenges include:

- Sub-optimal Inter-Domain End-to-End paths since the ASON architecture implies a per domain control and opaque interfaces through different domains;
- (G)MPLS networks re-optimization as successive setups and releases of Label Switch Path can fragment the transport network resources;
- Limited Network topology visibility due to Inter-Carrier confidentiality issues and presence of non GMPLS legacy equipment in core domain;
- Path Computation performed by Network Elements themselves that requires CPU resources inside the NE that can limit the availability for adaptive functions between layers which discriminate MSPP equipment;
- Inter-layer path computation in a multilayer transport plane which requires complex path computation algorithms that cannot run online in the Network element itself.

Using a remote Path Computation Element in charge of remotely computing E2E path inside an MPLS/GMPLS network is the key to meet these new challenges:

- The PCE server can combine Traffic Engineering information from multiples

sources as different layer control planes or management plane for additional TE objects that does not scale in IGP (e.g. Lambda info in WSON network).

- Dedicated server with powerful CPU can perform highly complex path computation to optimize Network Resource Usage. e.g. inter-layer path computation, Global re-optimization of the network....
- Inter domain optimal path computation can be solved by the PCE cooperation as detailed in the figure below: Every PCE server from each domain exchange path information to build an E2E optimal path.

Equipment vendors are thus facing a major issue to quickly develop the new PCE protocol from IETF Standard Development Organization to achieve this new challenge.

The PCE Protocol is mature enough now to build solution on top: Using a third party offer will solve your interoperability concerns and give you time to focus on your differentiating features.

KEY BENEFITS

Marben Products introduces the first commercial implementation of PCE. Interoperability testing has solidified MARBEN™ PCE Solution

The solution is based on our large experience on protocols stack: PCE is another productive tool of the MARBEN™ MPLS/GMPLS suite which can be added to your ongoing stack or operate as a standalone solution.

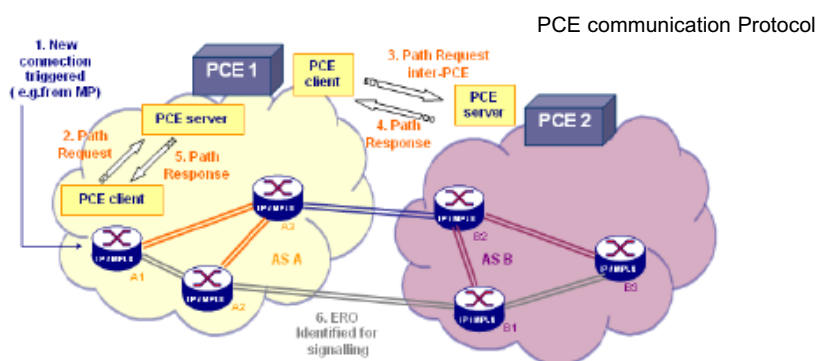
About Marben Products

Since the 1980's, Marben Products has been supplying portable software solutions that meet standards from the most established telecommunication standardization bodies. Marben Products is recognized as a leading provider of standards based protocol software for Service Providers, Equipment Manufacturers and Software Development Companies.

Marben Products delivers highly robust and efficient signalling, routing and AAA solutions for the network control plane of Next Generation Networks (NGN) and the service control plane of IP Multimedia Subsystem (IMS).

Telecom players such as: ADC, Adtran, Alcatel-Lucent, Amdocs, Ciena, Cisco, Ericsson, Fujitsu, HP, Motorola, Nortel, Oracle, Siemens Communications, Sprint Nextel, Tellabs, Telesciences have been trusting MARBEN™ Products for its high quality performance products, expertise and industry leading support.

Marben Products is an affiliate of NE Technologies, Inc.



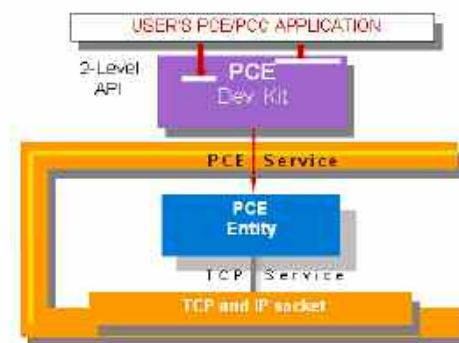
PCE communication Protocol

MARBEN™ PCE as an additional feature may interact with the MARBEN GMPLS controllers for Traffic engineering capability for far easier to integrate and faster PCE builds.

MARBEN™ PCE resides on both client side and server side offering two-level API as a trade-off between flexibility and simplicity.

TECHNICAL OVERVIEW

MARBEN™ PCE implementation is based on two separate parts which allow a clear separation of real time and management functions:



MARBEN™ PCE Architecture

MARBEN™ PCE entity inside the MARBEN stack offers the following features:

- managing PCEP sessions (FSM, negotiation phase, keep alive mechanism);
- encoding/decoding the PCEP messages;
- SVEC management;
- offering user trace facilities on the decoded messages.

The PCE entity runs inside the stack as an independent process or task while the MARBEN™ PCE DevKit is basically a library to be linked to the PCE/PCC application.

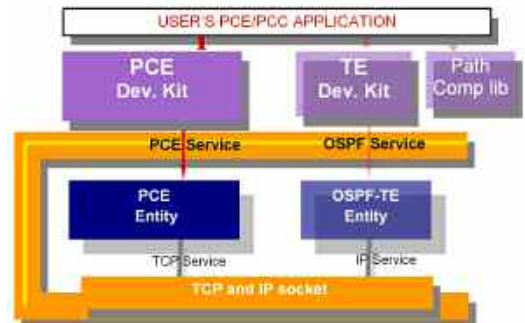
The PCE DevKit offers a C Application Programming Interface for:

- opening/closing PCEP sessions;
- building PathRequests/Replies;
- managing the set of objects as bandwidth, LSP attributes, metric load balancing stored in the transient db;
- Offering a higher interface with pre-built messages.

This PCE solution is either a C source code delivery or binary deliver at your convenience, fully portable and thread safe.

This implementation can run with the combination of MARBEN™ Traffic Engineering offer for interaction with the

control plane and Path computation libraries including Node Disjoint and Link Diverse Path computation algorithm.



MARBEN™ PCE combined with MARBEN™ TE

The path computation library can also be provided by Aria Networks as Marben Products and Aria Network partner for online planning tools and global concurrent manager tools.

CONFORMANCE

MARBEN™ PCE stack is conformant to the following RFCs::

Available

RFC4655: A Path Computation Element Based Architecture

Draft - PCE Communication Protocol V1 v9

RFC4657: PCE Communication Protocol generic requirements

Next release

Draft - Extensions to the PCEP for Route Exclusions v2

Draft - Encoding of Objective Functions in PCEP

Draft - PCEP Requirements and Protocol Extensions In Support of Global Concurrent Optimization v1

Ongoing evaluation

RFC4674: PCE discovery requirements

Draft - PCE discovery based on IGP (i.e. IS-IS/OSPF)

Draft - PCE inter domain requirements v3

Draft - PCE inter-layer framework v4

Draft - PCE inter-layer requirements v5.

RELATED PRODUCTS

MARBEN™ GMPLS Suite

MARBEN™ GMPLS Emulator

MARBEN™ Diameter

Consulting, Training, Custom services

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