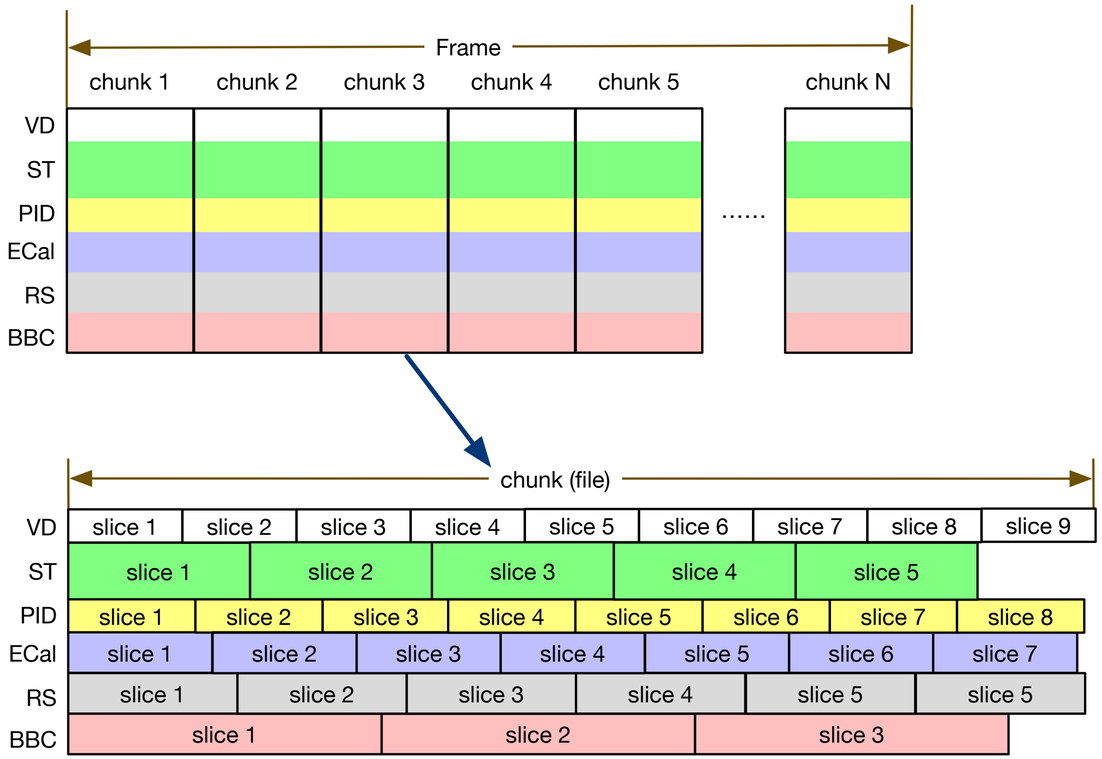
SPD OnLine Filter.
Status update.

Danila Oleynik 10.01.2023

SPD OnLine filter

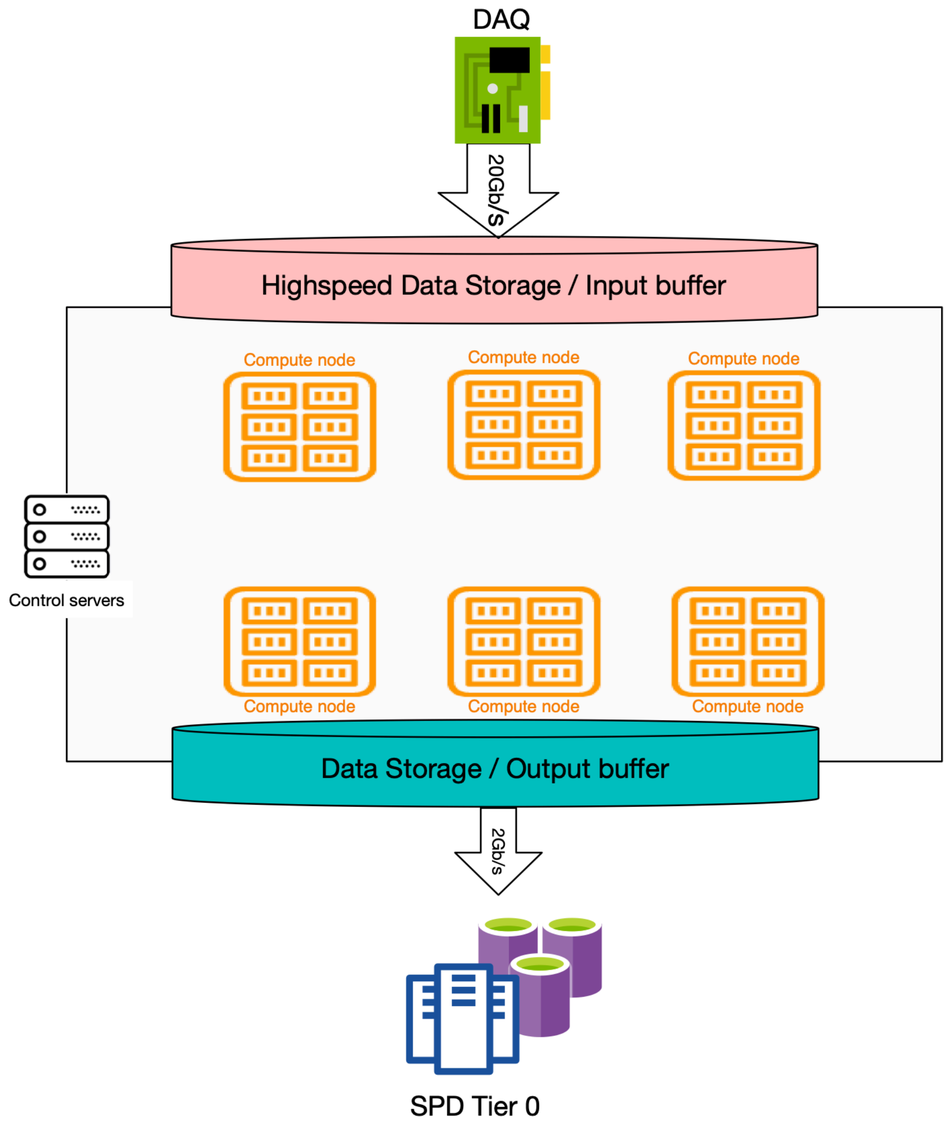
Remainder

- SPD Online Filter is a high performance computing system for high throughput processing of data
- This computing system should carry out next transformations of collected data:
  - reorganize data into event's oriented format – Event building;
  - partial preliminary reconstruction;
  - filter 'boring' events and leave only 'hot';
  - settle output data, merge events into files and files in datasets for future processing.



Online filter infrastructure

- High speed (parallel) storage system for input data written by DAQ.
- Compute cluster with two types of units: multi-CPU and hybrid multi CPU + accelerator(s) (GPU, FPGA etc.).
- A set of dedicated servers for managing of processing workflow, monitoring and other service needs.
- Buffer for intermediate output and for data prepared for transfer to long-term storage and future processing.



Online filter middleware functionality

Data management;

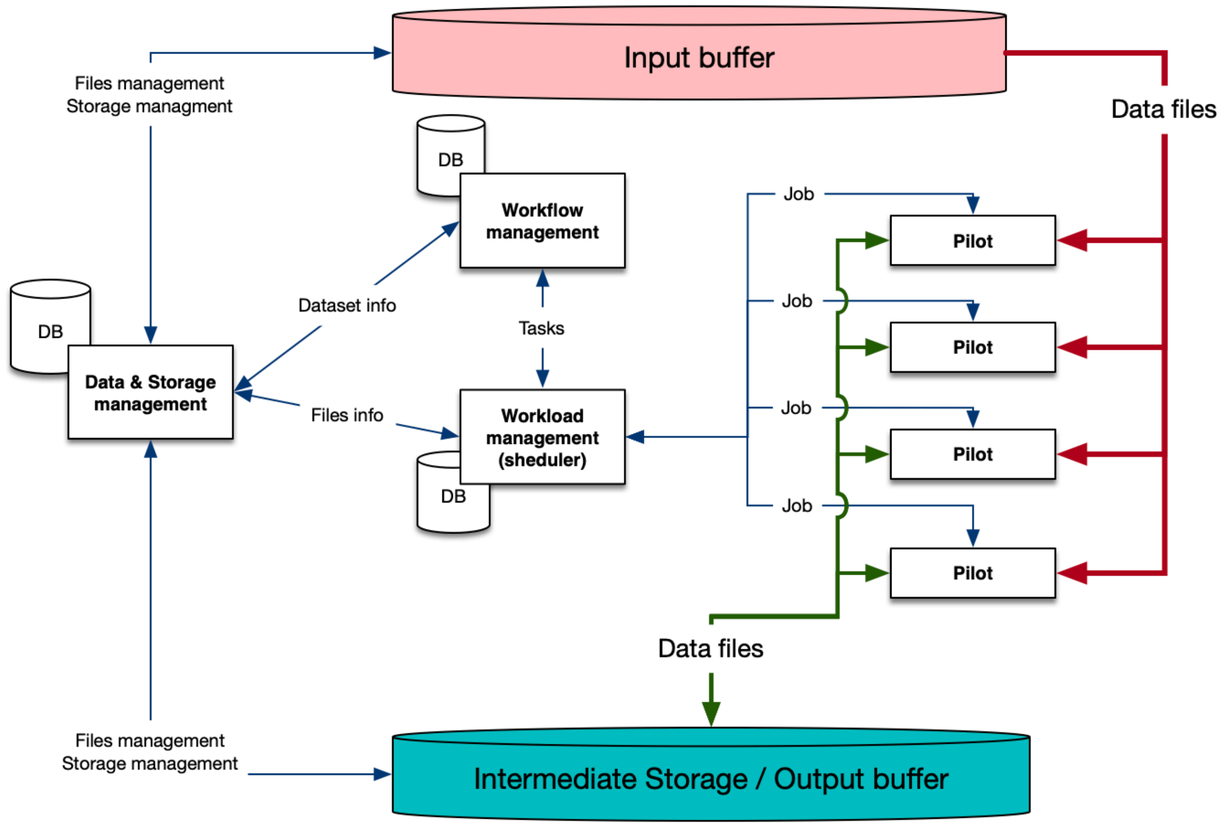
- *Support of data lifetime (registering, global transfer, cleanup);*

Processing management;

- *Generate tasks for each type of processing:*
  - *Events identification (building);*
  - *Verifying of processing results (AI vs traditional processing);*
  - *Select (Filter) events;*
  - *Pack (merge) output data for transferring to “offline”;*

Workload management:

- *Generate required number of jobs to perform task;*
- *Dispatch jobs to pilots;*
- *Control of jobs executions;*
- *Control of pilots (identifying of "dead" pilots)*
- *Manage efficient resources usage*



Resources for prototyping

- At least four services should be realised for initial prototype of Online Filter middleware complex
- Prototype will demonstrate proof of concept and will provide initial code base
- Compute resources for development and testing are provided by JINR Cloud service
- **Manpower.** Nice outcome from first JINR IT School. A few master students are interested to participate in SPD computing and already involved in software design and development process.

Nearest plans

- We have ambitious plan to deliver prototype before July.
  - In February initial design of backend databases for each subsystem should be finished and cross system interfaces will be agreed
  - March - April will be devoted for rapid coding of each component
  - May - June: integrated testing and debugging
  - It will be good to have at least some prototype of application software framework before may, to be able to simulate more or less realistic behaviour of middleware components