NorESM simulations for HAPPI

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status and plans

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with contributions from others

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uni Research

Bjerknes Centre
for Climate Research

Experiments

Tier	Experiment	Simulations (minimum)	Schedule*
Tier 1	present decade	100	completed
SST perturbation from CMIP5 ensemble mean	1.5 deg	100	September
	2 deg	100	October
Tier 2	1.5 deg	15 models X 10 members	November
SST perturbation from individual CMIP5 models	2 deg	15 models X 10 members	December

*integration time per experiment ~20 days (not considering 6-hourly output)

Open issues

- how much storage will NorStore provide? ok to borrow some storage from EVA?

- how many SST patterns should we consider for the Tier 2 simulations?

- for which experiments and how many members should we write 6-hourly output needed for downscaling?
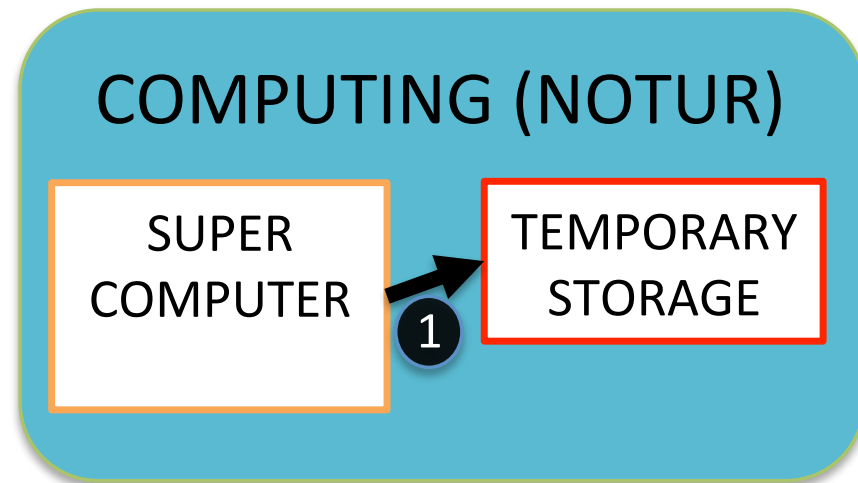
NorESM_Happi setup

- **model:** CAM4-OSLO, 1deg resolution

- **computational platform:** HEXAGON (Cray-XE6 in Bergen), cpu time provided by BCCR

- **ensemble setup:** max.128 members in parallel (1 node=32 cores per member, total=4096 cores)

- **performance:** 0.63 sim-yr/d (12 sim-yr/19 d)

- **boundary conditions:** Operational Sea Surface Temperature and Sea Ice Analysis (OSTIA) + CMIP5 projected anomalies; adjusted GHGs + anthropogenic aerosols?
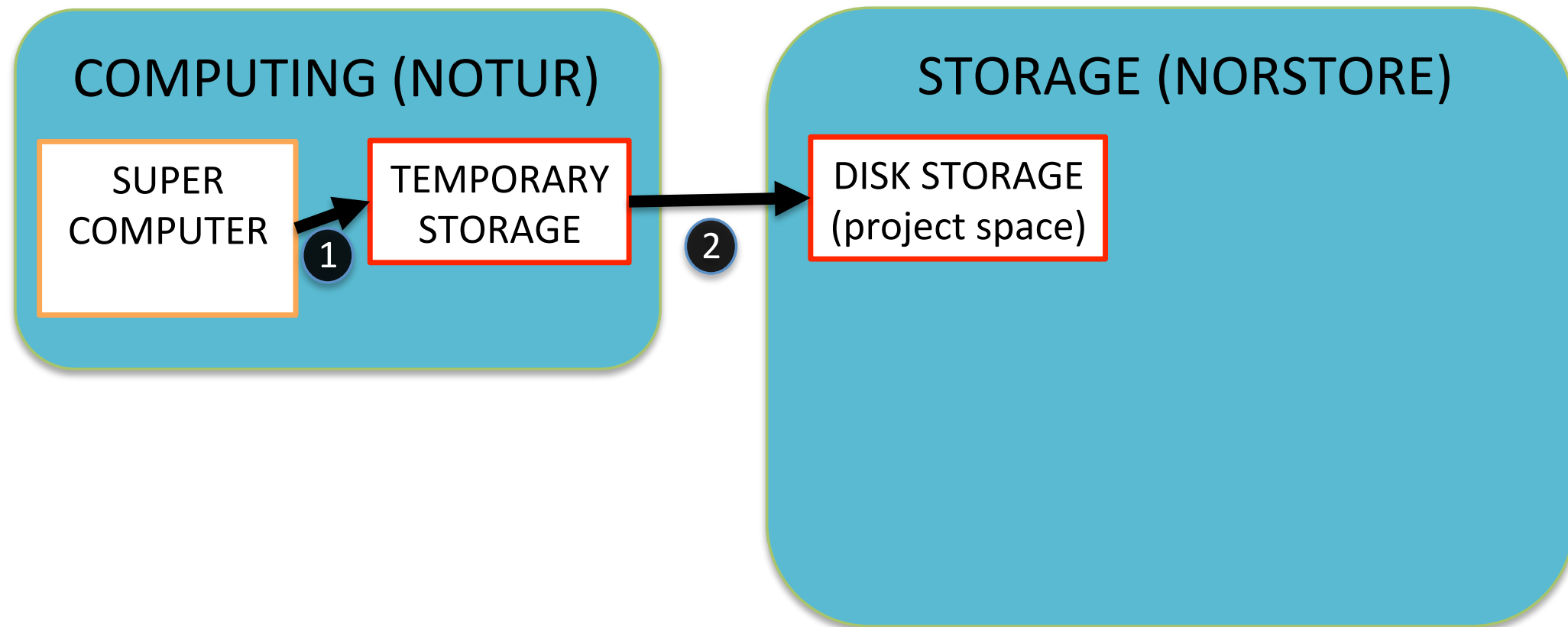
Diagnostic output

- **default:** http://www.happimip.org/wp-content/uploads/2016/03/HAPPI_request_diagnostics_v2.pdf
(update: Z, T, Q, U, V at 850, 500, 250 hPa; snow water, daily minimum Qrel at 2m, daily subsurface/surface runoff)

- **daily extra:** U, V and T on model levels

- **6-hourly for downscaling:** 3d model level (U, V, T, Q, CLOUD WATER) ; 2d (PS, SLP, SIC, U10m, V10m, TS, T2m, Q2m)

Workflow

COMPUTING (NOTUR)

SUPER COMPUTER → ① TEMPORARY STORAGE

1. Model integration & short-term archiving

Workflow

COMPUTING (NOTUR)

SUPER COMPUTER

TEMPORARY STORAGE

1

STORAGE (NORSTORE)

DISK STORAGE (project space)

2

1. Model integration & short-term archiving
2. Transfer to national storage facilities (disk)

Workflow
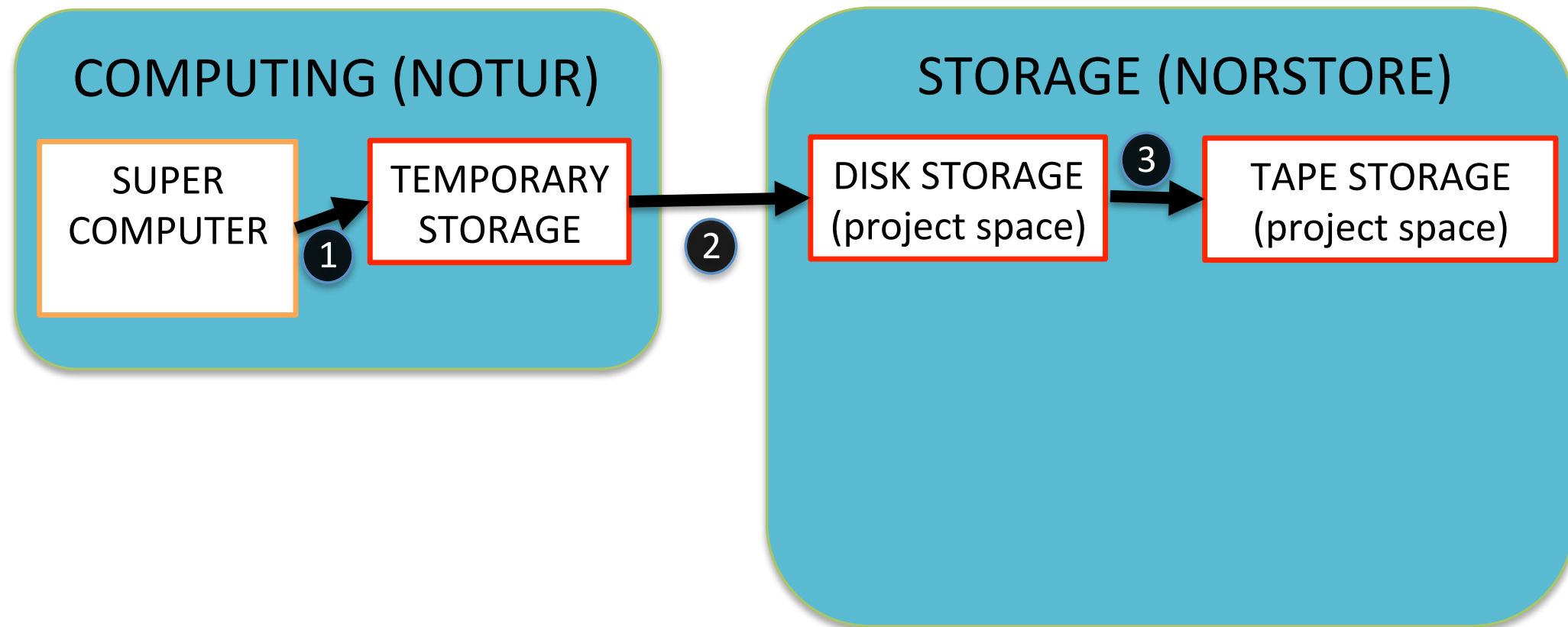
COMPUTING (NOTUR)

SUPER COMPUTER → TEMPORARY STORAGE

STORAGE (NORSTORE)

DISK STORAGE (project space) → TAPE STORAGE (project space)

1. Model integration & short-term archiving
2. Transfer to national storage facilities (disk)
3. Backup of raw output (tape)

Workflow

COMPUTING (NOTUR)

SUPER COMPUTER → **1** → **TEMPORARY STORAGE**

STORAGE (NORSTORE)

DISK STORAGE (project space) → **3** → **TAPE STORAGE (project space)**
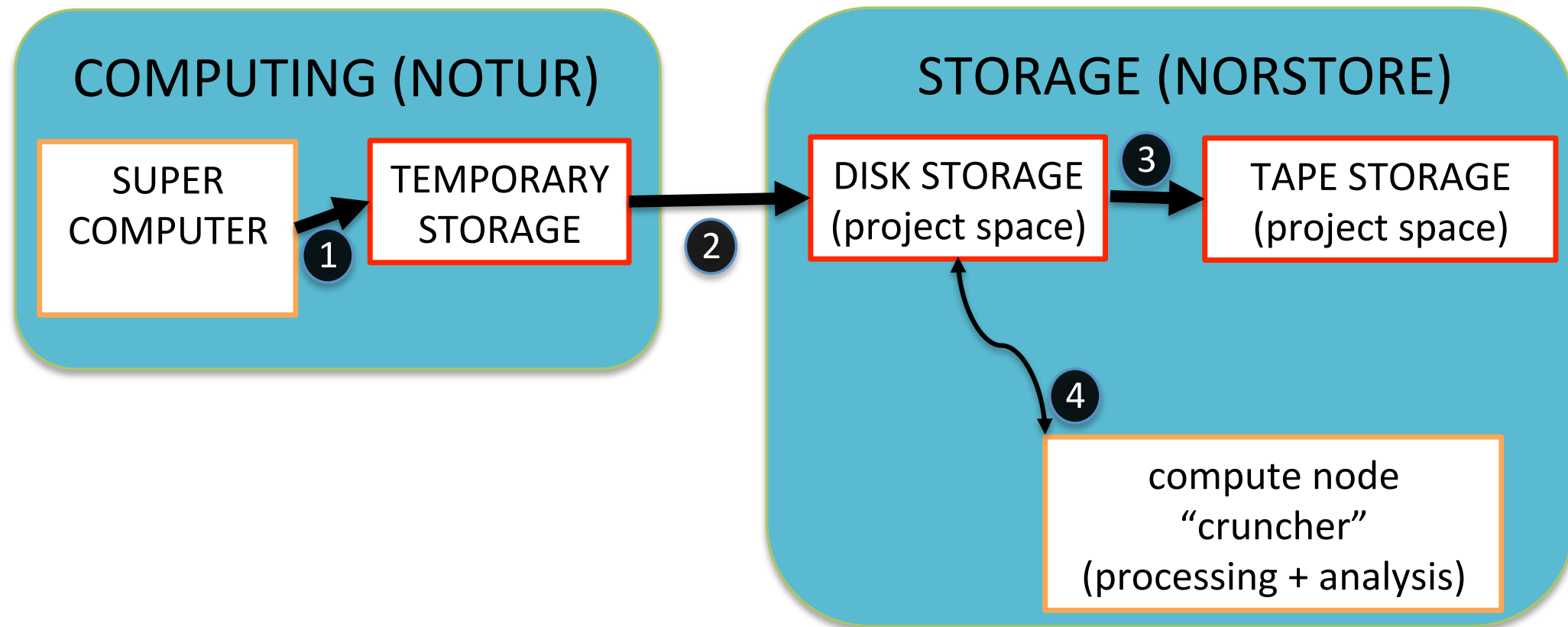
2

4

compute node "cruncher" (processing + analysis)

1. Model integration & short-term archiving
2. Transfer to national storage facilities (disk)
3. Backup of raw output (tape)
4. Compression & CMOR-ization

Workflow

COMPUTING (NOTUR)

SUPER COMPUTER → TEMPORARY STORAGE

STORAGE (NORSTORE)

DISK STORAGE (project space) → TAPE STORAGE (project space)

HTTP server

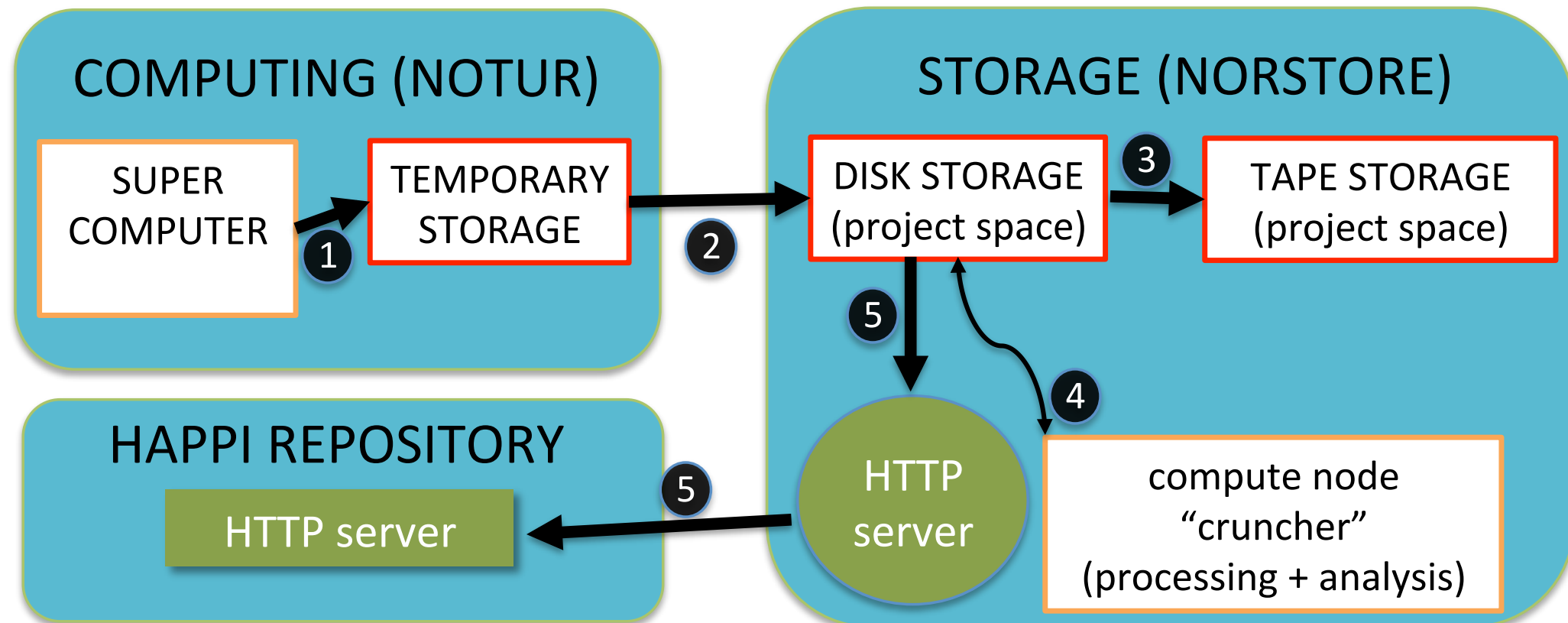compute node "cruncher" (processing + analysis)
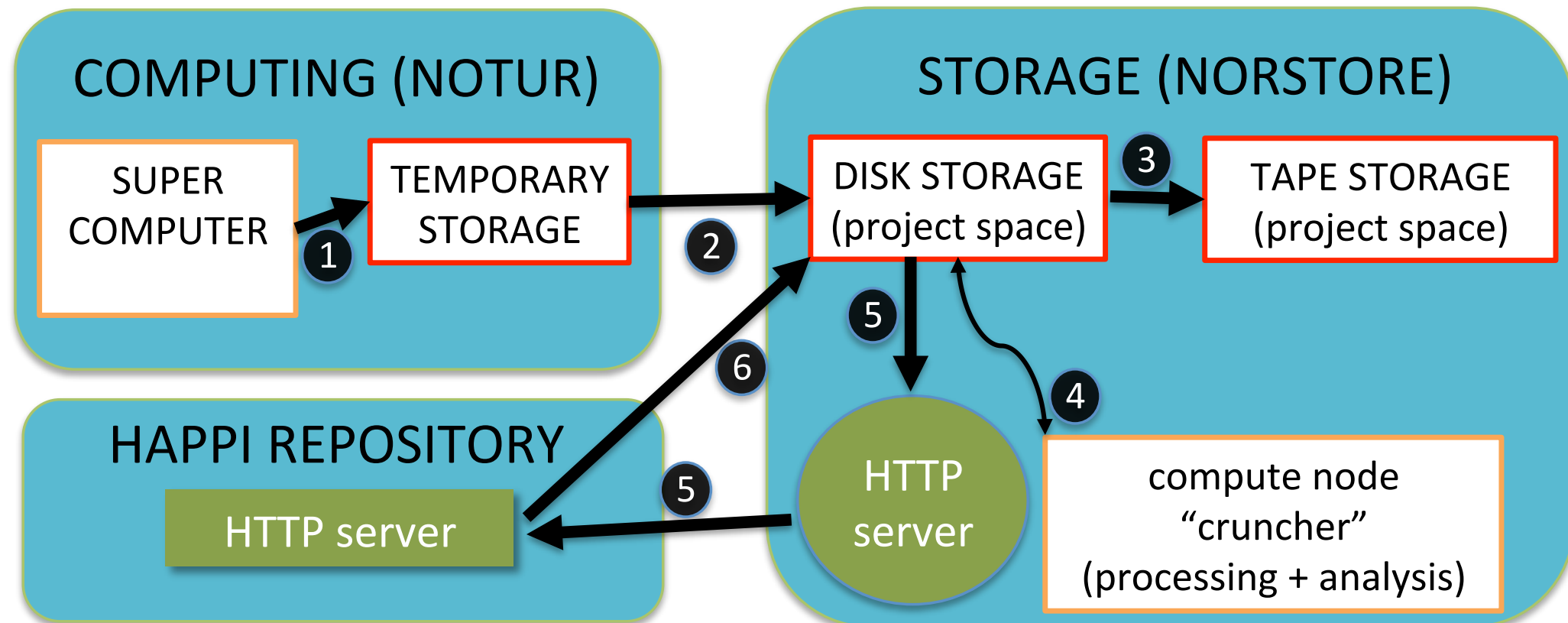
HAPPI REPOSITORY

HTTP server

1. Model integration & short-term archiving
2. Transfer to national storage facilities (disk)
3. Backup of raw output (tape)
4. Compression & CMOR-ization
5. Transfer to HAPPI repository at NERSC

Workflow

COMPUTING (NOTUR)

SUPER COMPUTER

TEMPORARY STORAGE

STORAGE (NORSTORE)

DISK STORAGE (project space)

TAPE STORAGE (project space)

HAPPI REPOSITORY

HTTP server

HTTP server

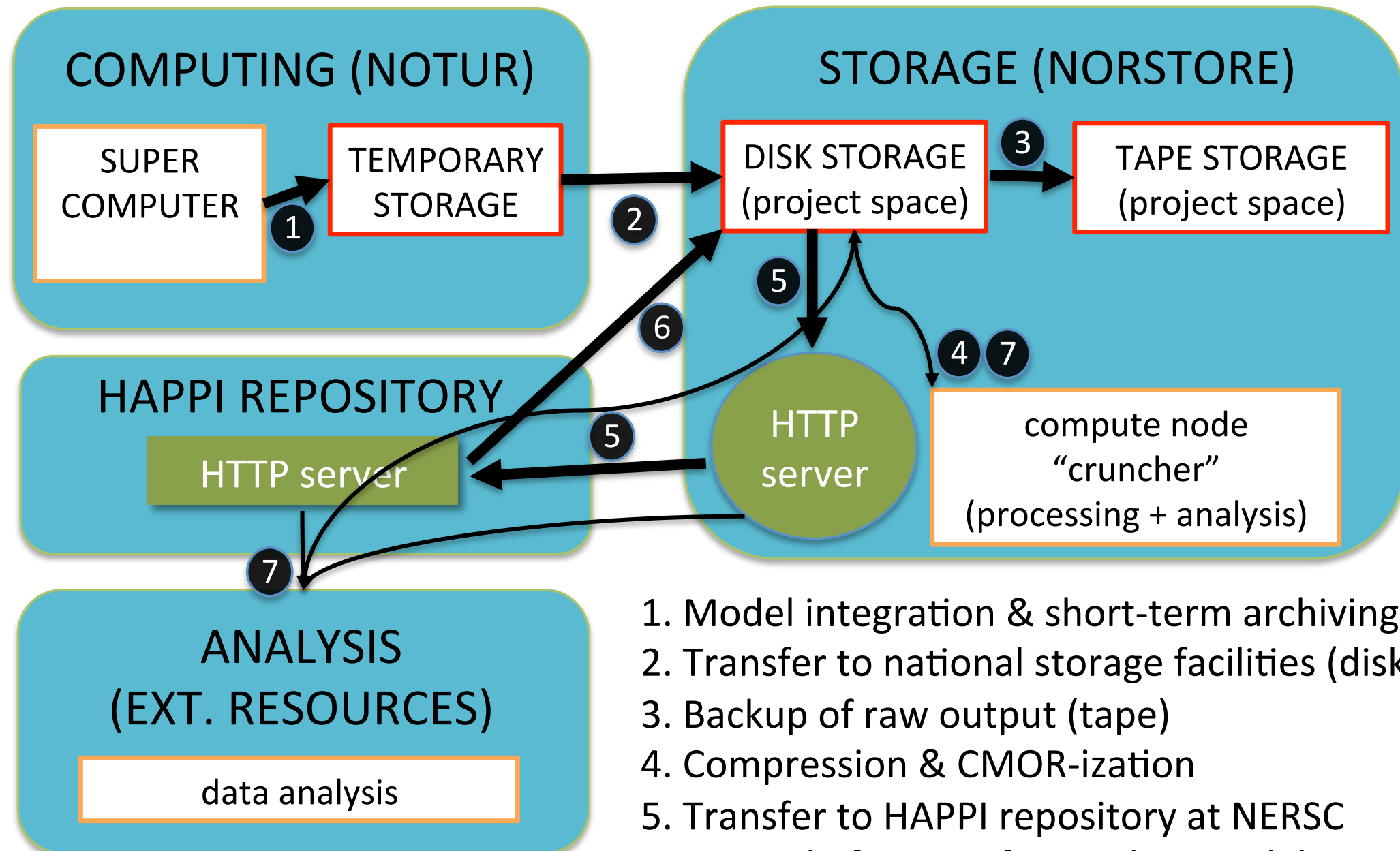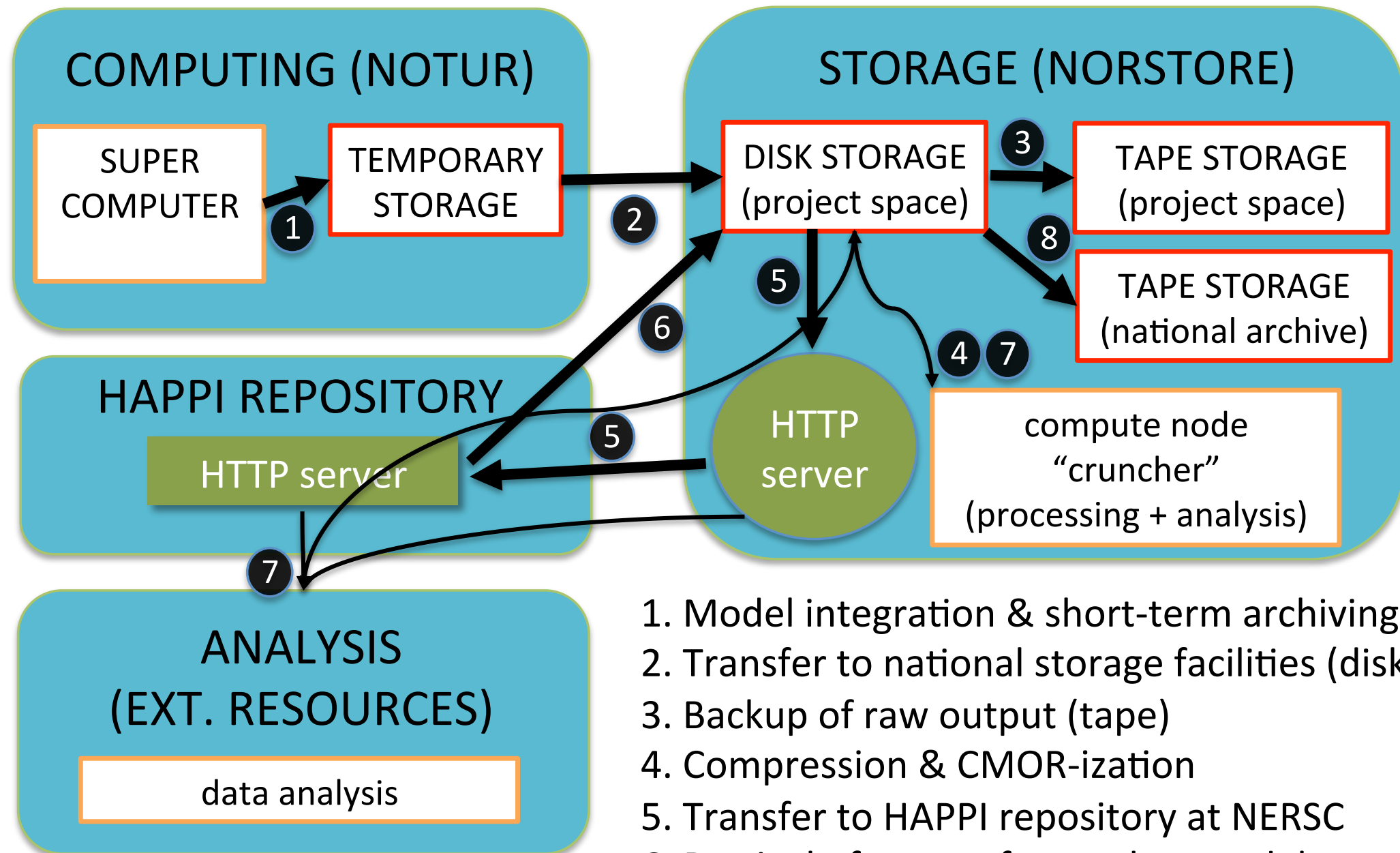compute node "cruncher" (processing + analysis)

1. Model integration & short-term archiving
2. Transfer to national storage facilities (disk)
3. Backup of raw output (tape)
4. Compression & CMOR-ization
5. Transfer to HAPPI repository at NERSC
6. Retrieval of output from other models

Workflow

COMPUTING (NOTUR)

SUPER COMPUTER

TEMPORARY STORAGE

STORAGE (NORSTORE)

DISK STORAGE (project space)

TAPE STORAGE (project space)

HAPPI REPOSITORY

HTTP server

HTTP server

compute node "cruncher" (processing + analysis)

ANALYSIS (EXT. RESOURCES)

data analysis

1. Model integration & short-term archiving
2. Transfer to national storage facilities (disk)
3. Backup of raw output (tape)
4. Compression & CMOR-ization
5. Transfer to HAPPI repository at NERSC
6. Retrieval of output from other models
7. Data analysis

Workflow

COMPUTING (NOTUR)

SUPER COMPUTER

TEMPORARY STORAGE

STORAGE (NORSTORE)

DISK STORAGE (project space)

TAPE STORAGE (project space)

TAPE STORAGE (national archive)

HAPPI REPOSITORY

HTTP server

HTTP server

compute node "cruncher" (processing + analysis)

ANALYSIS (EXT. RESOURCES)

data analysis

1. Model integration & short-term archiving
2. Transfer to national storage facilities (disk)
3. Backup of raw output (tape)
4. Compression & CMOR-ization
5. Transfer to HAPPI repository at NERSC
6. Retrieval of output from other models
7. Data analysis
8. Transfer to long-term archive (tape)

TODO

Task	Description	When	Who
1	set up and perform remaining HAPPI experiments	2016	Øyvind, Lise, Ingo
2	backup raw data on tape	2016	Ingo
3	QC/experiment verification: boundary conditions applied correctly? diagnostics?	2016	Øyvind, Lise, Ingo
4	adapt post-processing (CMOR) tools to HAPPI output specs & do post-processing	2016	Ingo
5	transfer NorESM HAPPI output to NERSC	2016	Ingo
6	make 6-hourly output accessible to downscaling groups	2016	Ingo
7	download output from other HAPPI contributors to NorStore	2017	Ingo?
8	transfer NorESM HAPPI output to NorStore's long-term archive	2017	Ingo, Lise?