HSC Data Processing Environment

～Upgrading plan of open-use computing facility for HSC data

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Missions of HSC Data Processing in NAOJ

- Support General Open-use Observing Programs with HSC
- Carry out data production for Subaru Strategic Program (SSP)

→ Both require more powerful processing resources than the present system

- We plan to introduce a new large-scale data analysis system in updating the current open-use computer facility operated by Astronomy Data Center (ADC)

Open-use Programs

- Condition
  - Support 5 programs at a time
- Requirements
  - >>32cores – ~100cores / program
  - 1TB raw data inputs + 10TB outputs
    - up to 10TB inputs + a few x 100TB outputs / intensive program
  - The current systems (in next slide) are not optimal

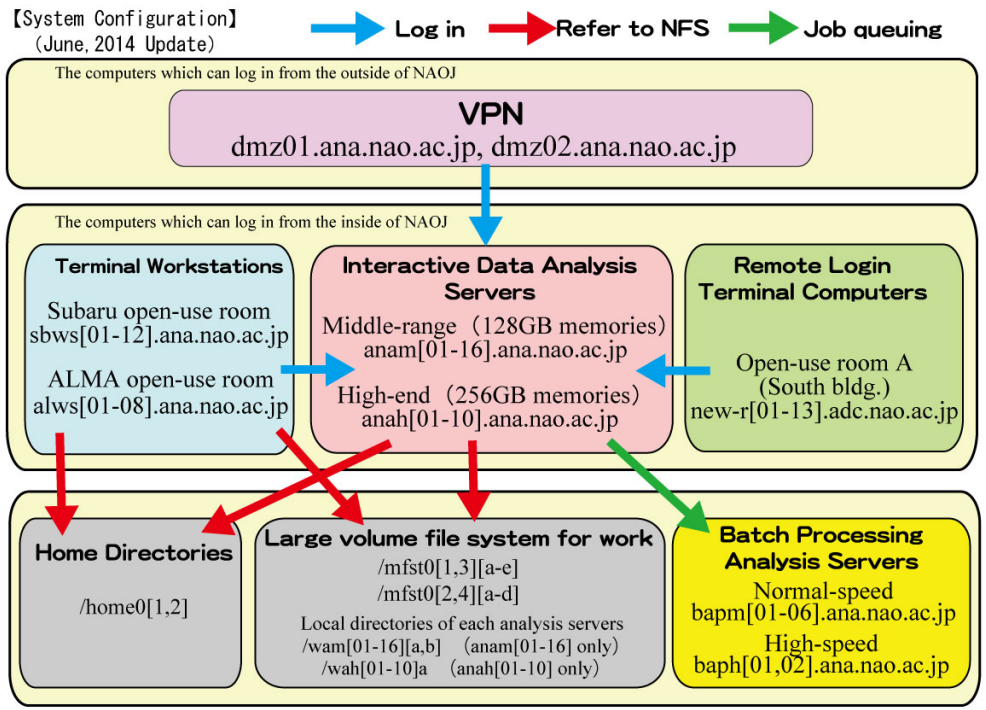
→ Improve the data processing environment for HSC users

NAOJ Support for Open-use Data Analysis (Platform)

1) Astronomy Data Center (ADC) Data Analysis System

Not optimal for HSC data analysis

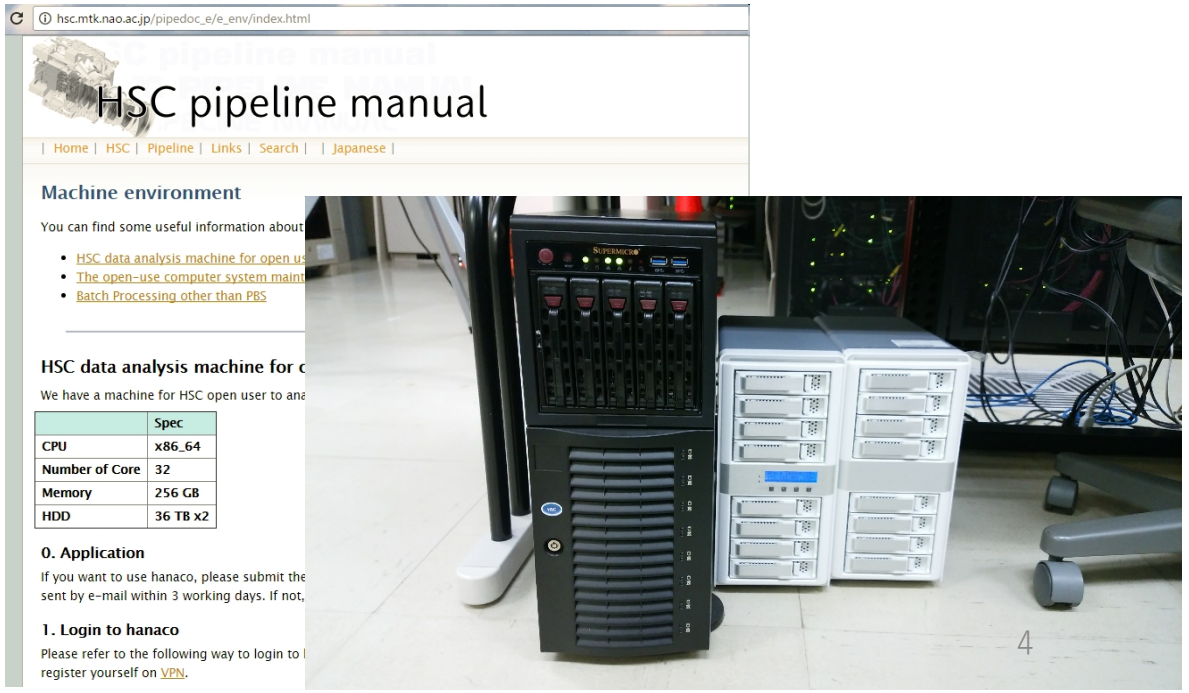
- Only <=16 cores available



2) HSC helpdesk/Subaru (hanaco)

Not strong enough for multiple user

- 32core, 256GB, 100TB disk
- designed for 1-night data / week

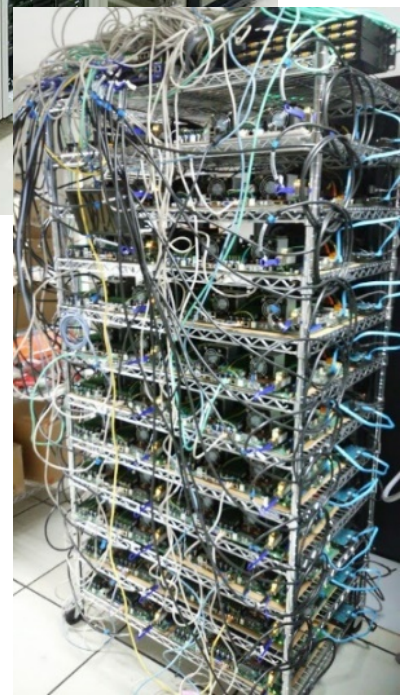


HSC-SSP Data Processing

- Condition
  - Runs up to twice a year
  - 100TB inputs + 1PB outputs within 2-3 months
- Requirements
  - CPU: Minimum 1000 cores
  - Memory: >>8 GB / process
  - Storage: >>1.5PB working area on fast file system

→Update the current system,
to get prepared for full SSP data release

HSC SSP cluster system 356cores
Operated by HSC (Subaru + ADC)

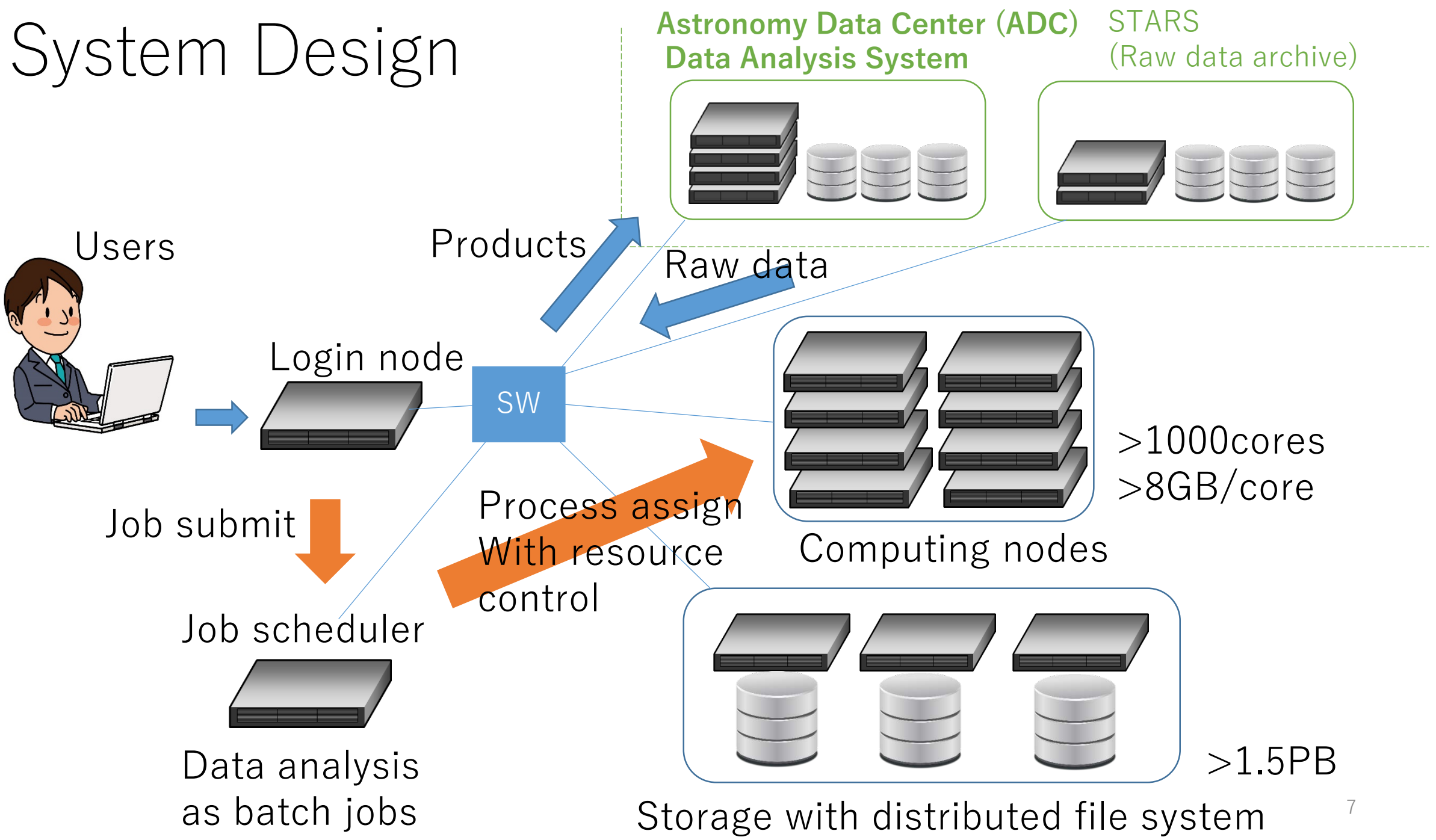


Cluster system 1056cores
operated by CfCA & HSC

A New Large-scale DA System

- Setting up and Operation
  - As part of the ADC/NAOJ open-use DA support
    - In coordination with Subaru Telescope, to primarily promote HSC sciences incl. SSP
      - integration, system admin (mostly in-house), helpdesk (w/ Subaru)
    - Cooperation with CfCA/NAOJ as necessary
- Target system design
  - CPU: >1000 cores
    - to be increased up to >> 2000cores
  - Memory: >8 GB /core
  - Storage: 1.5PB built on a parallel file system
    - to be increased up to > 2.0PB

System Design



Draft Operating Model (TBD) – User Management

- Accounts shared with ADC DA System
  - VPN access from outside NAOJ
- Registration for this cluster system

Draft Operating Model (TBD) – Resource Assignment

- Computing resources (CPU time, disk space etc) assigned based on:
  - Priority of programs determined by the Subaru observatory
    - maximize outcomes from highly-ranked programs by the observatory (TAC)
  - Basic rule for balancing CPU loads
- SSP (as a highest-priority program)
  - Given necessary resources (1000core, 1PB storage) for ~2 months x 2 / yr
- Batch job queues for resource control
  - With different levels of available resources
  - large (SSP), middle (a few x100 cores), small (tens cores), test (<~16cores)

Draft Operating Model (TBD) – Issues

- Archive users or users with non-HSC data
- Balancing between Subaru PIs and the aboves
- Relation with other observatories' programs
- Period of resource assignment

- We will start with coordination with Subaru first, and figure out a adequate operating rule

Schedule

- Developing the system from FY2018 over 3—5 years
  - FY2018: budget is assumed as part of upgrading the NAOJ comp. system
  - FY2019—later: requires approval from NAOJ for FY2019 and later

    → will require justification
- FY2018
  - Started a procurement process for the initial system
  - Aims to be operational in S19A (2019.2—)
    - May perform some commissioning processing in late S18B
    - hanaco users will be gradually moved to this system

Summary

- We plan to introduce a new cluster system for open-use HSC data processing as part of ADC's DA support
- SSP will occupy the system resources twice a year
- Resource assignment will reflect observers' priority
- We aim to make the initial system available in S19A

Please see the poster by S. Makiuti et al. (P 14)

for ADC data analysis system

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