# The Trigger and Data Acquisition System for the KM3NeT-Italia towers

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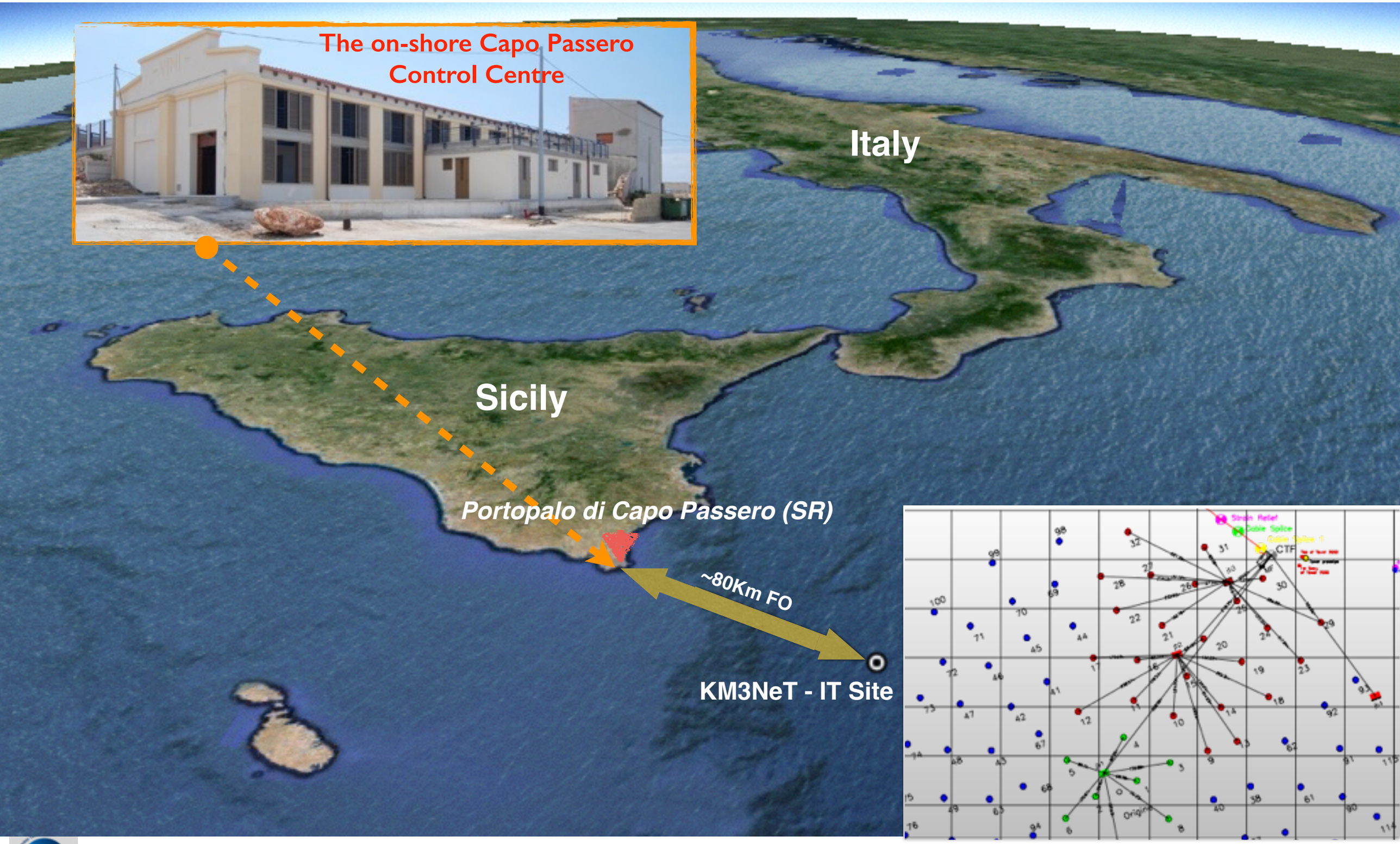
# KM3NeT-Italia detector layout



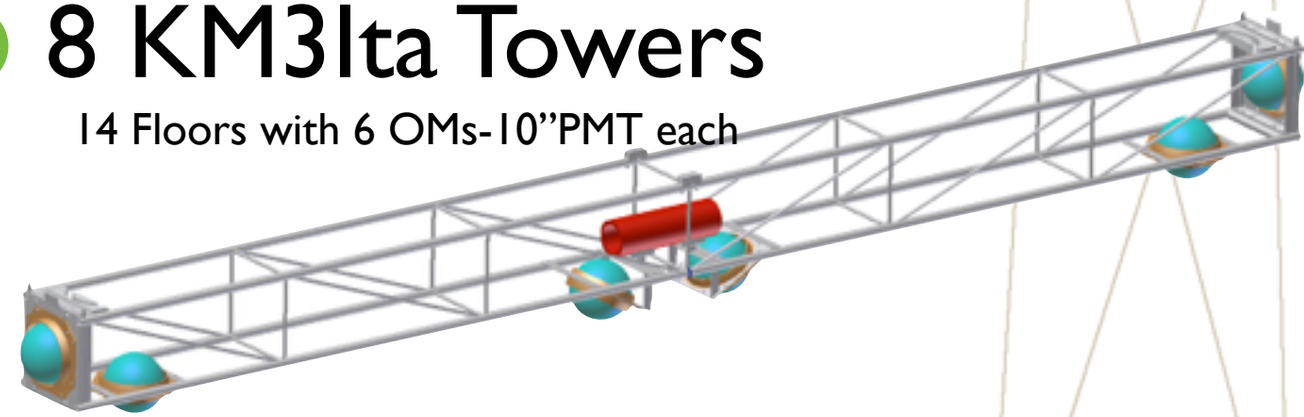
# 24 KM3NeT Strings

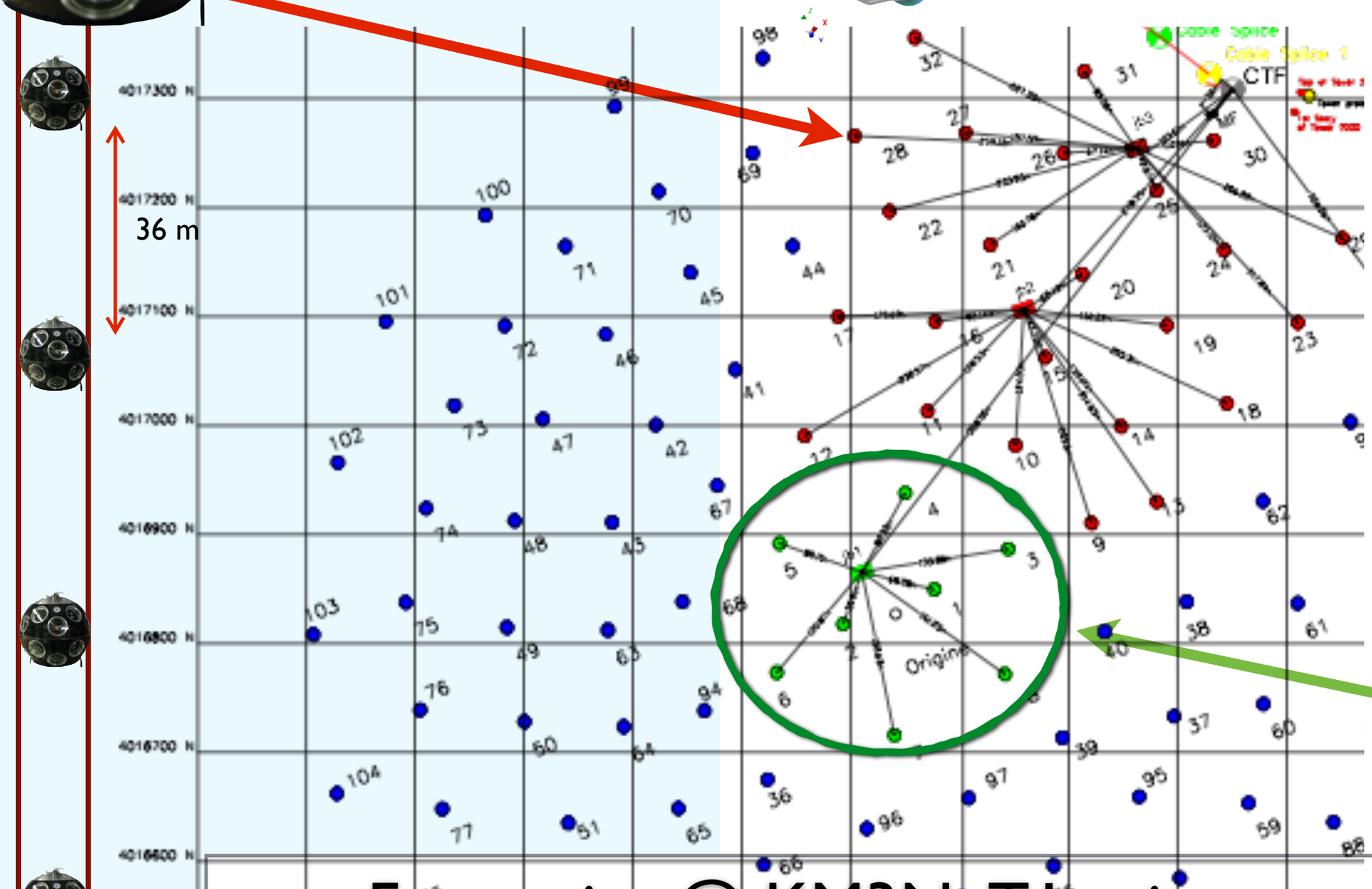
18 MultiPMT OMs with 31 3" PMTs

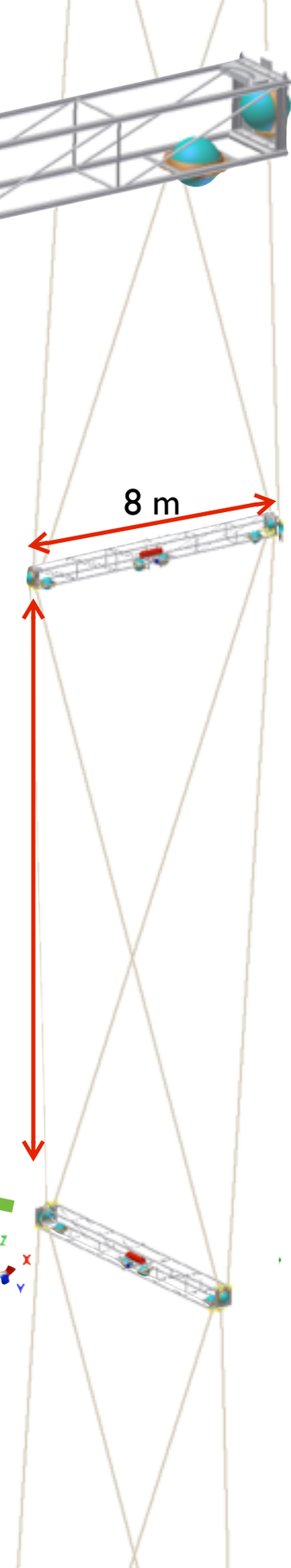
Talk by C. Pellegrino

# 8 KM3Ita Towers

14 Floors with 6 OMs-10"PMT each






## Foot print @ KM3NeT-It site

Dr. Matteo Fa

# Detector throughput

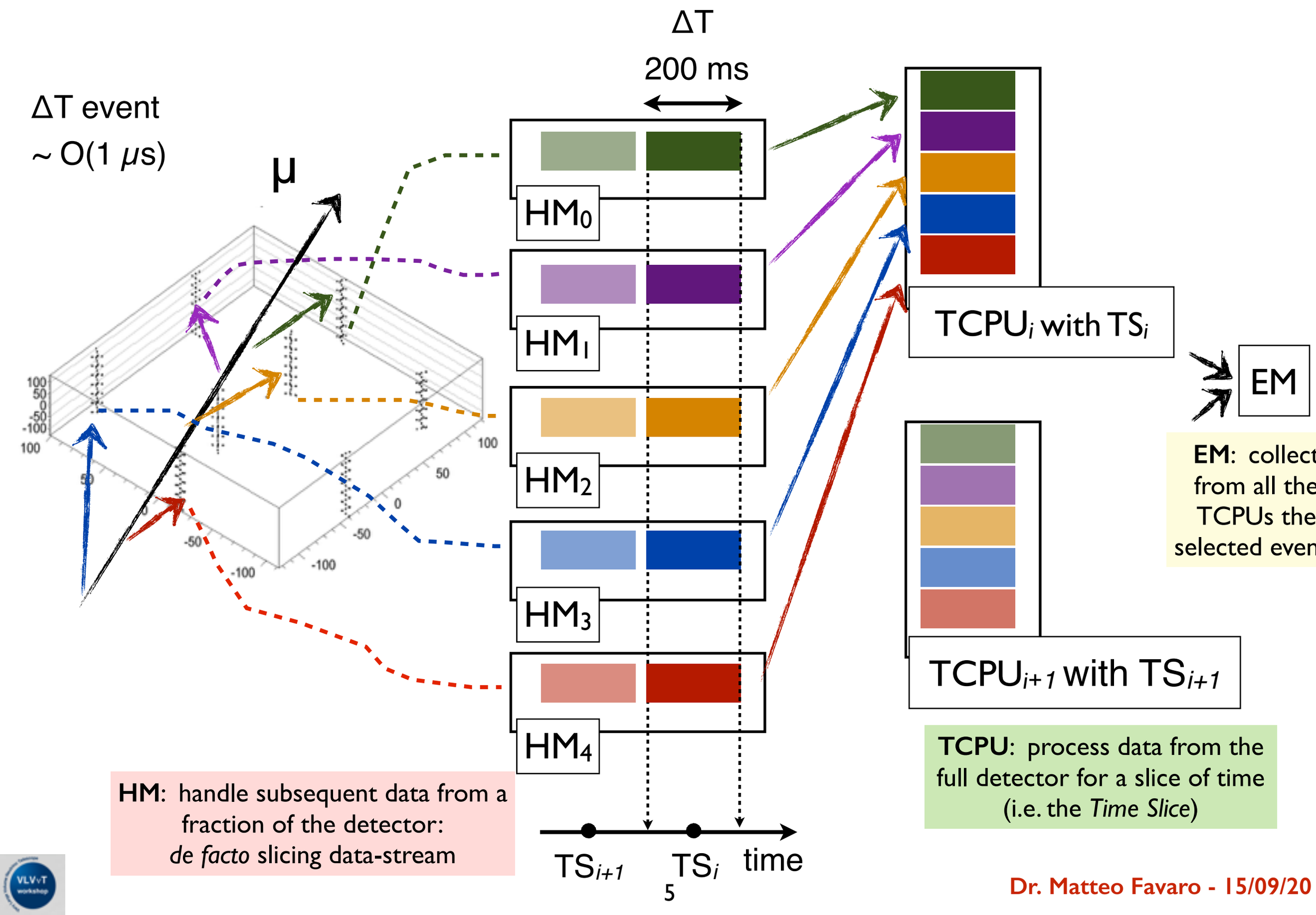
**S.P.E. HIT SIZE:**

**Hit PMT Info**
**+**
**Hit Time**
**+**
**Hit Charge**
**+**
**Hit Wave Form(16 bit/ sample)**

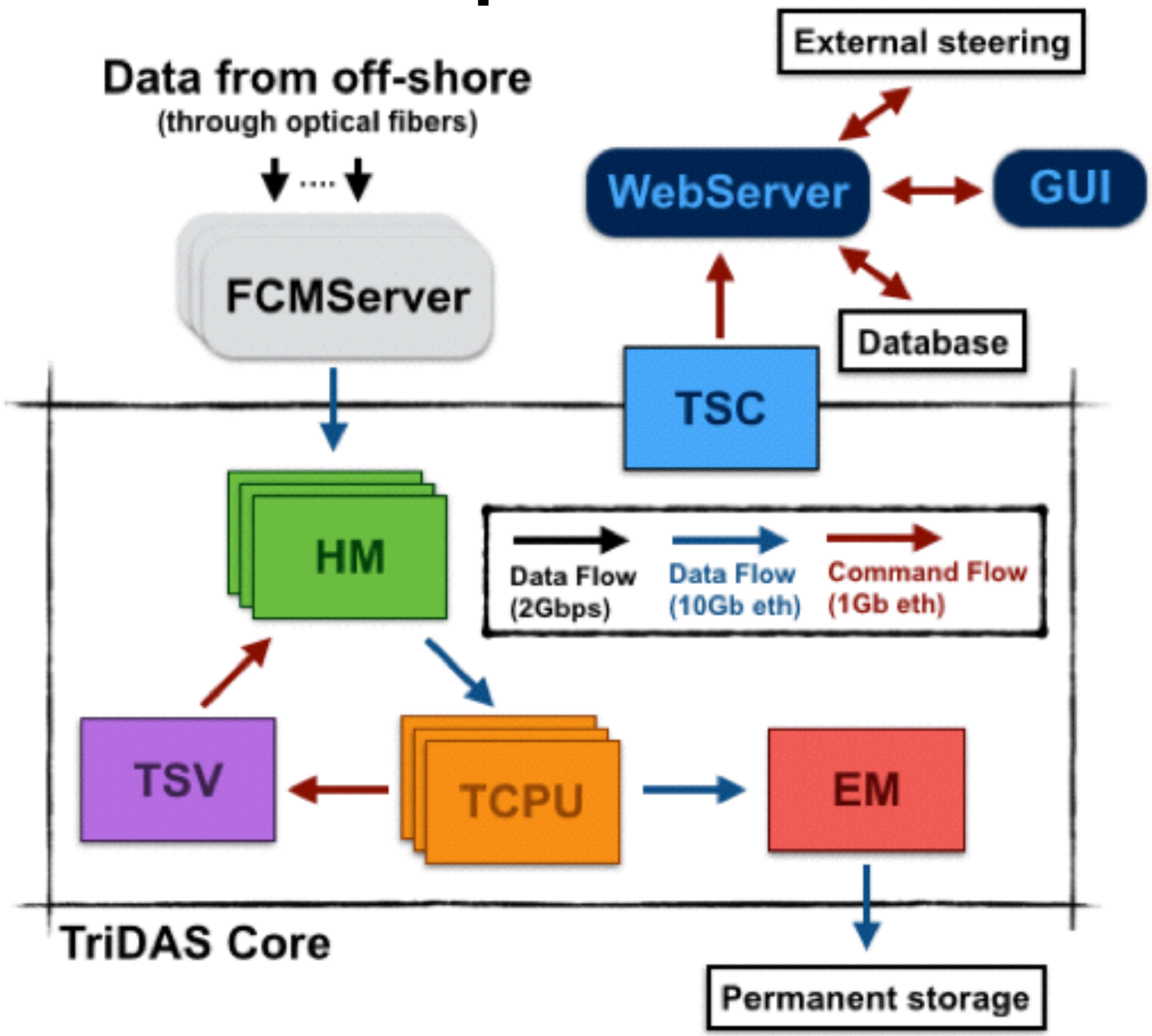
**46 Bytes**

| Case (KM3NeT–Italia) | | Expected ($\nu_{single}$ = 50 kHz) | Conservative ($\nu_{single}$ = 70 kHz) | Maximum ($\nu_{single}$ = 150 kHz) |
|---|---|---|---|---|
| 10" PMT (0.25 p.e thresh.) | (Mbps) | 19.0 | 26.0 | 56.0 |
| Floor (6 PMT/Floor) | (Mbps) | 110.0 | 160.0 | 330.0 |
| Std Tower (14 Floors) | (Mbps) | 1600.0 | 2200.0 | 4700.0 |
| NEMO Phase 2 (8 Floors– 4 PMT/Floor) | (Gbps) | 0.6 | 0.8 | 1.8 |
| Full Detector (8 Std Towers) | (Gbps) | 12.0 | 17.0 | 37.0 |

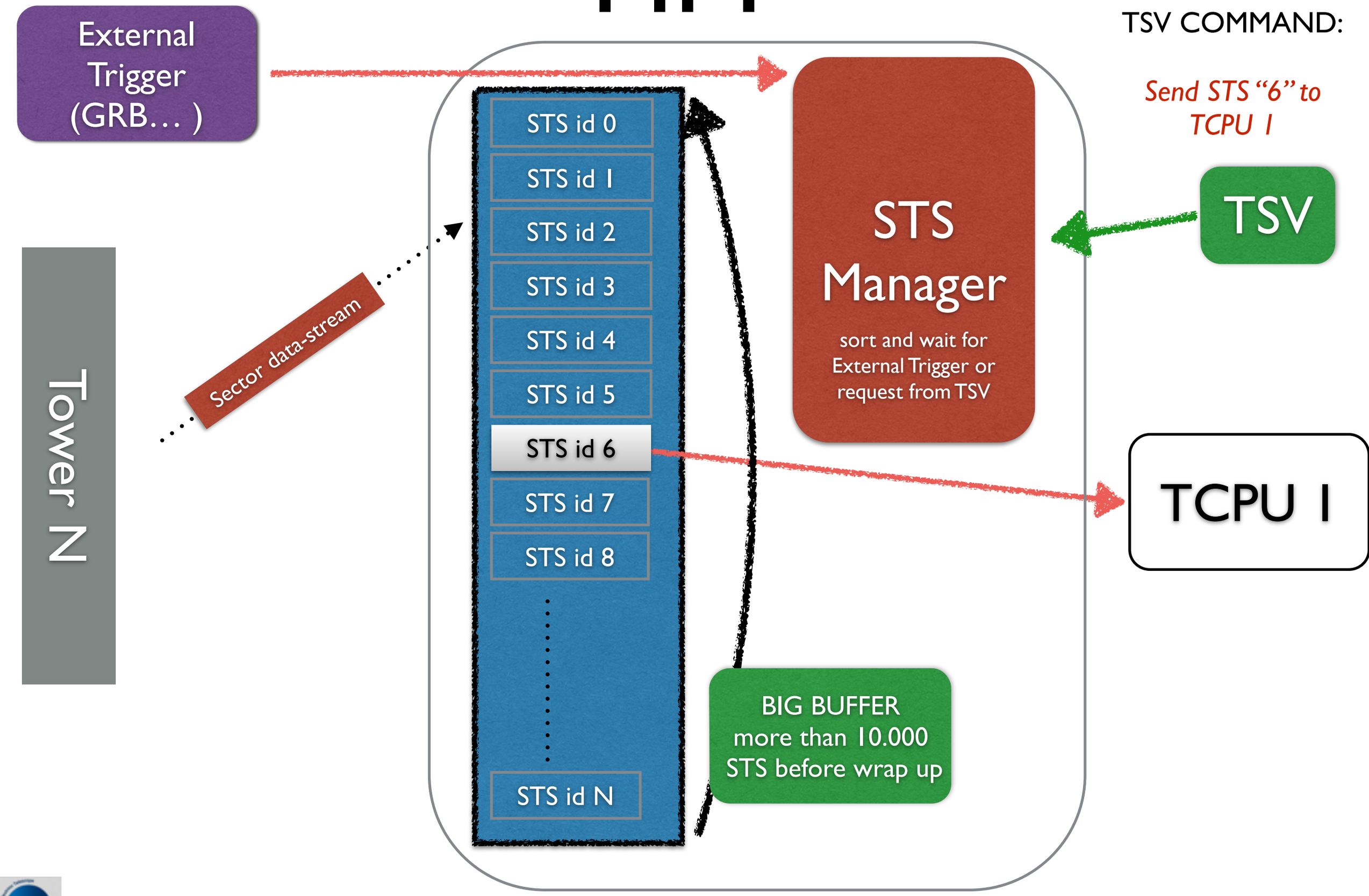
**What is kept:** the TriDAS modularity (and most of the C++ code)



# Overview Of TriDAS System Components

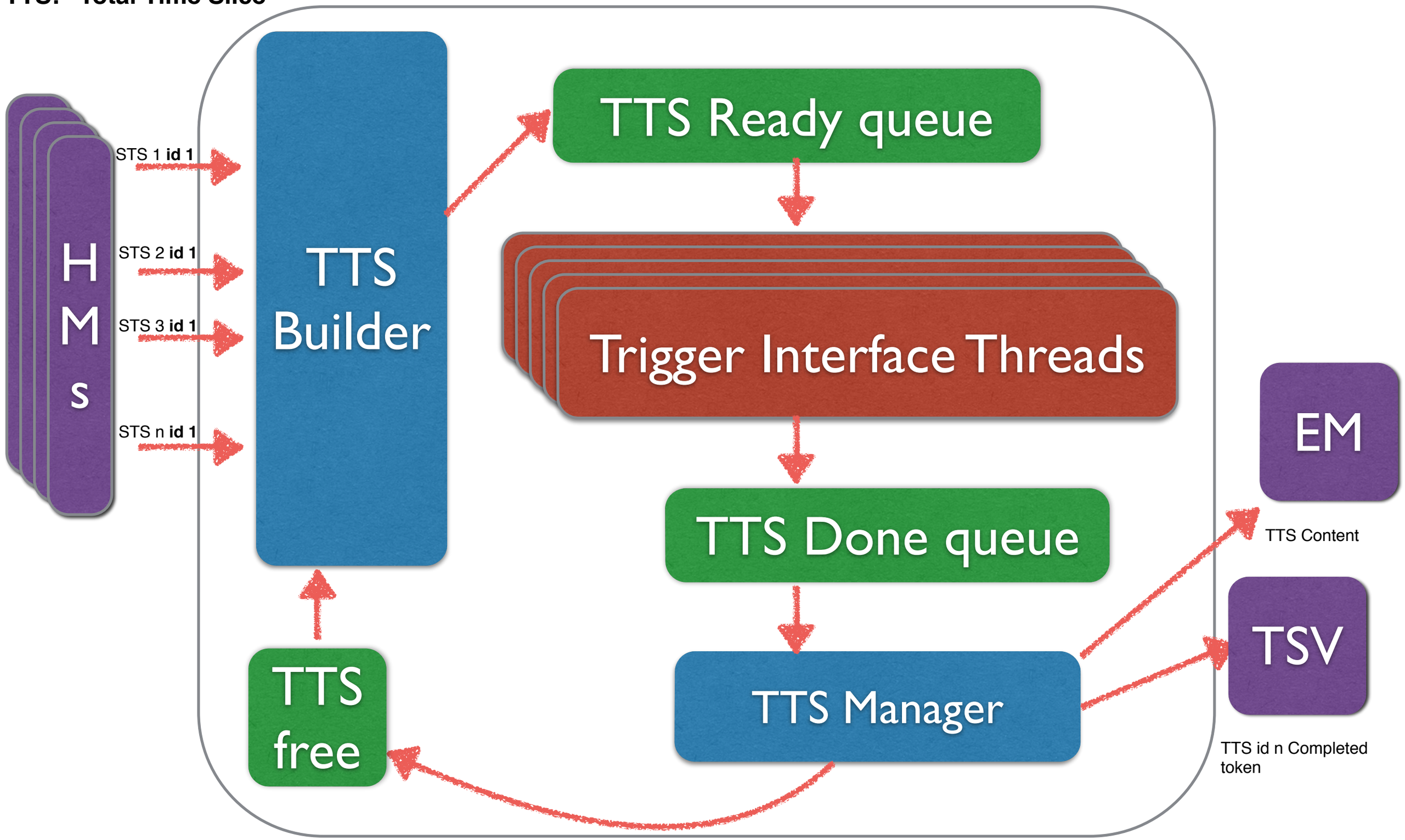


# HM

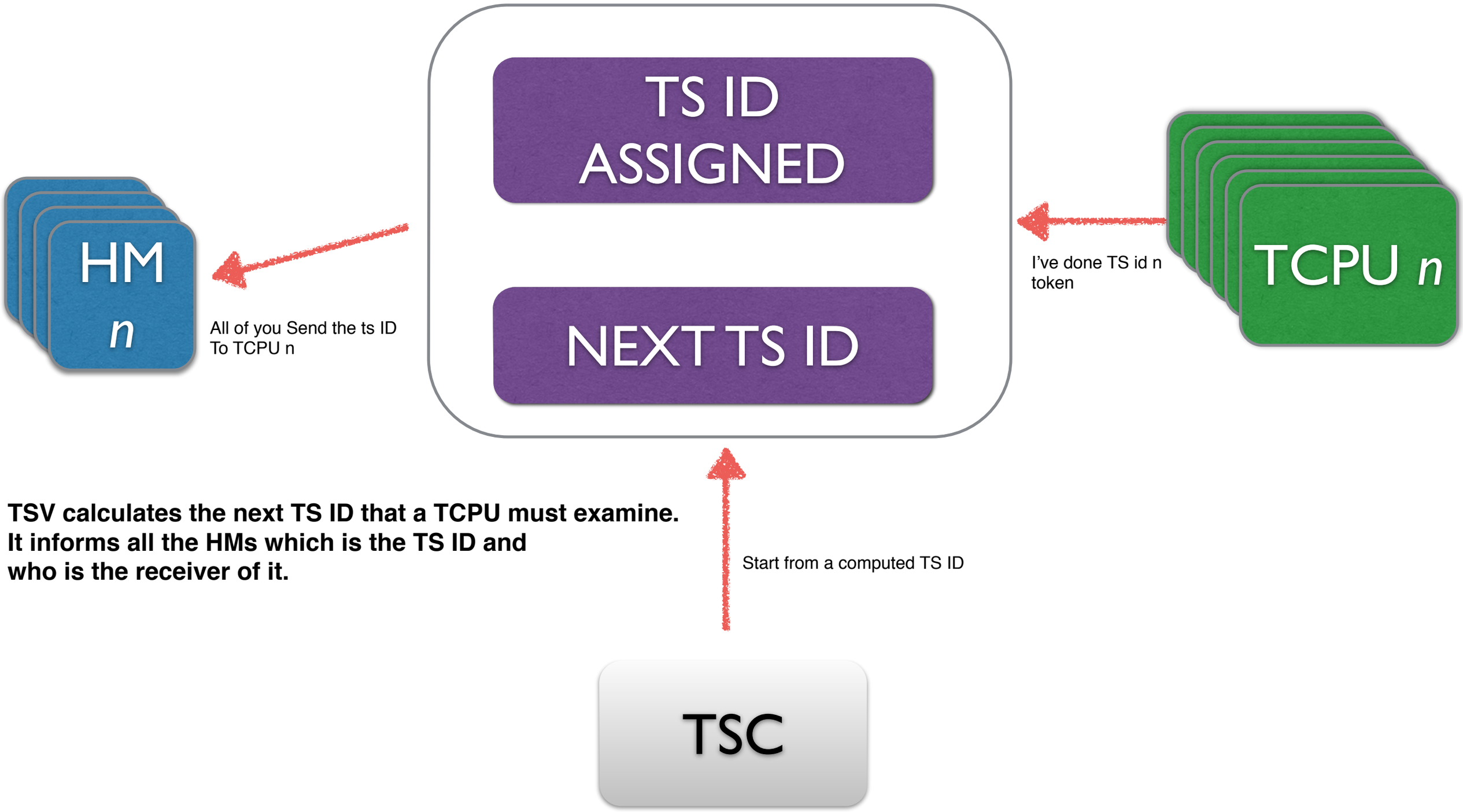

External Trigger (GRB… )
TSV COMMAND:
Send STS "6" to TCPU 1
TSV
STS Manager
sort and wait for External Trigger or request from TSV
STS id 0
STS id 1
STS id 2
STS id 3
STS id 4
STS id 5
STS id 6
STS id 7
STS id 8
STS id N
Sector data-stream
Tower N
TCPU 1
BIG BUFFER
more than 10.000
STS before wrap up

# TCPU

**TTS: "Total Time Slice "**

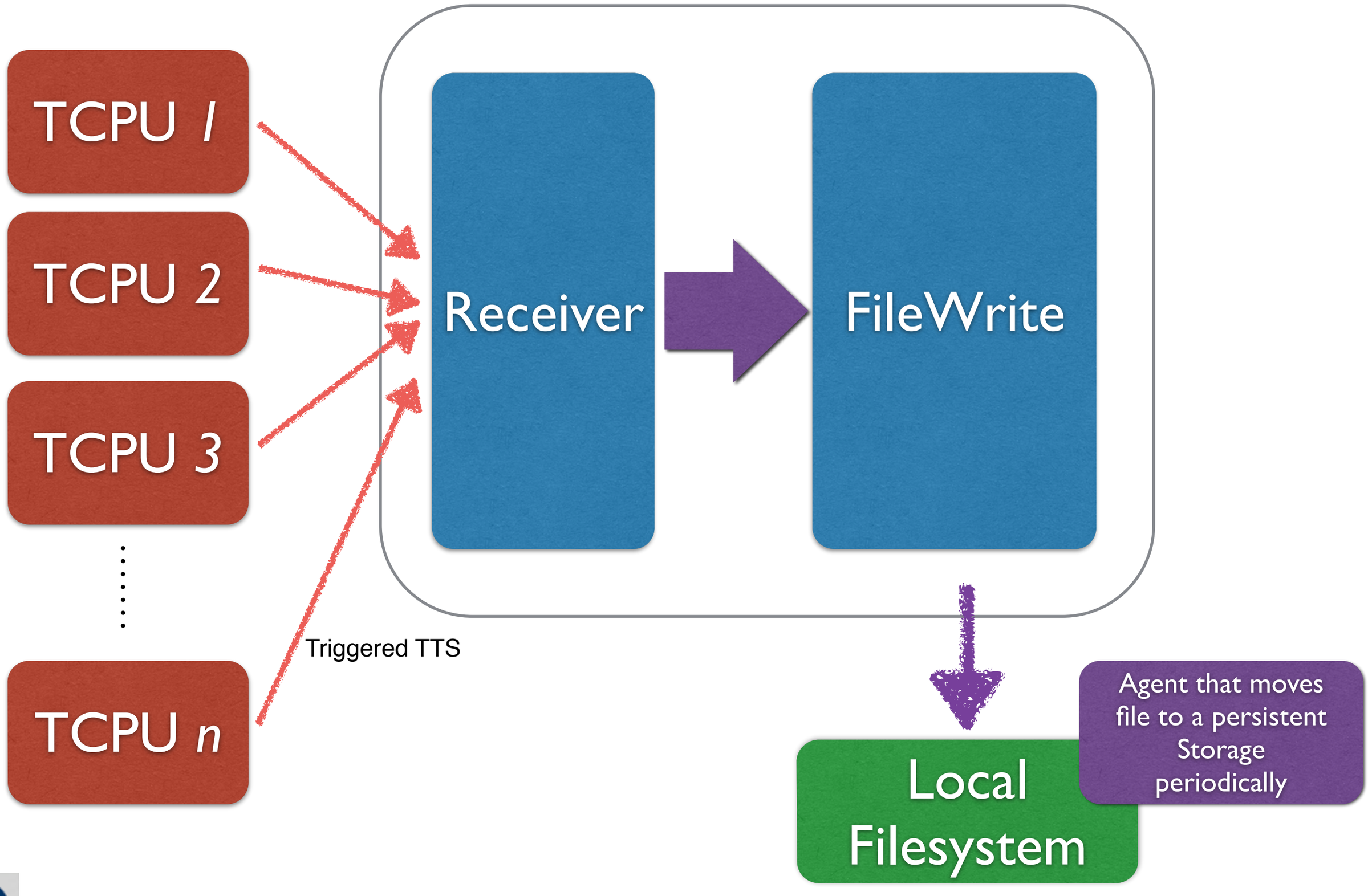


# TSV

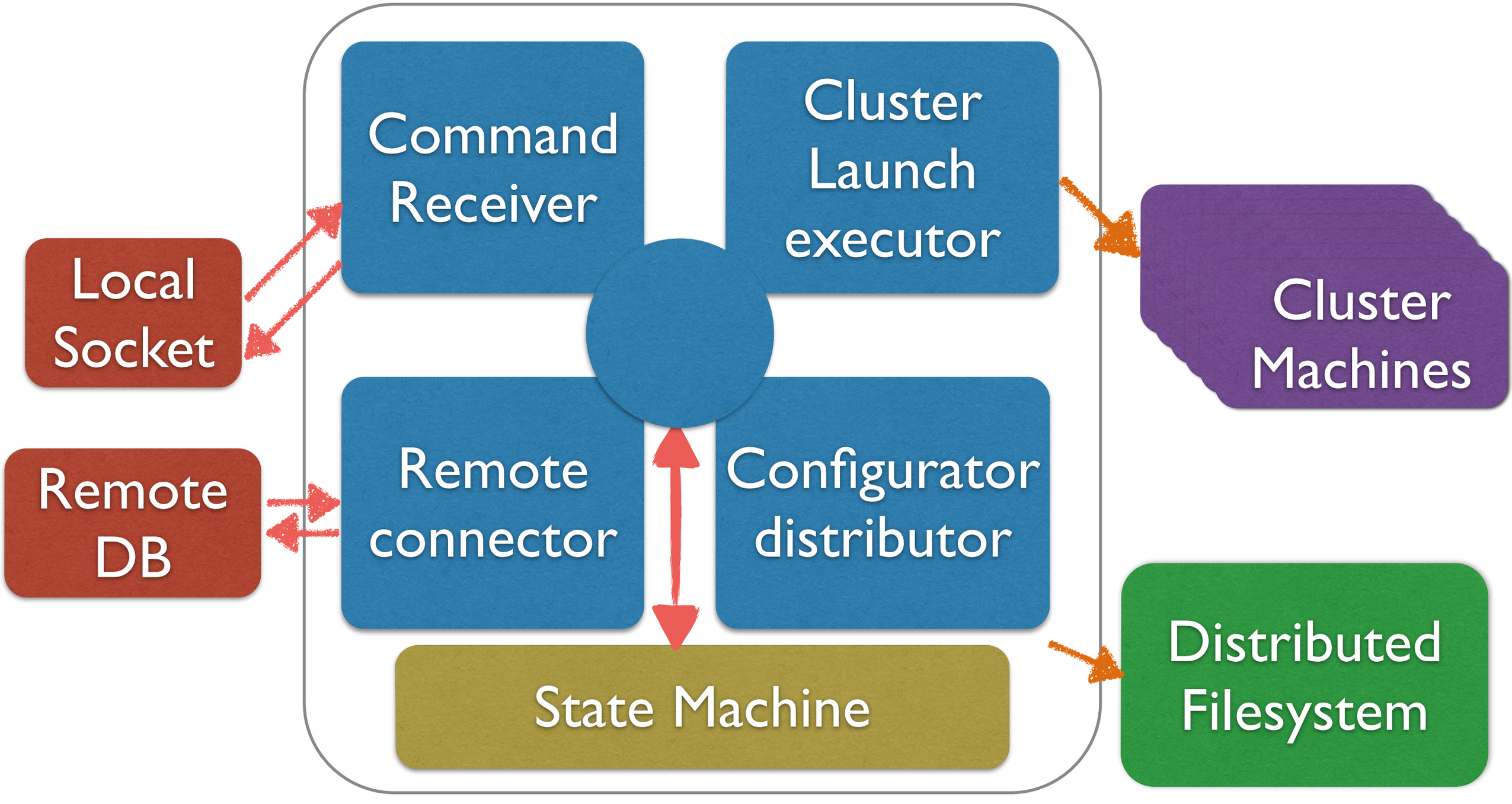



**TSV calculates the next TS ID that a TCPU must examine.
It informs all the HMs which is the TS ID and
who is the receiver of it.**

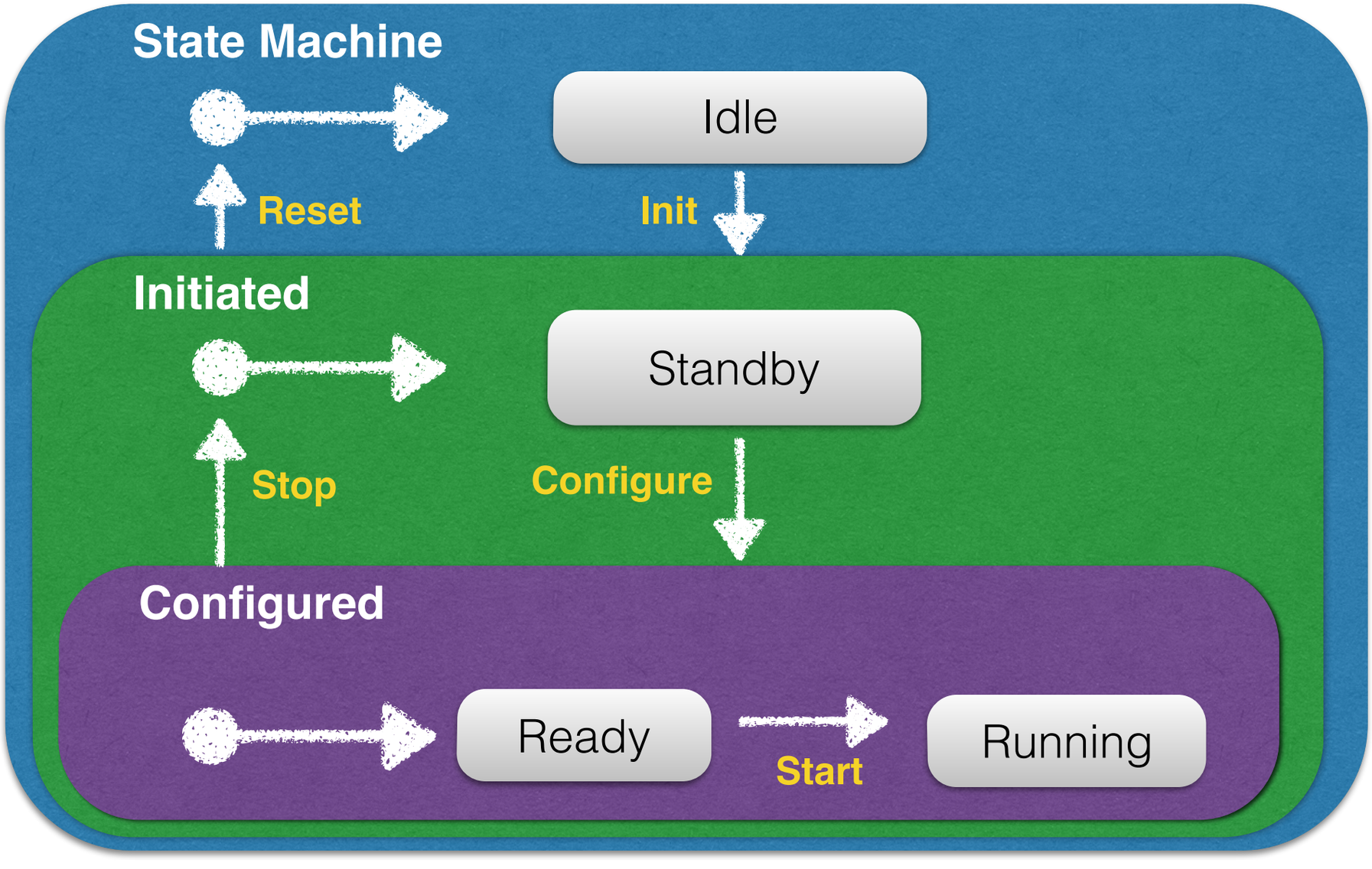
# EM


TCPU 1
TCPU 2
TCPU 3
TCPU n
Triggered TTS
Receiver
FileWrite
Local Filesystem
Agent that moves file to a persistent Storage periodically

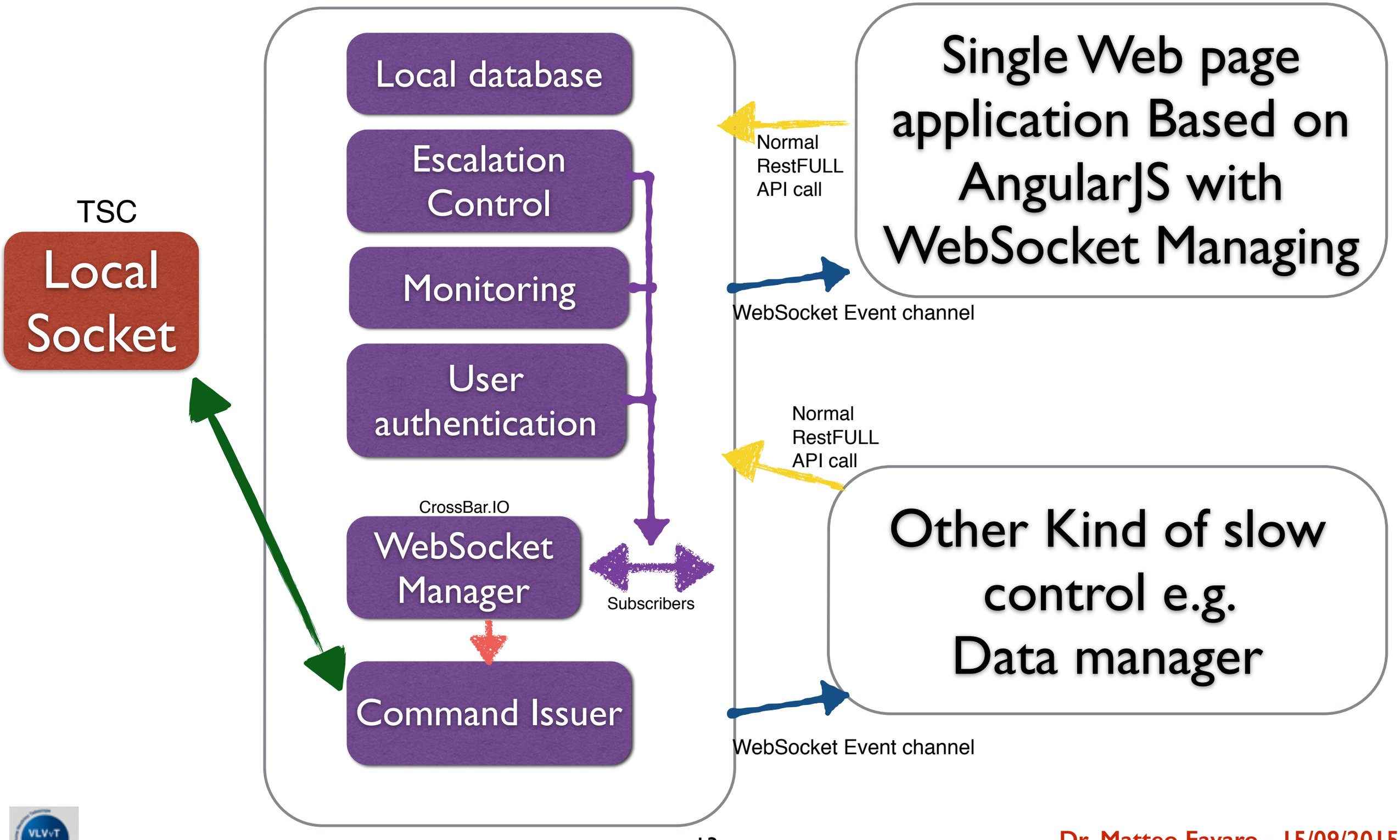
# TSC 1/2 Overview



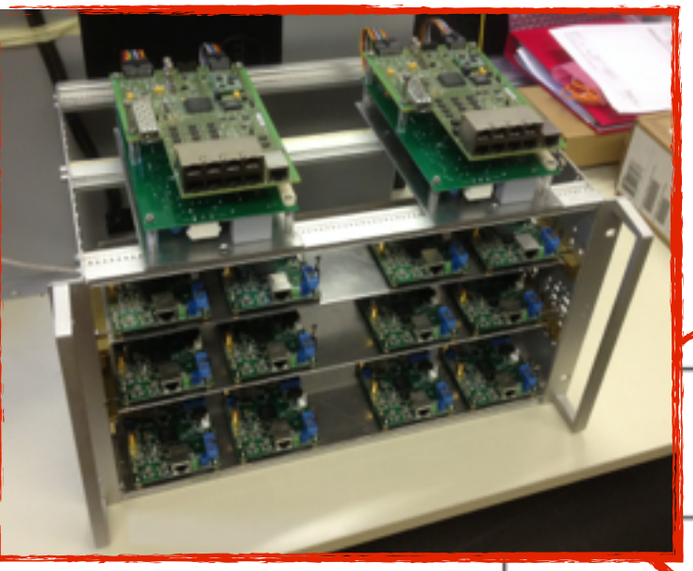
# TSC 2/2 Hierarchic Finite State Machine

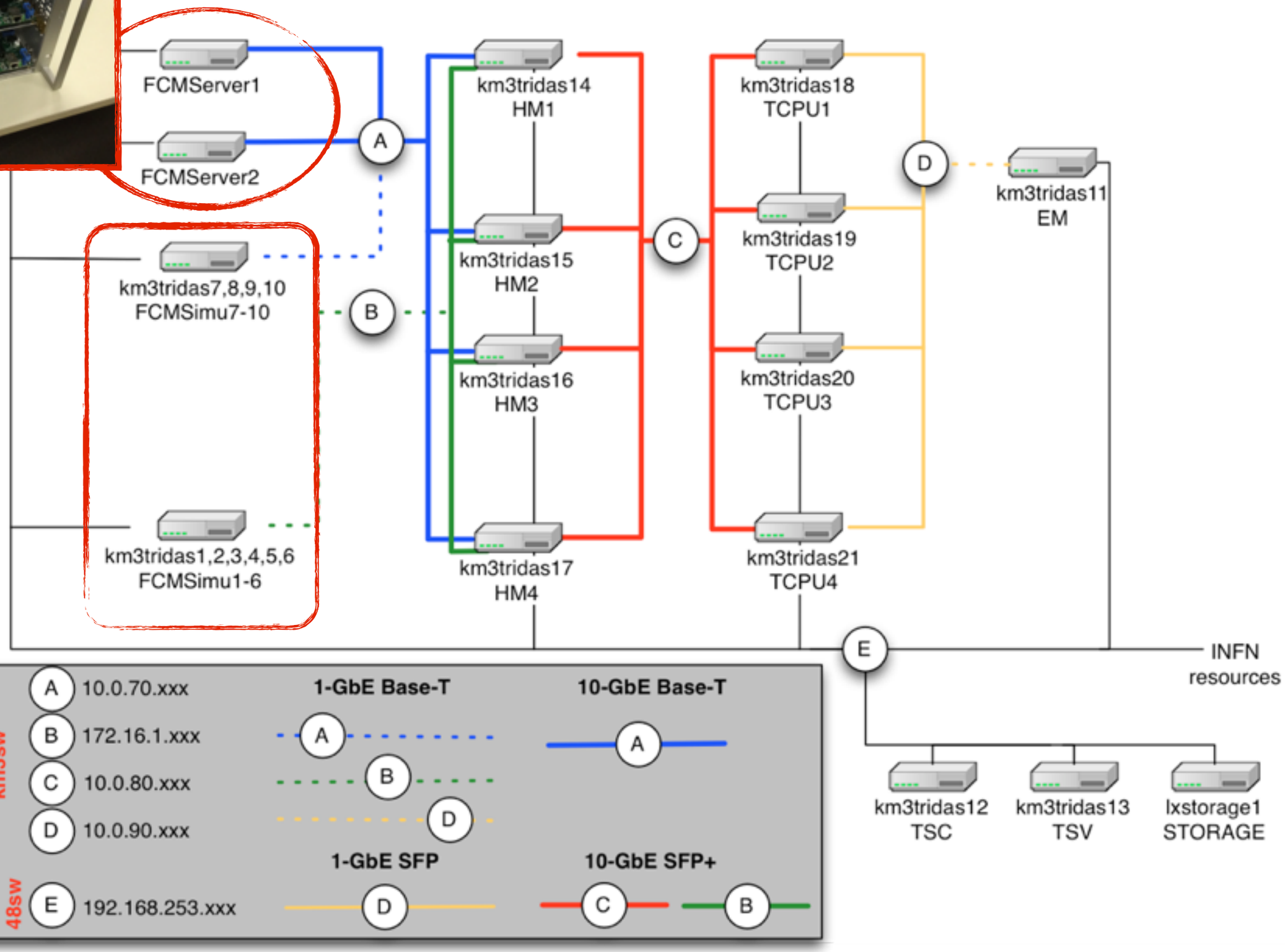


# WebServer - GUI



# Testbench in Bologna





# Conclusions & outlook

- TriDAS upgraded to scale with the number of towers
- Perfomances being tested @ test-benches with actual networking configuration
- Deployment of the system foreseen in the next month
- System fine tuning demanded during the commissioning

**Some References:**


- 13th Pisa meeting on advanced detectors - The Trigger and Data Acquisition System for the 8 tower subsystem of the KM3NeT detector - June 24, 2015

- VLVnT - 2013 - The Trigger and Data Acquisition for the NEMO-Phase 2 Tower - March 29, 2014

# Thank You!