



OPEN
Compute Project

TIME APPLIANCE PROJECT (TAP) PROJECT CHARTER

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Revision History

Revision	Date	Name	Description
0.1	March-26, 2021	Elad Wind	Document Created
0.2	March-30, 2021	Ahmad Byagowi	Update various paragraphs and clarify certain points
0.3	April-1, 2021	Elad Wind	Security added to project scope

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OCP Time Appliances Project (TAP) Vision

Build a special interest group (community) around the topic, precision time sync in data centers. The community will share knowledge, discuss related topics, create specifications and reference designs for Data Center Timing appliances and share them as open source contributions.

TAP Overview

Precision time sync in a distributed system, such as a data center or Edge/POP, can boost the performance and efficiency of applications by reducing necessary delays and minimizing hand shaking communications.

As such, several vertical industries have already embraced the need for high-accuracy and reliable distribution and synchronization of time across packet networks.

TAP will focus on time distribution and synchronization specifications, appliances, components, and the compatibility across the OCP ecosystem, required for time-sensitive data center applications

TAP will enable Data Centers and Service Providers, as well as subsystems, software, board and component suppliers to transition from existing proprietary solutions to modern OCP solutions which are open, secured and viable.

Several organizations have developed specifications that relate to high accuracy, reliable time distribution and synchronization over packet networks: IEEE, IEC, ITU-T, IETF, etc.

TAP will expand on the wealth of information from the industry and apply it in the context of DC time-sensitive applications and network infrastructure.

Successful projects delivered by TAP will offer:

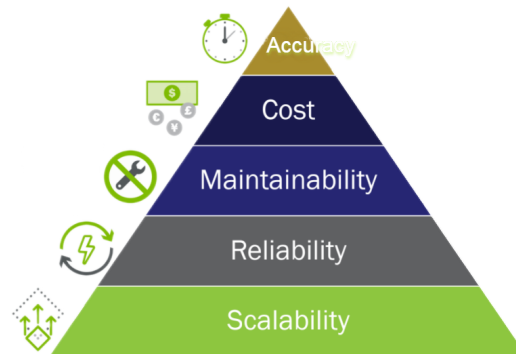


Figure 1. Trade off Pyramid for Time Services in DCs

- 1) **Scalability**
Designs that work at any size of DC, and to scale up to hyperscale while maintaining precision and quality.
- 2) **Reliability**
Today, there is not a well-known or standardized method known for real time error bound measurement, (not to mention, at-scale).
- 3) **Maintainability**
A production environment may be unstable due to maintenance for example. Time service, like any service, must maintain a self auto discovery and allow unaware maintenance. The service itself should be maintained by a high level of observability.
- 4) **The Right Cost**
For many DCs, the cost factor is the next important thing.
To name some, Oscillator selection will determine CAPEX, however sync tools and monitoring will save OPEX.
- 5) **Precision and Accuracy**
Today's PTP technologies allow for great precision and accuracy in DCs. We believe that the precision and accuracy should be measured and accessible at the application level. This is considered as the error bound that is advertised along the time provided to the nodes of a system (servers in a data center).

1 Charter and Scope

TAP's focus is on functional areas of the data center:

1. Promote openness in timing appliances as well as necessary software and interfaces through open-source contributions.
2. Bring together a special interest group (community) of scientists, system architects, hardware developers, application developers, equipment and semiconductor companies and vendors, etc. to enable adoption of time-sensitive applications in DC environments
3. Promote development and improvements of time-sensitive applications and use cases that necessitate highly accurate & reliable time distribution and synchronization
4. Create specifications, standards and blueprints for data center applications and timing appliances over OCP-compliant and PTP-aware networking infrastructure, coherent with the OCP ecosystem
5. Invite experts in related fields to enrich the community and increase collaboration opportunities
6. Engage with other OCP Projects including, but not limited to Networking, Storage, Server and Telco projects as well as IEEE, TIP and other related societies.

In Scope Activities

TAP intends to develop end-to-end synchronized data center network architectures, performance objectives and methods to distribute, operate, monitor and test time and synchronization within data centers:

(Examples not all-encompassing)

1. Develop a Data Center PTP Profile and best practices that allows deployment of time-sensitive applications over timing appliances and interfaces based eg., IEEE1588, and augmented with methods such as NTP, Chrony, 1PPS, GNSS etc.
2. Develop specification such as mechanical, environmental, hardware, software and security, in accordance with OCP for:
 - a. Timing Appliances (eg., Open Source Grandmaster, Time Card, Boundary Clock, Transparent Clock, servers, NIC cards)
 - b. Interfaces (eg., sync interfaces, measurement)
 - c. Network Configurations (eg., mix unicast/multicast, IPv6, data models)
 - d. Classification of hardware components (eg., Oscillators)
 - e. Monitoring tools
 - f. Validation and test methods and tools

3. Engage with the community to build a viable ecosystem of applications, systems and components through technical meetings, events and contributions

Out of Scope Activities

The Data Center Facility Project does not intend to cover or address:

- Safety
- Physical security
- Proprietary software stacks
- Commercialization and endorsements