



TSP future, what's next?

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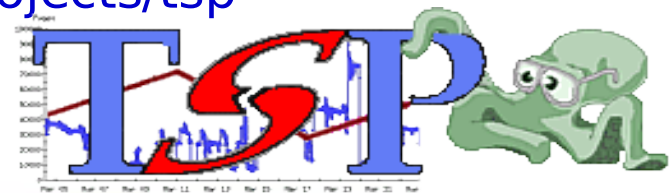


retour sur innovation

ONERA DTIM Context

Distributed System Engineering Team

- We work on distributed software technology
 - for fundamental research purpose formal analysis of distributed applications and systems
 - for applications using distributed simulation standard like HLA
 - for embedded and real time application for ours clients or partners
 - in partnership with other ONERA teams on safety, systems of systems design
- We develop Open Source Software as research enabling technology
 - CERTI : <https://savannah.nongnu.org/projects/certi>
<http://www.cert.fr/CERTI/>
 - TSP : <https://savannah.nongnu.org/projects/tsp>
<http://www.ts2p.org/tsp>

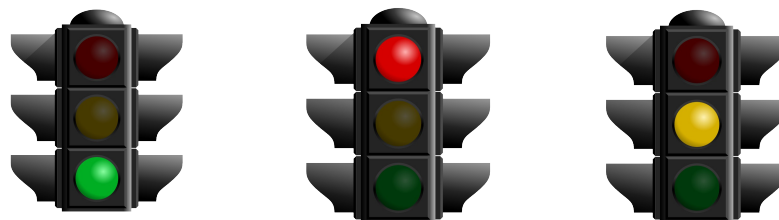


TSP future features ... or not?

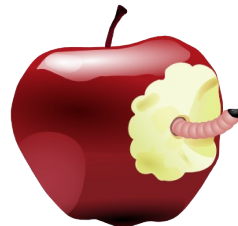
✓ Time handling



✓ Synchronization



✓ Quality of Service



✓ TSP as Middleware



Time & Synchronization (1/2)

- Distributed Components needs to synchronize
 - in order to ensure distributed simulation causality (see HLA Time Service)
 - to be able to correlate distributed observation (multiple TSP providers)
- The TSP (initial) point of view
 - time & synchronization are **not TSP concerns**
 - global time **may** be transported as a TSP Symbol which as special application specific meaning
 - TSP sample time stamp is ill-named it **is only a TSP sample sequence verifier**



Time & Synchronization (2/2)

- We may convey the time in a dedicated special TSP Group
 - See « TSP Group Explained » document
 - What format for this TSP time?
 - But how do we synchronize the TSP time?
- We may integrate with synchronization protocol
 - IEEE 1588 PTP (Precision Time Protocol)
 - IRIG signal
 - GPS signal
 - HLA Time Service
 - Any other application specific mean?

Quality of Service (1/2)

- QoS handling is not specified by TSP
 - Each Provider should decide to accept or refuse connection (today's hard coded limit = 100 TSP Sessions)
 - Each Consumer should check whether if can handle what he asked for (may easily flood its network capacity)
- TSP is already robust since
 - Provider drops connection if a consumer does not consume at the requested pace
 - Consumer gets TSP_RESERVED_GROUP_CONSUMER_DATA_LOST if ever it is too slow
 - Provider garbage collect session for broken connection (socket)
- We may add built in support for bandwidth control
 - we have all what is needed to compute user consumed bandwidth

Quality of Service (2/2)

- Secure data link needed or not?
 - We may/should improve TSP session authentication
 - We may/should use SSL socket
 - Your opinion?
 - Which solution?
- End to End real time control using the synchronization protocol?
 - Today TSP relies on the provider to ensure sampled data are coherent and consumer gets a lossless stream of sample
 - Should we try add time control from consumer to provider?



TSP as a Middleware

TSP shares many publish/subscribe principles with other protocols

- **OMG DDS** (was needed after CORBA)
 - Should we build TSP over DDS?
 - Or try to upgrade TSP to become DDS-like?
- **MPI**
 - Include communication topology (Communicator)
 - Mostly statically computed communication pattern
- Other proprietary Data oriented Exchange protocol

We should further use the fact that we precisely know the (user) bandwidth of a TSP sample connection for implementing TSP over a protocol that fully support QoS and bandwidth reservation

Conclusion

Let's Talk and share ideas & keyboard

