IX SPD collaboration meeting

Production manager control panel for the SPD experiment

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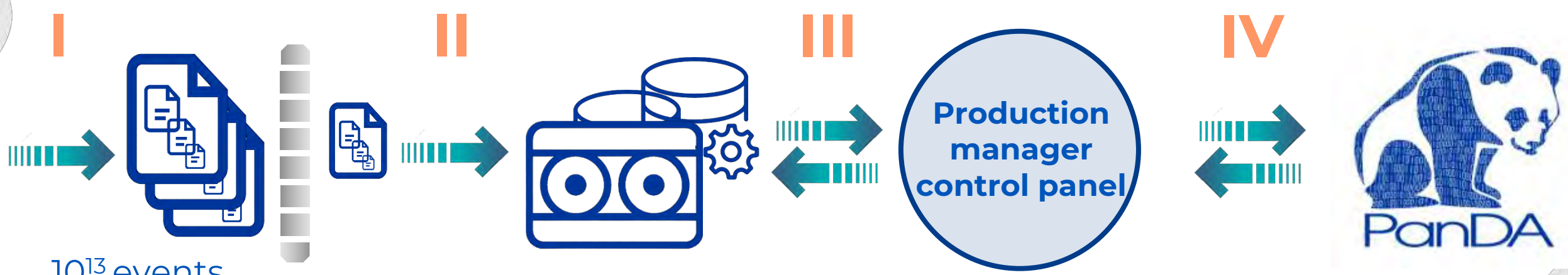
Motivation for developing the system



10^{13} events
x
10-15 KB
≈
10^{2} PB/year

dropout ~90%

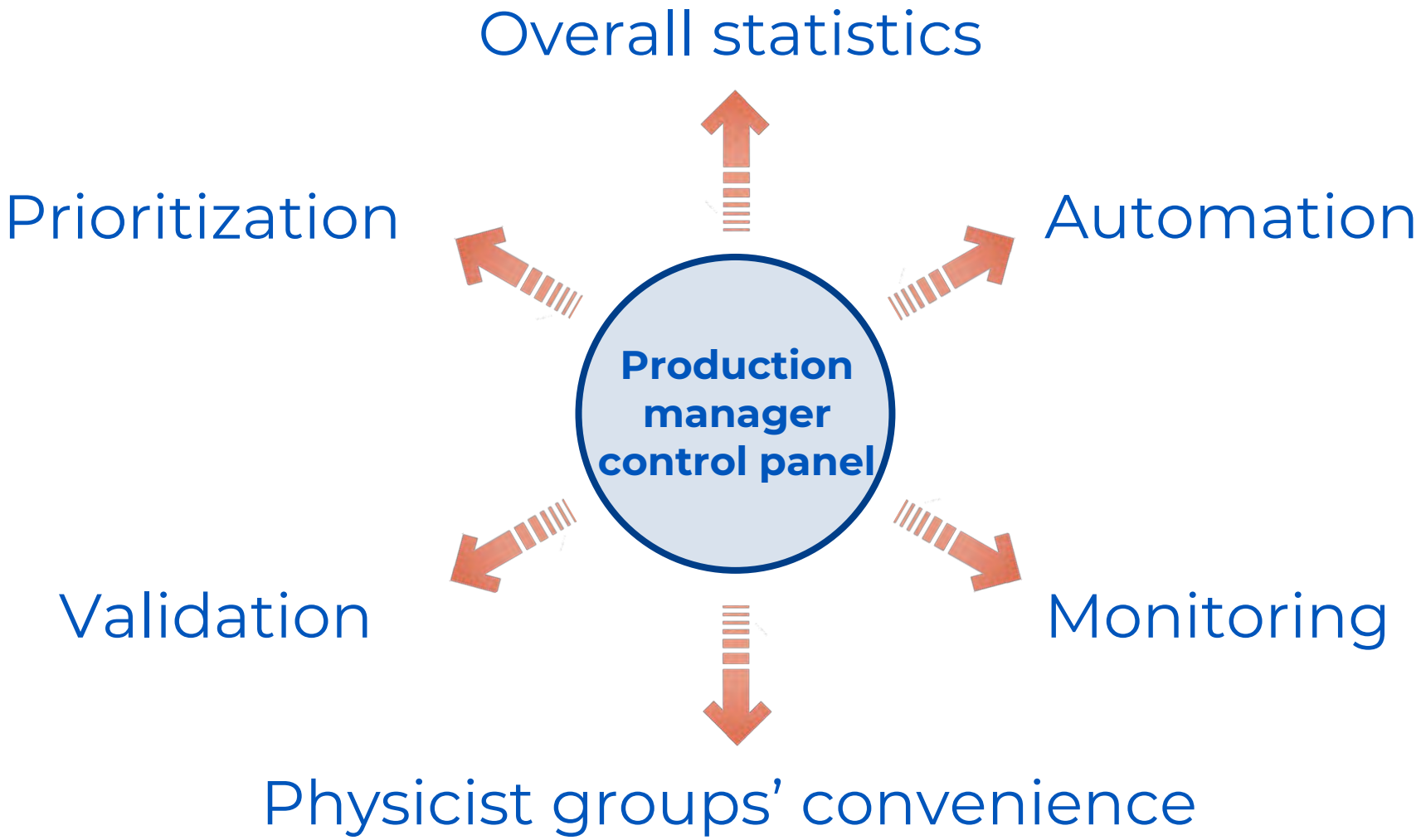
~ 1 - 10 s/event
↓
5 - 60 · 10^{3} CPU

Tasks
↓ ↓ ↓

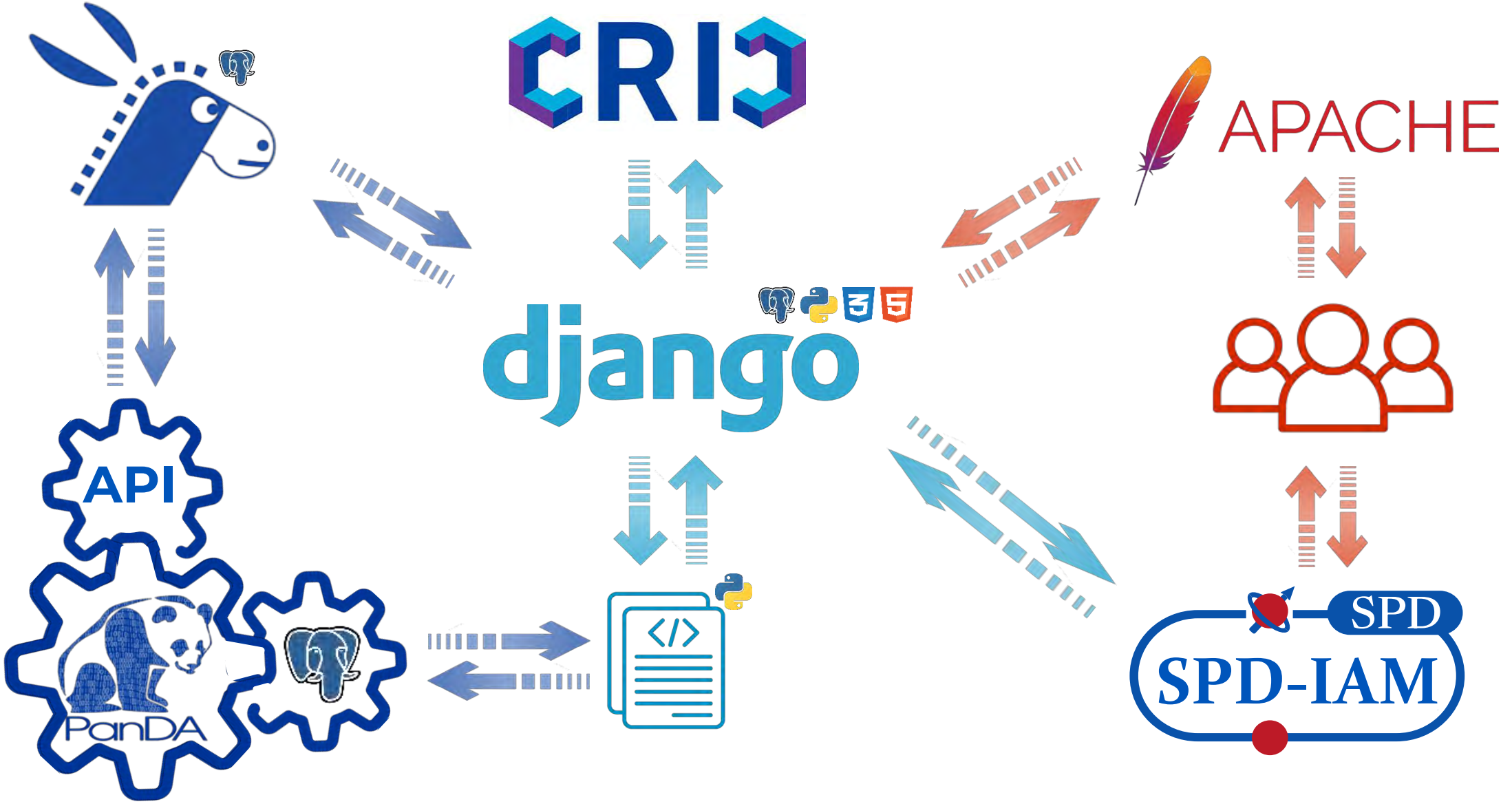
- Testing of application software
- Mass modeling
- Processing
- Reprocessing

Multiple repetitions of similar tasks
- need for constant collection of parameters to launch tasks
- need to generate proxy certificates or obtain tokens
- persistent risk of errors

Current service concept



Technology stack

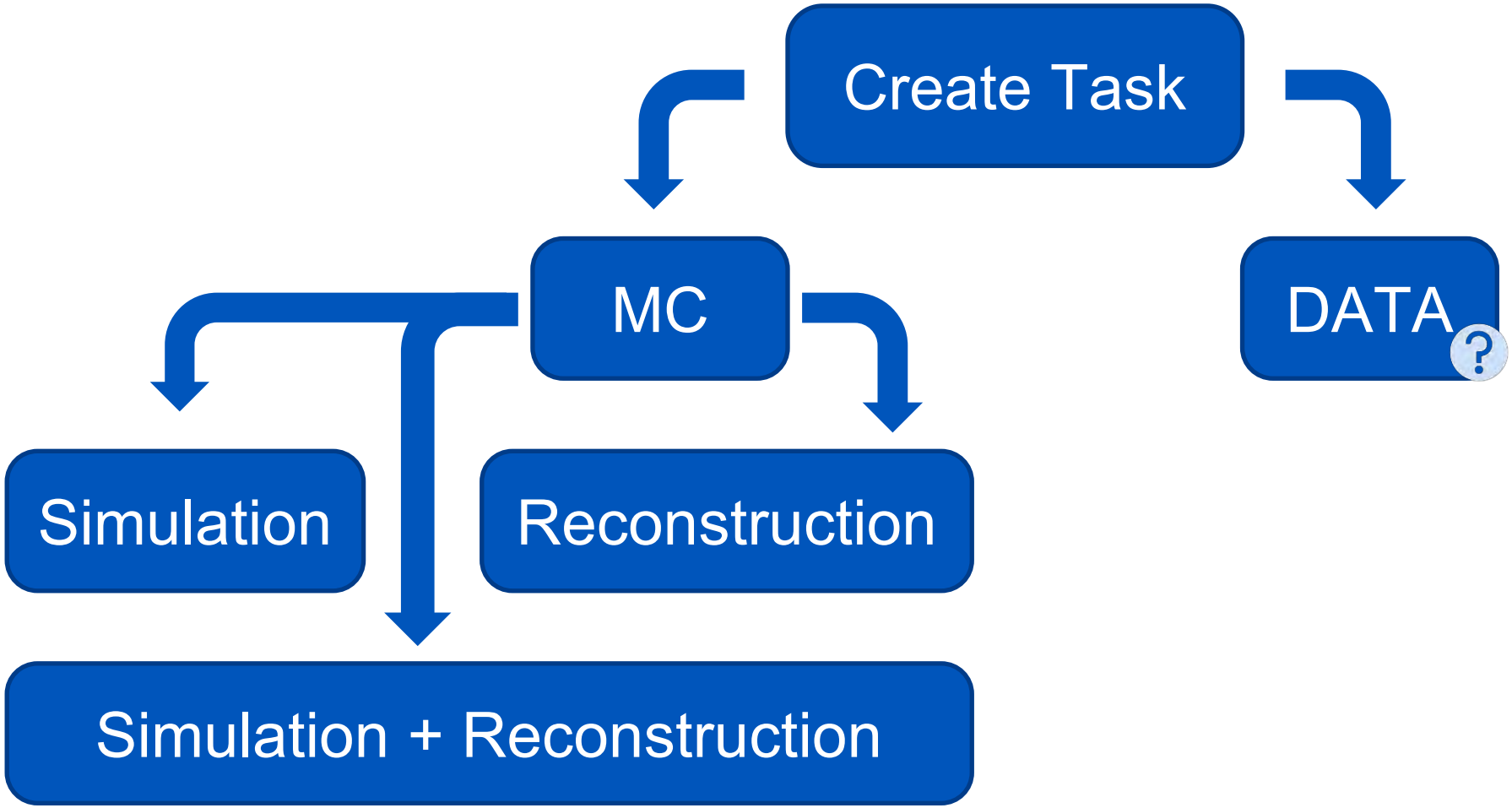


Work done

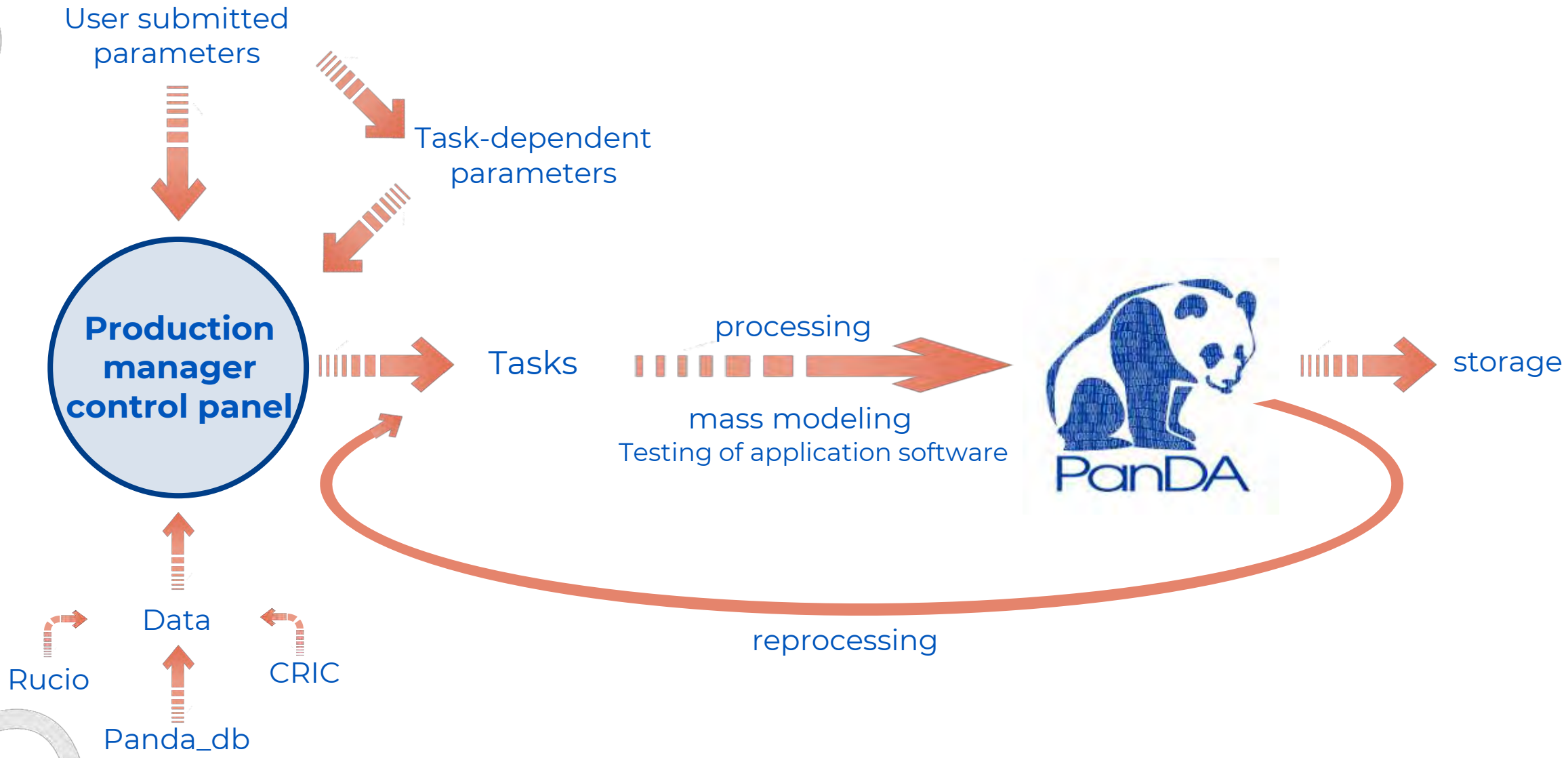
- A web application prototype has been developed
  - User authentication via SPD-IAM
  - Task creation following naming conventions
  - Job status tracking with filtering and sorting capabilities
  - Configured decorators and middleware

- Implementation of automation scripts
- Integration with PanDA WMS using JWT
- Logging interactions with PanDA WMS

Task creation 1/3



Task creation 2/3



Task creation 3/3

Simulation

Task Creation

Task name:

Output dataset name:

Naming convention here

Total events: 0

Events per job: 0

Cloud: RU

Data disk: SPDDATADISK

Skip scout:

Offset: 0

Path to execution files:

smth like -> /cvmfs/spd.jinr.ru/production/MC/minbias-P8-spdroot417-dev.10GeV.V01

Path to container:

smth like -> /cvmfs/spd.jinr.ru/images/spdroot-dev-4.1.7.sif

Create task

Reconstruction

Task Creation

Task name:

Input dataset name:

Naming convention here , note that no extension expected

Output dataset name:

Naming convention here

Files per job: 0

Cloud: RU

Data disk: SPDDATADISK

Skip scout:

Offset: 0

Path to execution files:

smth like -> /cvmfs/spd.jinr.ru/production/MC/minbias-P8-spdroot417-dev.10GeV.V01

Path to container:

smth like -> /cvmfs/spd.jinr.ru/images/spdroot-dev-4.1.7.sif

Create task

Monitoring

Select field | Enter value | Filter

Task ID	Task name ↑ ↓	Parent ID	Creator	Status	Done jobs	Default/Current priority	Total events	Submit time ↑ ↓	Start time ↑ ↓	End time ↑ ↓
343	PROD2025-008.RECO	343	Elena Zemlyanichkina	finished	9997	900/900	0	12:40, 06 Apr 2025	12:48, 06 Apr 2025	03:56, 07 Apr 2025
342	PROD2025-008.SIM	342	Elena Zemlyanichkina	done	10000	900/900	0	03:06, 05 Apr 2025	06:08, 05 Apr 2025	11:38, 06 Apr 2025
341	PROD2025-007.RECO	341	Elena Zemlyanichkina	finished	9993	900/900	0	03:40, 04 Apr 2025	06:46, 04 Apr 2025	01:41, 05 Apr 2025
340	PROD2025-006.RECO	340	Elena Zemlyanichkina	aborted	0	900/900	0	03:21, 04 Apr 2025	None	03:35, 04 Apr 2025
339	PROD2025-007.SIM	339	Elena Zemlyanichkina	done	10000	900/900	0	12:42, 03 Apr 2025	12:50, 03 Apr 2025	22:57, 03 Apr 2025
338	PROD2025-006-RECO	338	Elena Zemlyanichkina	done	1535	900/900	0	04:08, 03 Apr 2025	04:11, 03 Apr 2025	12:04, 03 Apr 2025
337	PROD2025-006-SIM	337	Elena Zemlyanichkina	running	1231	900/900	0	12:22, 01 Apr 2025	12:24, 01 Apr 2025	None
336	PROD2025-006	336	Elena Zemlyanichkina	aborted	0	900/900	0	11:27, 01 Apr 2025	None	12:10, 01 Apr 2025
335	PROD2025-005-RECO.1	335	Artem Petrosyan	finished	1221	900/900	0	12:15, 25 Mar 2025	12:18, 25 Mar 2025	16:35, 25 Mar 2025
334	PROD2025-005.1	334	Artem Petrosyan	done	1250	900/900	0	10:16, 25 Mar 2025	10:18, 25 Mar 2025	12:25, 25 Mar 2025

Page: 1 2 3 ... 25 26 27

⟸ Current tasks

Successful tasks

Select field | Enter value | Filter

Task ID	Task name ↑ ↓	Status	Start date	End date	Walltime	Total events	Events per job	Total jobs	Out DS size, GB	Out Log size, GB
343	PROD2025-008.RECO	finished	06 Apr 2025	07 Apr 2025	30	None	None	9997	3390.70	3.94
342	PROD2025-008.SIM	done	05 Apr 2025	06 Apr 2025	0	40000000	4000	10000	3214.03	1.06
341	PROD2025-007.RECO	finished	04 Apr 2025	05 Apr 2025	38	None	None	9993	3389.51	3.97
339	PROD2025-007.SIM	done	03 Apr 2025	03 Apr 2025	0	40000000	4000	10000	3214.65	1.07
338	PROD2025-006-RECO	done	03 Apr 2025	03 Apr 2025	15	None	None	1535	1138.59	0.62
335	PROD2025-005-RECO.1	finished	25 Mar 2025	25 Mar 2025	26	None	None	1221	413.70	0.48
334	PROD2025-005.1	done	25 Mar 2025	25 Mar 2025	0	5000000	4000	1250	401.83	0.13
333	PROD2025-004-RECO.1	finished	24 Mar 2025	25 Mar 2025	17	None	None	9993	7869.24	4.04
331	PROD2025-004-1	done	20 Mar 2025	22 Mar 2025	10524	40000000	4000	10000	7674.93	1.59
329	TEST_S1-001-SIM.1	done	18 Mar 2025	18 Mar 2025	0	100	10	10	0.03	0.00

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Export csv

*Filtering & sorting functionality available

Task content

Modeling and reconstruction are made for p-p collisions with SpdRoot framework.

Framework includes:
- geometric description of SPD detector
- particle propagation with Geant4
- simplified simulation of detector response
- reconstruction algorithms

Systems turned on during modeling and reconstruction:
- vertex detector
- straw tracker
- Time of flight system
- electromagnetic calorimeter
- range system

At the current stage of development, redundant information about particle interactions within the detector is still being retained; this will be subject to future event-size optimization as well as optimization during the modeling and reconstruction phases.

PROD2025-001 → … → **PROD2025-012** → **PROD2025-013** → … → **PROD2025-016**

Done | Done | Ready | Ready

Stage	S1 & S2
Energy	4 - 27 GeV
Polarization	UU
Total events	5 – 40 M

Events/file	4000
Initial seed	1-1250 1-5000 | 5001-10000 1-10000 10001-20000 | 20001-30000 30001-40000 | 40001-50000

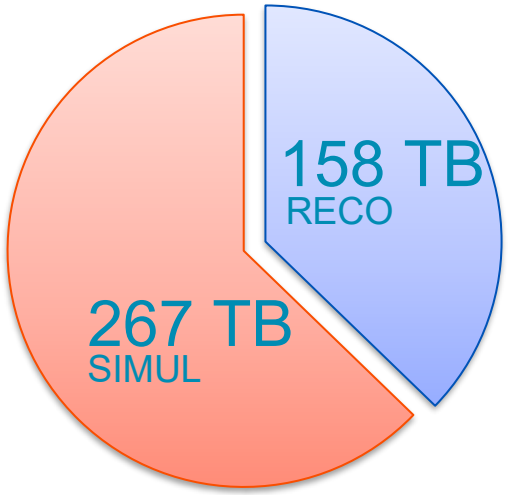
Dataset naming convention

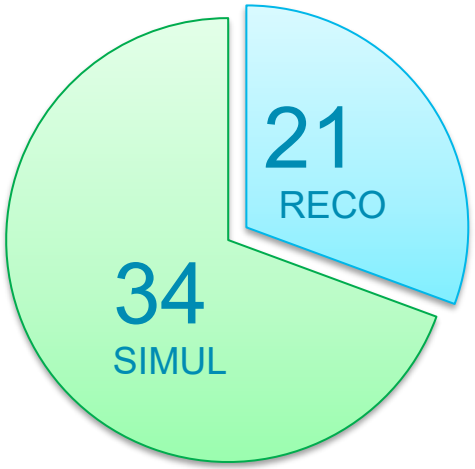
(DATA SOURCE)(YEAR)_(STAGE):(SHORT DESCRIPTION).(ENERGY)-(POLARIZATION).(PRODUCTION NAME).(TASK TYPE).(VERSION).(EXTENSION)

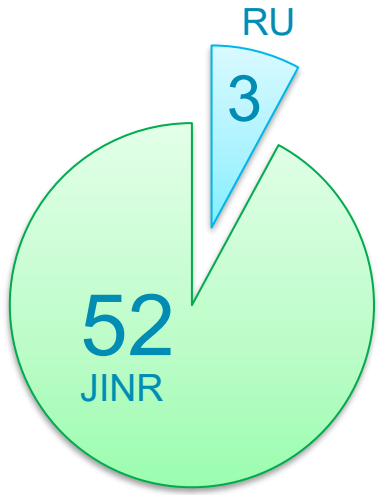
https://docs.google.com/spreadsheets/d/10uG1p6wPQ_GWe7wkZ_t4RPFLmsHuHxnth5MqM49uOYQ/

Statistics

- Successfully processed
  about 300k jobs
  across 55 tasks





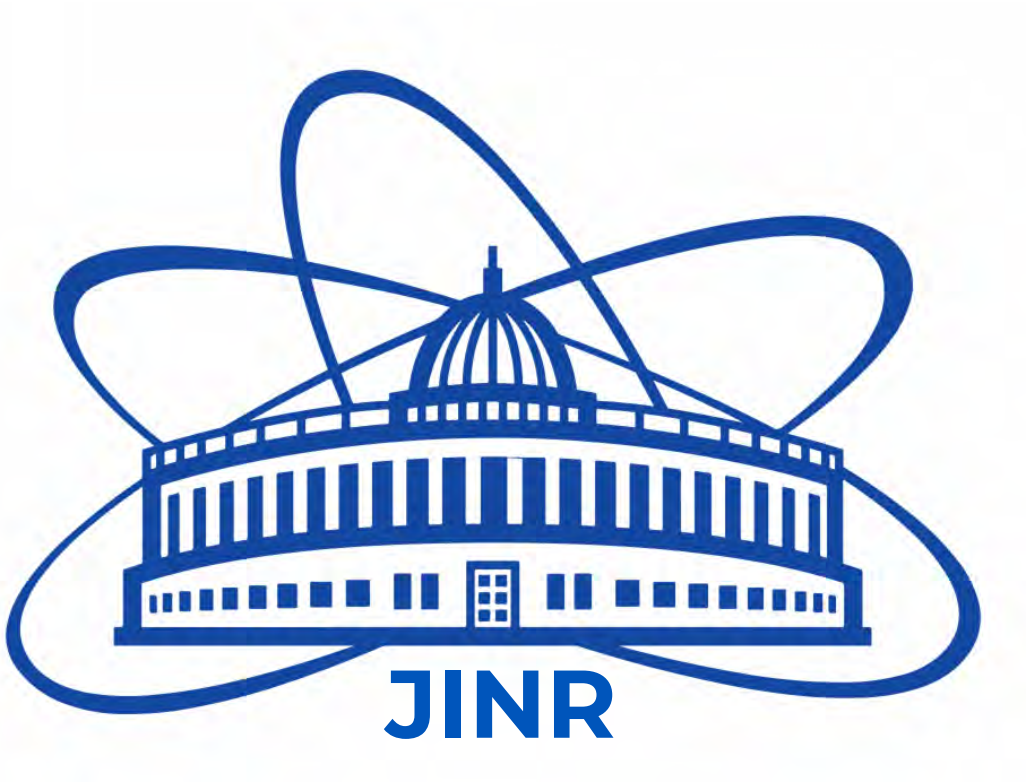


- Total output datasets volume –
  more than 425 TB

Current tasks and upcoming plans

- Task cloning mechanism*

- Further automation of task creation and validation
- Expansion of job monitoring capabilities
- Extra collection layer for big tasks



Thanks for attention