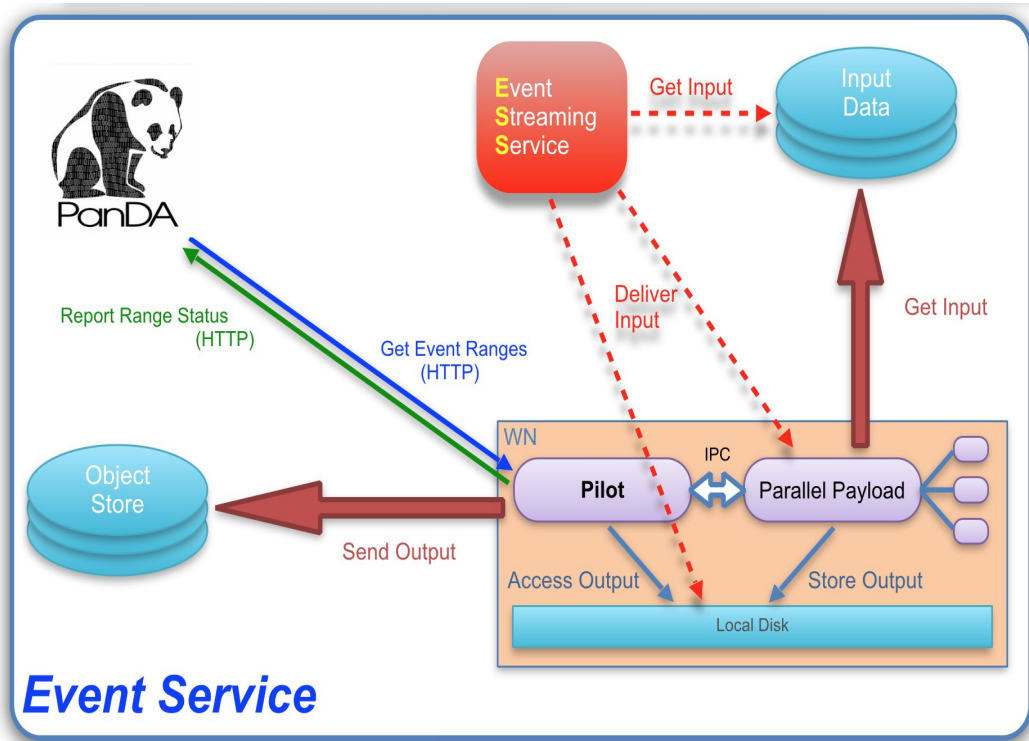


Event Streaming Service(ESS)

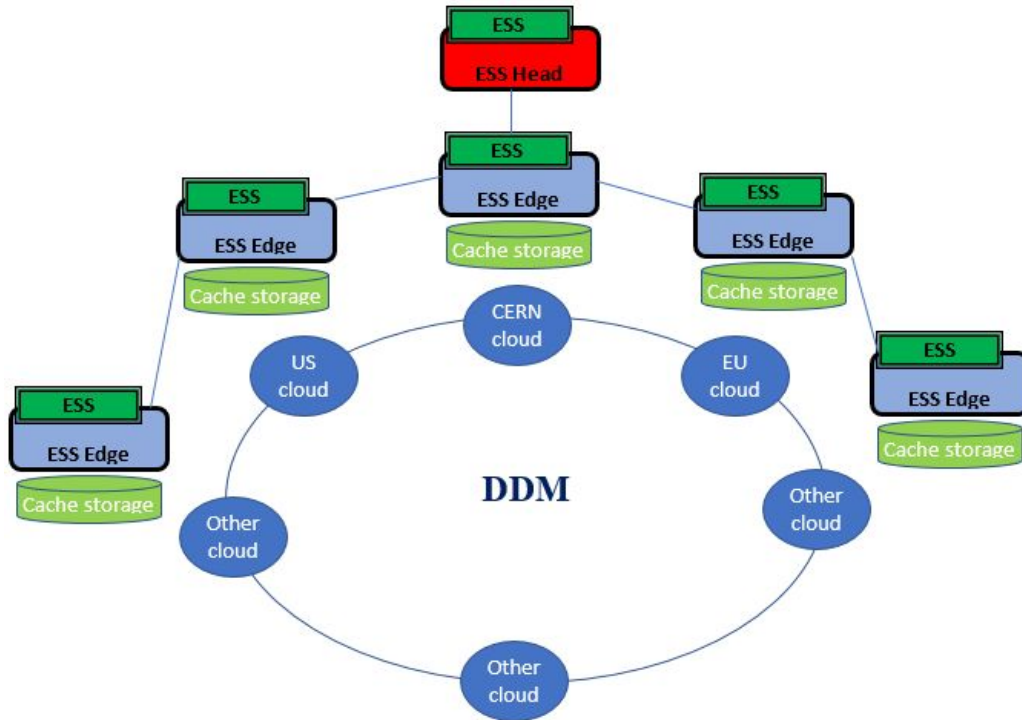
Gancho Dimitrov, Wen Guan, Tadashi Maeno, Vakho Tsulaia, Torre Wenaus

EventStreamingService(ESS)



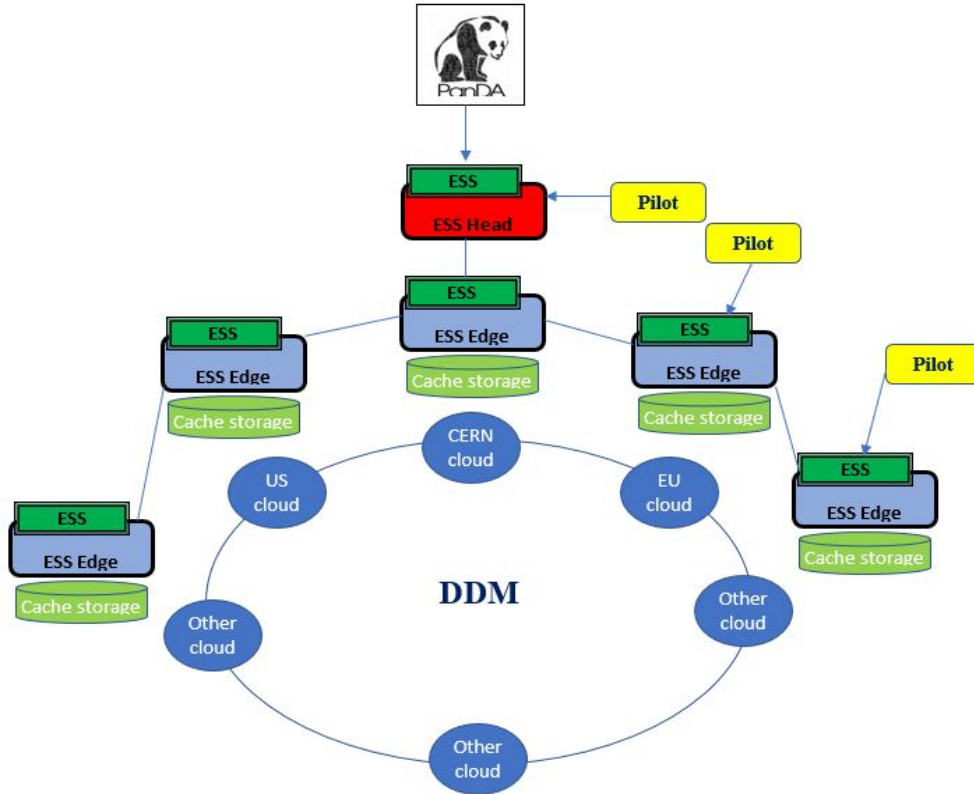
- **ESS: A streaming service to deliver fine-grained input events access.**
- **Object: Intelligently deliver event-level data to Event Service based on the payload requirements.**
- **An EventStreamingService is designed and developed recently.**

EventStreamingService(ESS) - full map



- A fine-grained **Content Delivery Network(CDN)**.
 - One Head Service
 - Multiple distributed Edge Services
- **The Head service**
 - Bookkeeping all pieces of event files.
 - Managing and brokering between distributed Edge services.
- **The Edge service**
 - Report heartbeat to the Head service.
 - Cache files
 - Split files to fine-grained event-level files.

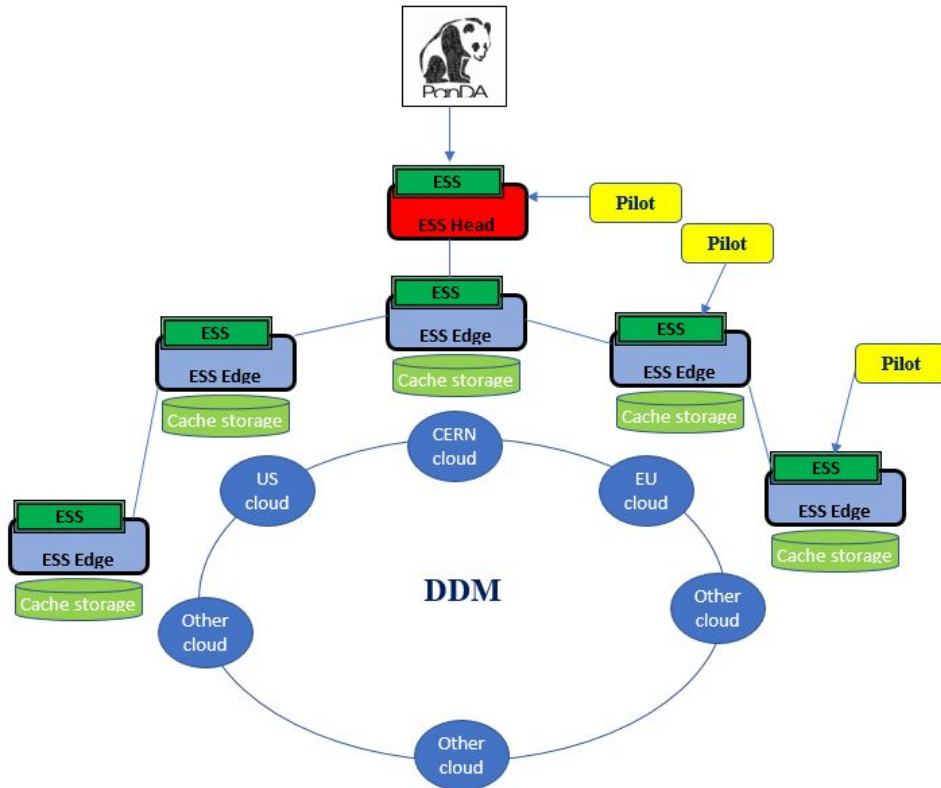
EventStreamingService(ESS) - workflow



* Light blue means parts that are not ready

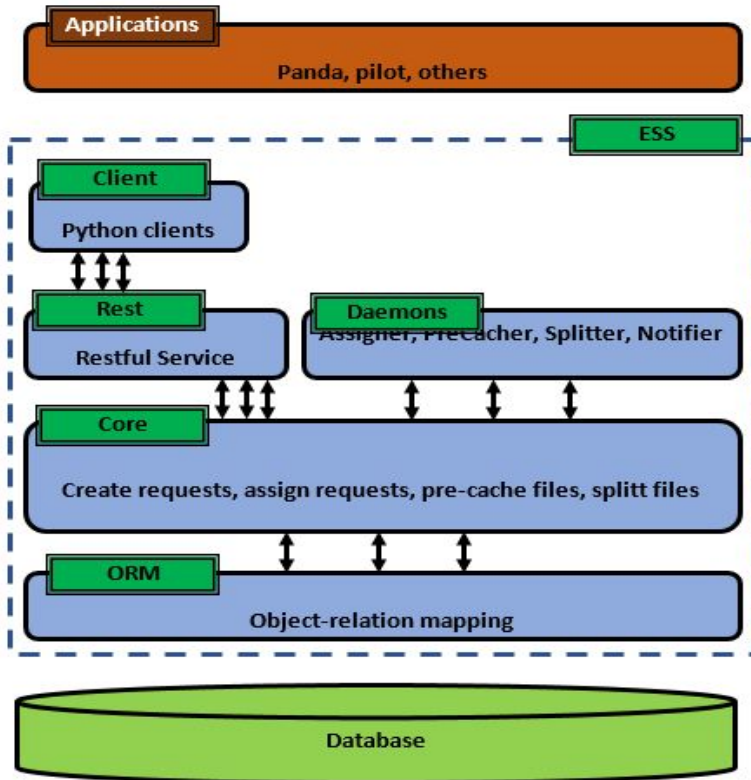
- Panda
 - Define an ES task
 - Request ESS to prepare event-level files
- ESS
 - Precache files from DDM if it's not available in ESS's close sites
 - Download to local disk, or
 - [Subscribe to close sites](#)
 - Split files
 - With AthenaMP prefetcher
 - [others](#)
 - Cache event-level files
 - To objectstore
 - [To xcache](#)
 - Notify to panda to activate the jobs
 - Through Rest interface to poll
 - Through messaging broker(testing)
- Pilot2
 - Call ess client to find best match splitted file for an event range
 - Call ess client to download cached file
 - From objectstore
 - [From others](#)

Event Streaming Service (ESS) - workflow (continue)



- Only ESS Head has full bookkeeping information.
- ESS Edge doesn't permanently bookkeeps any info. But ESS Edge can cache event range files info, for example for a dataset, for a period when pilot requests or ESS Head brokers, just like a Content Delivery Network(CDN).
 - When the Head brokers a request to one Edge, the Edge will cache info needed by this request. The access about this request will be redirected to this Edge service.
 - When pilot downloads an event range from an Edge service and the Edge doesn't have any info about it. The Edge will cache the related dataset info from the Head.
 - Bookkeeping in an ESS Edge can be destroyed at any time.
- Pilot can request files directly from ESS Head or from close ESS Edges.
- The cache storage associated to an ESS Edge can be objectstore, xcache
 - Better to have good remote access performance

EventStreamingService(ESS) - architecture



- **Database**
 - Central Oracle at CERN(Gancho)
- **ORM(Object-Relational Mapping) level**
- **Core level**
 - Providing basic access to ORM level.
- **Rest service**
 - Interface for Edge to heartbeat
 - Interface for Panda to request to pre-cache files
 - Interface for pilot to get event-level file info of cached files
- **Daemons**
 - ResourceManager: manage the cache space
 - Broker and assigner: broker and assign requests to different Edge services.
 - PreCacher: Precache files from ddm
 - Splitter: Split files to fine-grained level
 - Notifier: Notify Panda that the request is ready

EventStreamingService(ESS) - status

- **A prototype workflow is almost ready**
 - **The main ESS workflow and basic components are developed.**
 - **A patch to integrate ess client to pilot2 is also developed(not fully integrated yet because currently the ESS client is on my afs area. Will deploy it to somewhere).**
 - **Tested by:**
 - **Define an ES task from prodsys2.**
 - **Manually calls ess client to register a pre-cache request for this task and polls the request to wait it ready.**
 - **Start pilot2 to run es jobs**
 - **Pilot gets the event range from panda**
 - **Pilot calls ess client to download the matched and prepared event file from ESS**
- **Successful test jobs**
 - <https://bigpanda.cern.ch/job?pandaaid=4262165307>

EventStreamingService(ESS) - next

- **This ESS project started in only one and half months ago, for both design and development. It's very time-limited and currently only a prototype is developed.**
 - **Only basic necessary components and plugins are developed**
 - **Some components and plugins were planned but not yet developed.**
- **Work to extend the components and work to make the components more robust.**
- **Work to develop missing components and plugins which were planned.**
- **Integrate it with Panda and pilot2**

EventStreamingService(ESS) - next

- **Validation, performance and Capability**
 - **After integrated with Panda and pilot2**
 - **Will work to validate the workflow with some validation tasks**
 - **Check the performance and capability**
- **Work to improve components and workflow**

EventStreamingService(ESS) - future

- **Request On Demand**
 - **Currently we will prepare event ranges files before activating jobs**
 - **We may provide a limited scale On Demand Event Streaming service**
 - **For some tail of jobs or for some urgent jobs or for some special sites, ESS can prepare the event files on the fly when the job is running.**
 - **In a limited scale.**
 - **If more requests than a configured scale, will return failure immediately instead of letting jobs waiting.**
 - **ESS service will handle these On Demand requests in a high priority.**
- **Towards Intelligent Data Deliver Service(IDDS) of DOMA.**
 - **Extend ESS to a more general IDDS.**