

Integration with Global Run Control & Point 5 Status and Plans

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Where Pixel Online Software Fits In and How: *The Spawning Hierarchy*

In the Beginning

- There exists the **Level 0 Function Manager** (Property of the DAQ Group)
- and the **Resource Service Database**, aka RS 3 DB (Stores entire DAQ configurations)

Level 0
Function
Manager

Resource
Service
Database
(RS 3)

Where Pixel Online Software Fits In and How: *The Spawning Hierarchy*

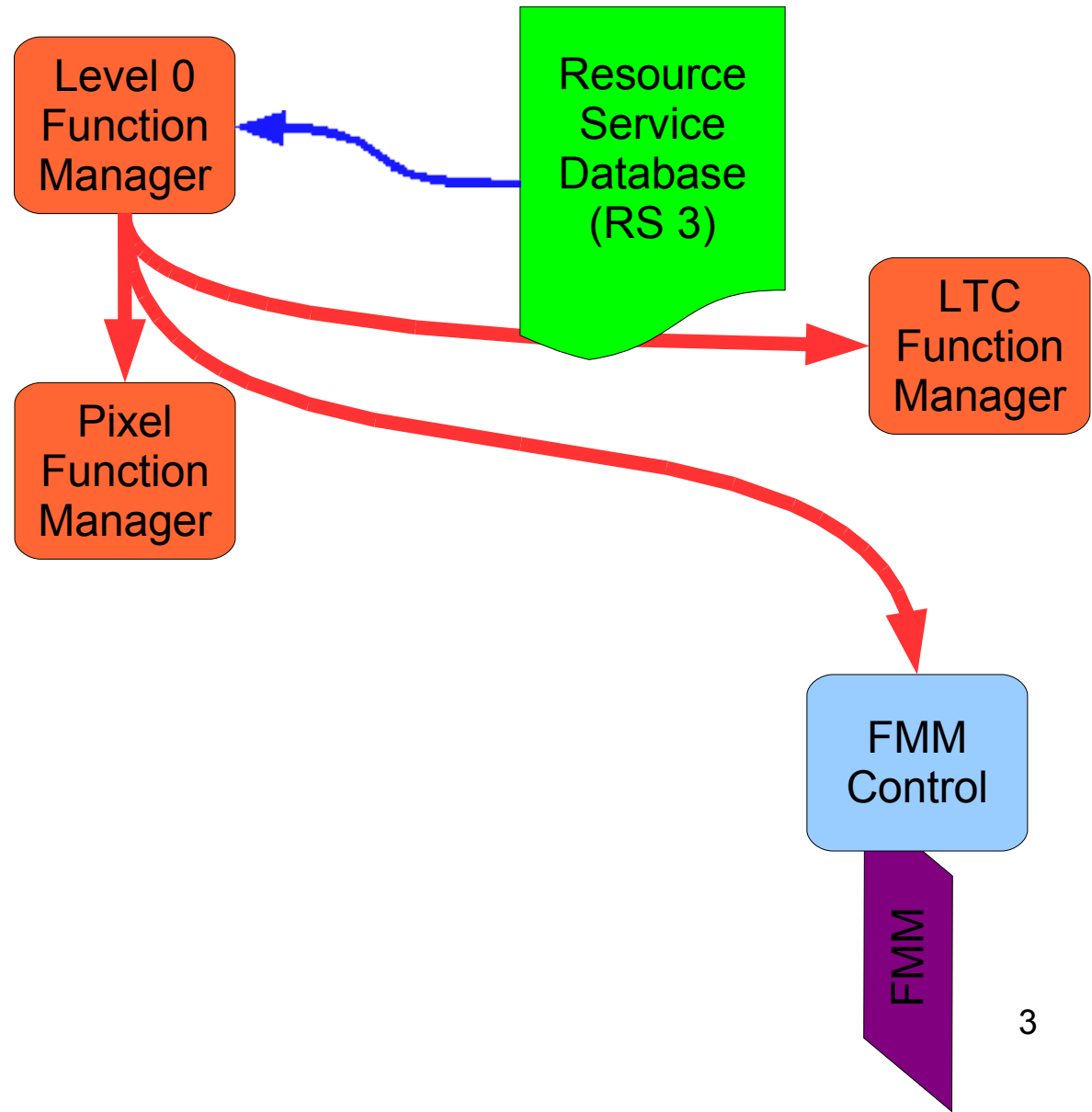
Initializing – Step 1

→ **Level 0 Function Manager** consults the **RS 3 DB** and spawns:

✓ **Pixel Function Manager** on *cmsrc-pixel.cms:370000*

✓ **FMM Control** on *fmmpc-sld12-08.cms:17000* . **FMM Control** directly controls the Fast Merging Modules for the Trigger and Throttling System signals from the FED.

→ **LTC Function Manager** on *cmsrc-trigger.cms:19000*



Where Pixel Online Software Fits In and How: *The Spawning Hierarchy*

Initializing – Step 2

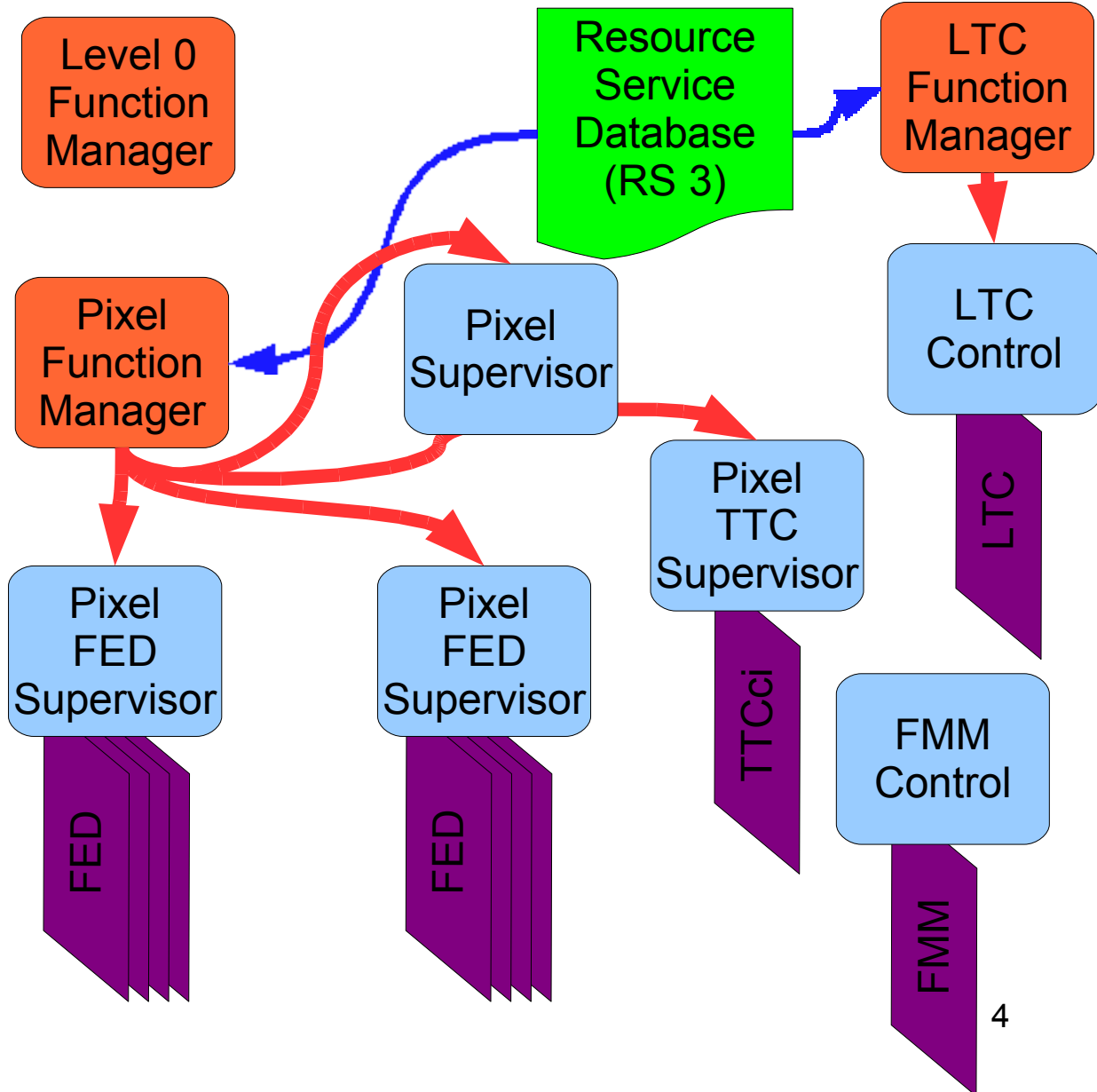
→ **Pixel Function Manager** consults the **RS 3 DB** and spawns:

• a XDAQ Executive on *vmepcs2b18-11.cms:1973* and loads **PixelSupervisor** on it,

• a **PixelFEDSupervisor** on *vmepcs2b18-13.cms:1973* and another **PixelFEDSupervisor** on *vmepcs2b18-14.cms:1973* and

• **PixelTTCSupervisor** on *vmepcs2b16-10.cms:1973*

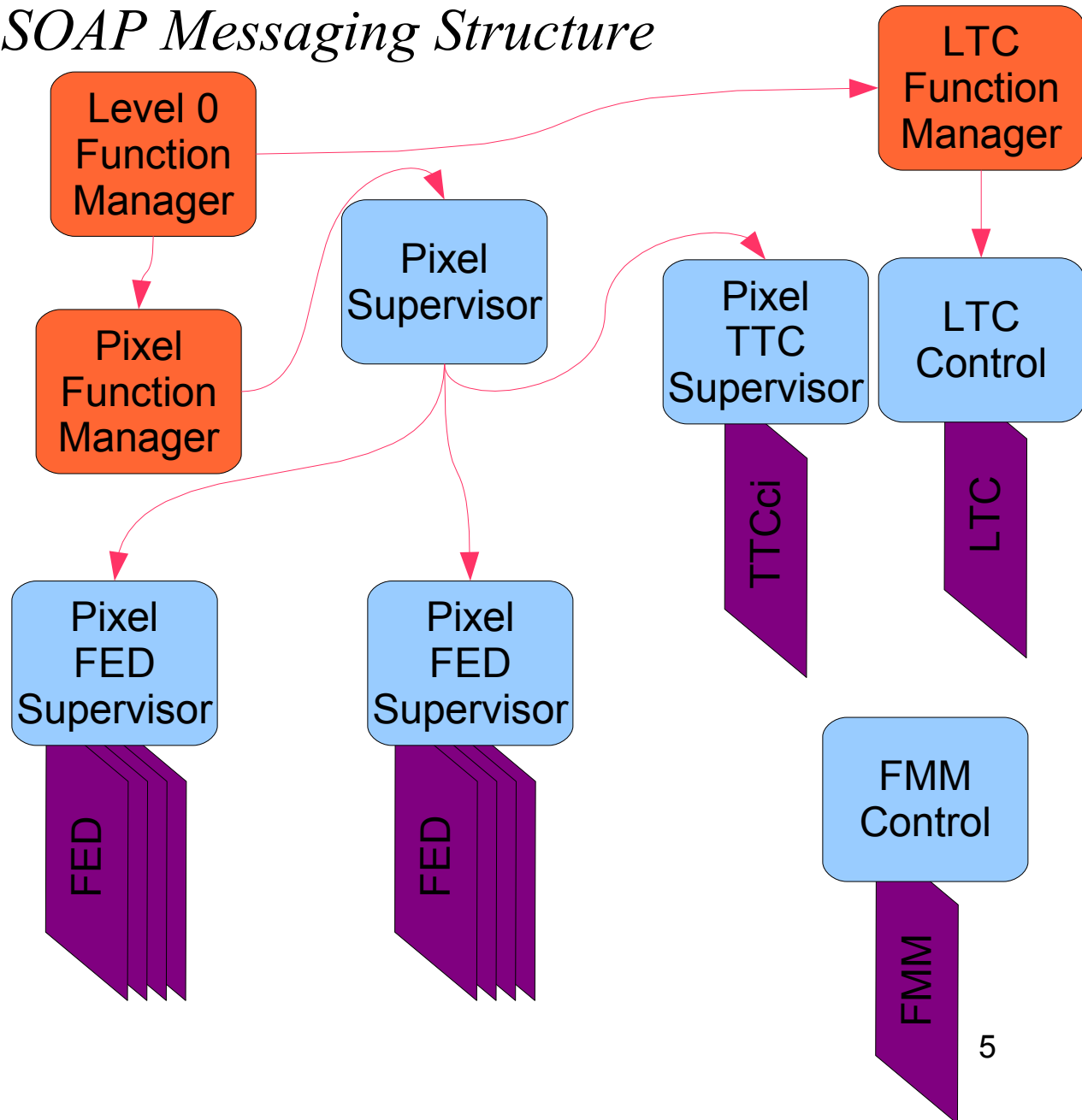
→ **LTC Function Manager** consults the **RS 3 DB** and spawns **LTC Control** in a XDAQ Executive on *vmepcs2b16-10.cms:1974*



Where Pixel Online Software Fits In and How:

The SOAP Messaging Structure

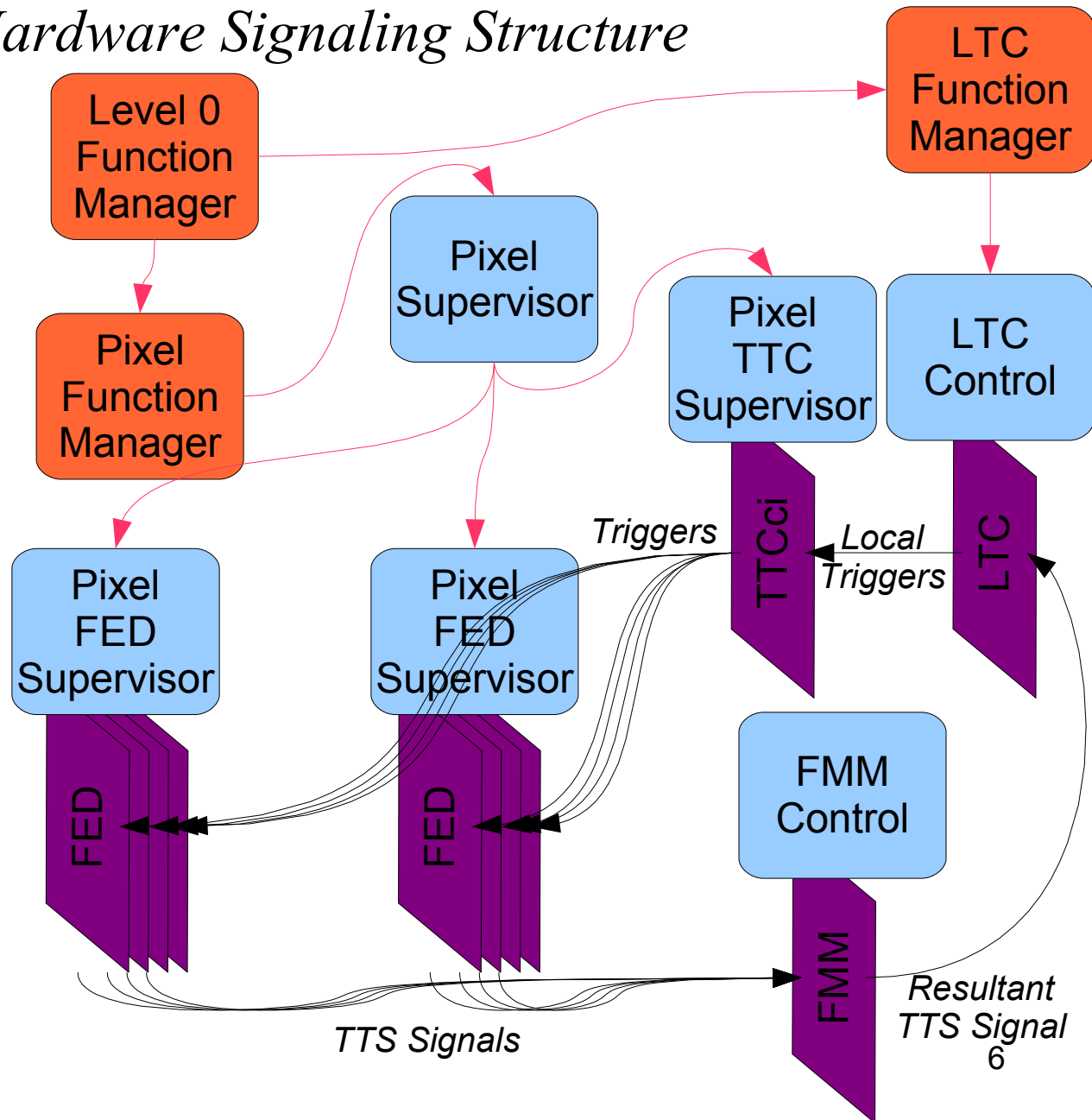
- Finite State Machine commands like “Configure”, “Start” etc come via SOAP messages from **Level 0 Function Manager** to **Pixel Function Manager**.
- **Pixel Function Manager** relays the command to **PixelSupervisor** after which point we can intervene or allow the commands to trickle down further to other Supervisors.
- We can intervene and issue our own FSM and Low Level commands at the level of any Supervisor!



Where Pixel Online Software Fits In and How:

The Hardware Signaling Structure

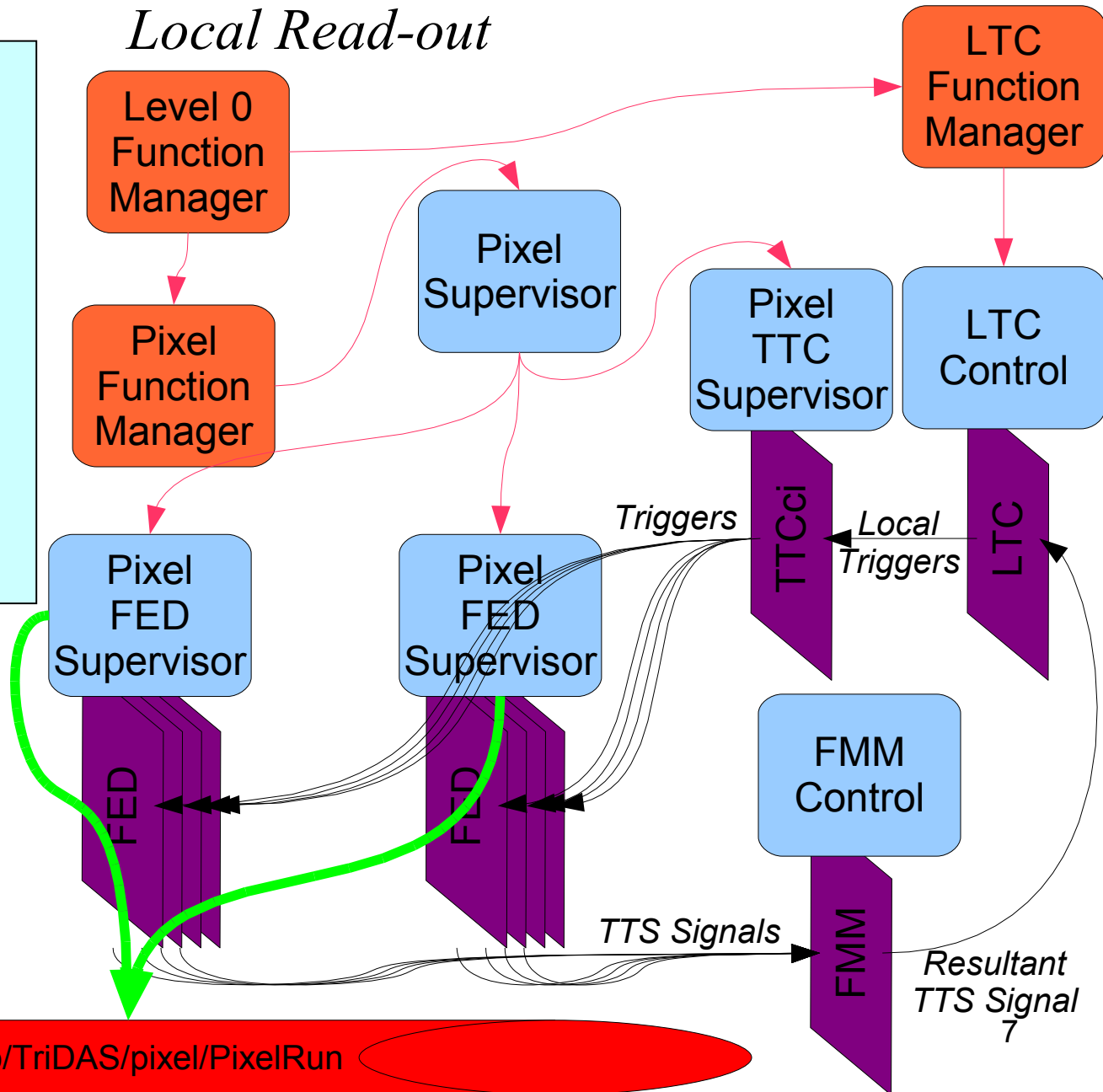
- The **LTC Function Manager** activates Local Triggers as and when required through the **LTC Control**.
- These Local Triggers are distributed by the TTCci to the FEDs (and Pixel-FECs and Tracker-FECs later)
- The FEDs output a Trigger Throttling System signal (that signal data overflow, out-of-sync etc in the FED) which is collected by the Fast Merging Modules
- The FMM effectively OR's those TTS signals and feeds it back to the LTC board in order to slow down the triggers if necessary



Where Pixel Online Software Fits In and How:

Local Read-out

- **PixelFEDSupervisors** read out SpyFIFO 3 of all 32 FEDs and currently dump them in SLink format in our NFS area.
- Rate ~ 2 KB / event with no hits make us hit our NFS quota in a matter of minutes.
- Maybe we should write to VME PCs' disks?



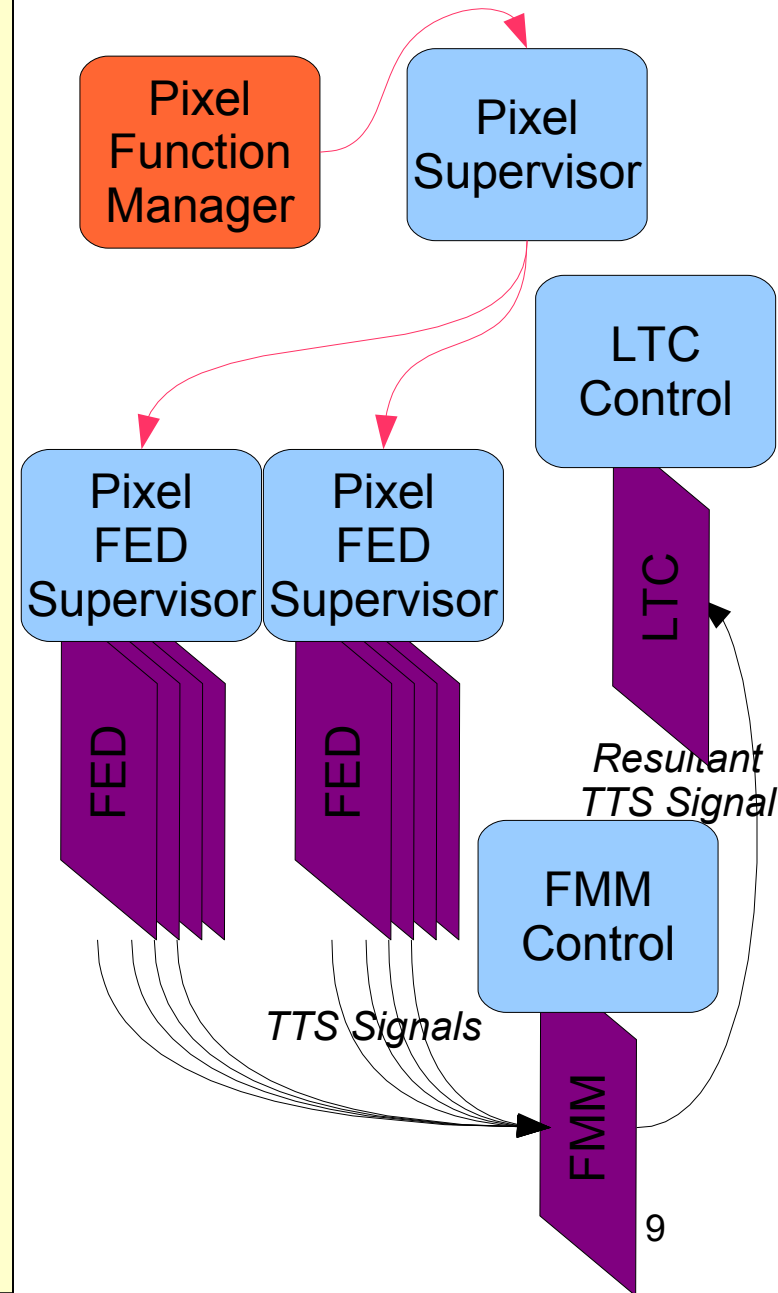
Prerequisites for Participation in a Global Run

- ✓ Pass the TTS Test with Global DAQ
 - 25 October 2007
- Pass the SLink Test with Global DAQ
 - Scheduled for the Week of 12th November

The TTS Test (aka the Connectivity Test)

Local TTS Test

- ✓ Added the FSM states for TTS Testing in **PixelFunctionManager**, **PixelSupervisor** and **PixelFEDSupervisor**.
- ✓ Two **PixelFEDSupervisors** could be used to fire TTS states of all 32 FEDs.
- ✓ Monitor TTS states of all FEDs using the FMM Controller. FED ID 22 was seen to be broken. (Replaced now.)
- ✓ Made sure that the merged TTS signal was reaching the LTC.
- ✓ **PixelSupervisor** could be used to control both **PixelFEDSupervisors**. TTS states in all 32 FEDs could be fired from **PixelSupervisor**.
- ✓ **PixelFunctionManager** could be used to spawn XDAQ Executives on 3 CPUs, load **PixelSupervisor** and two **PixelFEDSupervisors** in the appropriate CPUs. **PixelFunctionManager** could hence control **PixelSupervisor** and fire TTS states in all 32 FEDs. (At this point a DAQ Configuration had been created in the *Resource Service Database*.)



The TTS Test (aka the Connectivity Test)

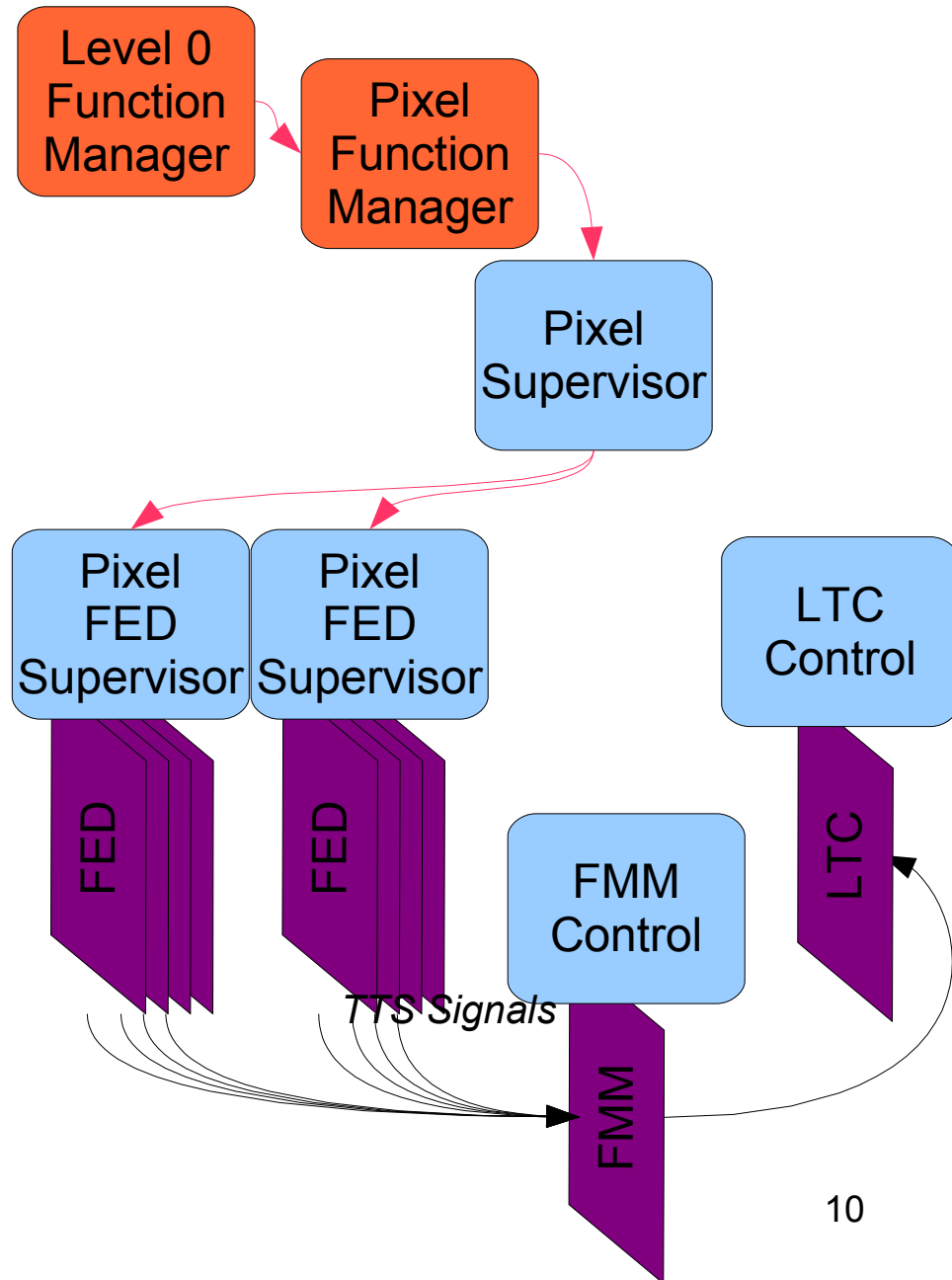
- **Global TTS Test**

- ✓Registered our DAQ Configuration as part of the Global DAQ Configuration in *Resource Service Database*.

- ✓Allowed Global DAQ's **Level 0 Function Manager** spawn our **PixelFunctionManager**, which in turn spawned our **PixelSupervisor** and **PixelFEDSupervisor**.

- ✓Level 0 FM could send all possible permutations of TTS signals to all the 32 FEDs except # 22 and verified that TTS signals were seen at the FMM.

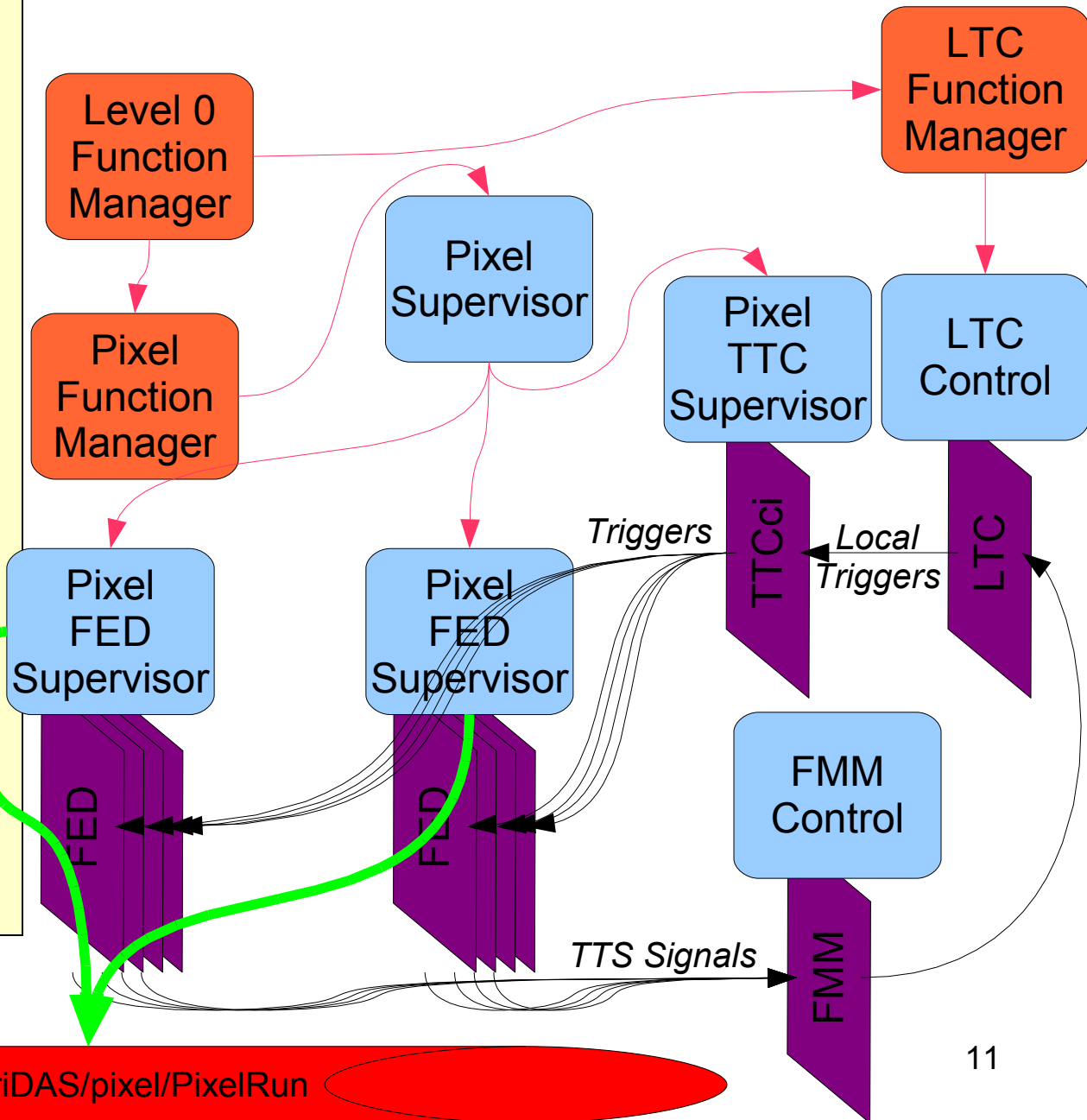
- ✓Pixels were certified to have passed the TTS Test.



The SLInk Test

Local SLInk Test

- We can Configure and Start a “Physics” run from **PixelFunctionManager!**
- We can send random triggers from the LTC (which will be controlled by the Trigger Group later) and immediately see data coming on all 32 FEDs with valid SLInk Headers and Trailers.
- We increased random triggers > 500 Khz to see if we can get TTS lines to fire, but in vain.
- Working towards getting a payload with fake pixel-hits. Involves reviving the Baseline and Address Levels calibration using test-DACs.



Recently Solved and Outstanding Issues

- ✓ Pixel FED Baseline Calibration with Test DACs successful over all 1152 channels!
 - However, algorithm iterates over all channels if one fails to converge!
 - It should check for convergence at the granularity of channels controlled by one Optical Receiver.
- ✓ Pixel Address Levels Calibration with Test DACs has not been tested. Must wait till cooling for the FED crates comes back on.
- ✓ Pixel's LTC Function Manager added to RS 3 Database. (Will be tested from Global DAQ by Gerry Bauer ASAP.)
 - We must write to some area other than our NFS area. (A new environment variable in order?)
 - Be able to start configurations and calibrations *asynchronously* on different Supervisors. Requires putting the calibrations into threads (Workloops in XDAQ). This also ties in with my plan for reporting completion status at runtime on the GUI.
 - “Destroy” from **PixelFunctionManager** often fails to kill XDAQ processes! Probably an RCMS problem and has been reported by other sub-detectors.

We are now READY for a first-order SLink Test with Global DAQ. Passing it will qualify us for participation in the November Global Run with CMS!

- Need to get Run Number from RCMS' RunInfo DB. Also need to get Configuration Keys from RCMS.