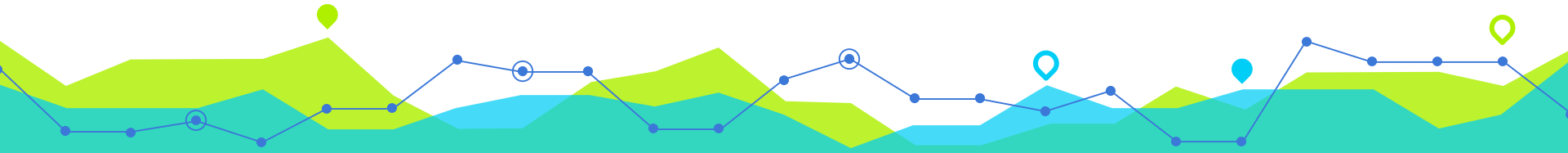
Hello, its CoCoTime!



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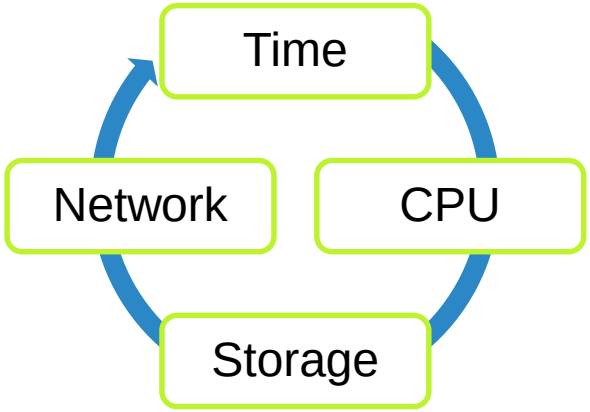
ALICE Offline week
(07 December 2018)

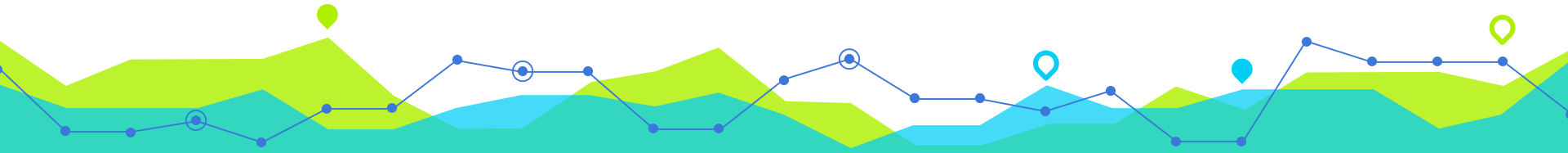
CoCoTime

Computing Coordination and Time Management Tool

*Simulation tool, which allows fine-grained planning, coordination and estimation of the **resource** usage during Run3 and LS3.*



It consists of a Web GUI, through which the necessary parameters are entered and the results are graphically visualized.



Input Parameters

1

SYSTEM PARAMS

Duration = 60 * 60 * 24 * **days**
Effective time = Duration * **Data taking efficiency** / 100
Integrated luminosity = (**Average peak** * Effective time) / (1e+33)

Number of events = 1E+09 * **Cross section** * Integrated luminosity

CTF size = Number of events * **CTF size per event**

Type	Avarage Peak	Cross section	Data taking efficiency (%)	Number of collistions	CTF size per event (kB)	Fraction of simulated events (% of total)
PbPb	2.86E+27	7.75	57	2.62E+10	1800	0.5
pp	5.3E+30	0.00846	57	3.09E+10	30	7.5
pp-ref	7.3E+30	0.00846	57	3.80E+11	30	12.51
pPb	1E+29	2.16	57	1.17E+11	110	5

LHC SCHEDULE

LHC Schedule (2017)

- Technical stop
- Recommissoning with beam
- Scrubbing (indicative - dates to be established)
- Machine development
- Physics runs
- Special physics runs (indicative - schedule to be established)

	Jan				Feb				Mar					Apr				May					June				July				Aug					Sep				Oct				Nov					Dec			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
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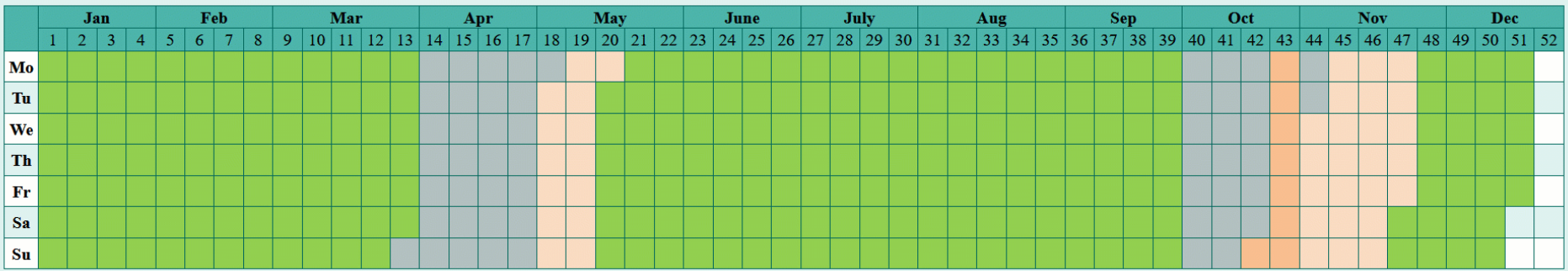
LHC SCHEDULE (in CoCoTime)

Technical stop	Recommissoning with beam	Scrubbing	Machine development	Physics runs (38 days)	Special physics runs
257 days	52 days	8 days	-		

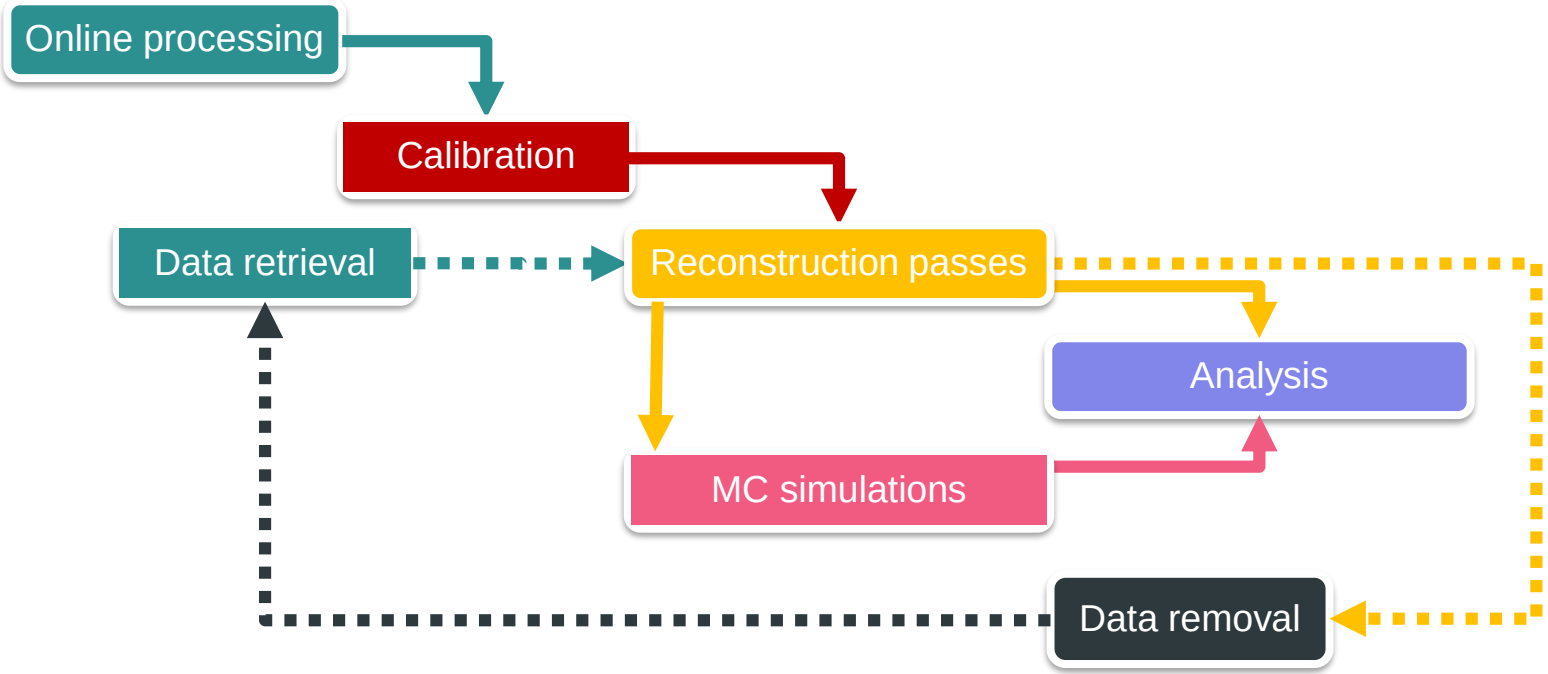
Type	Days	Collisions (%)
pp	14	100.00
PbPb	24	100.00

2021 | 2022 | 2023



What happens after data taking?

COMPUTING OPERATIONS



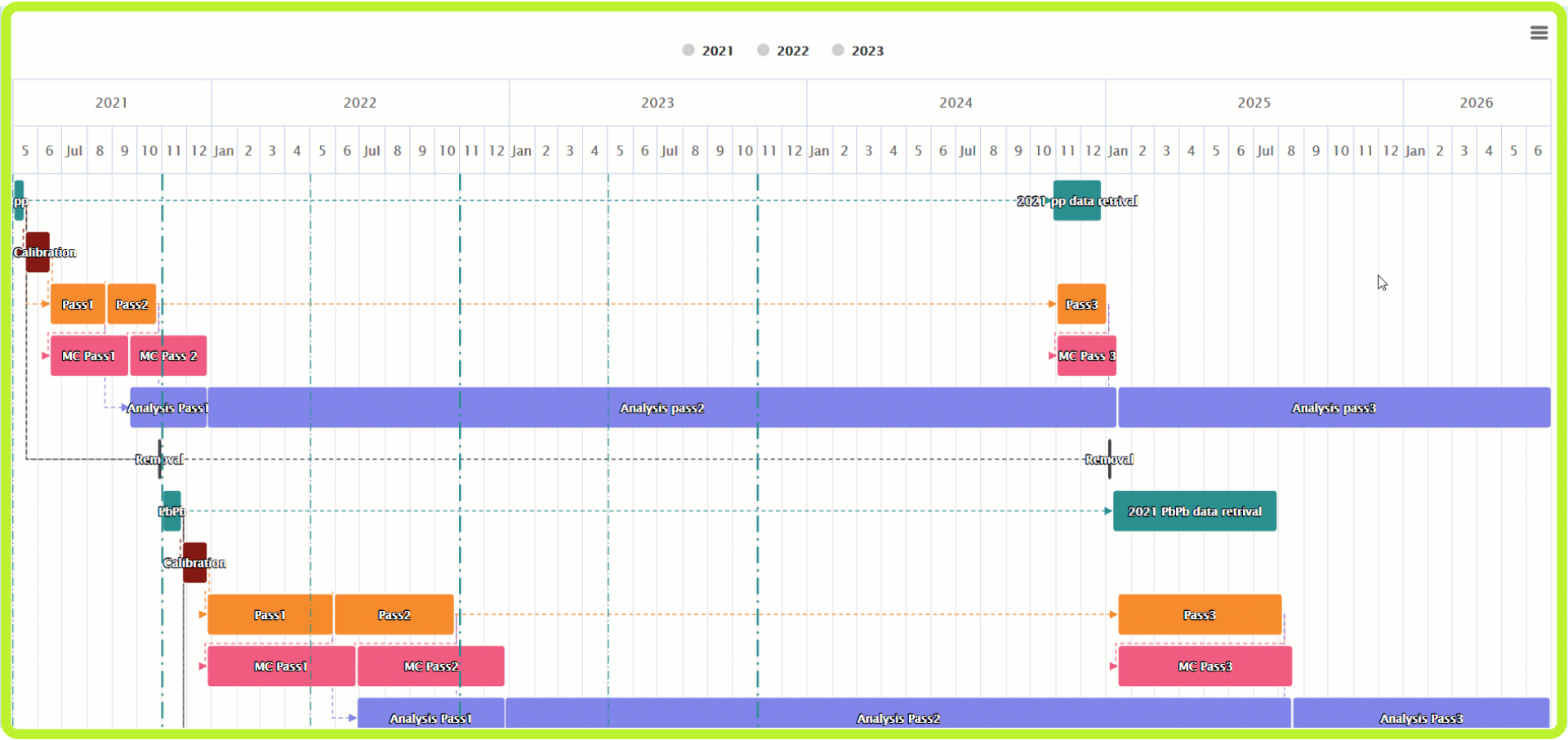
COMPUTING PARAMS (in CoCoTime)

The number of CPU cores (HS06 seconds/event) required to perform the specified operations for a given collision type.

The share percentage of the resource types involved in the specified operations.

	CpuTransformations				CpuShare				
	PbPb	pp	pp-ref	pPb	O2	T0	T1	T2	AF
Online processing	120	3.2	3.2	12	100	0	0	0	0
Calibration	300	6.8	6.8	27.6	100	0	0	0	0
Reconstruction	300	6.8	6.8	27.6	42	25	33	0	0
MC simulations	24000	950	950	1600	0	0	15	85	0
Analysis	1.2	0.3	0.3	0.3	0	6.7	3.3	0	10

COMPUTING SCHEDULE (in CoCoTime)



STORAGE PARAMS

The percentage of the derived data size from the CTF size.

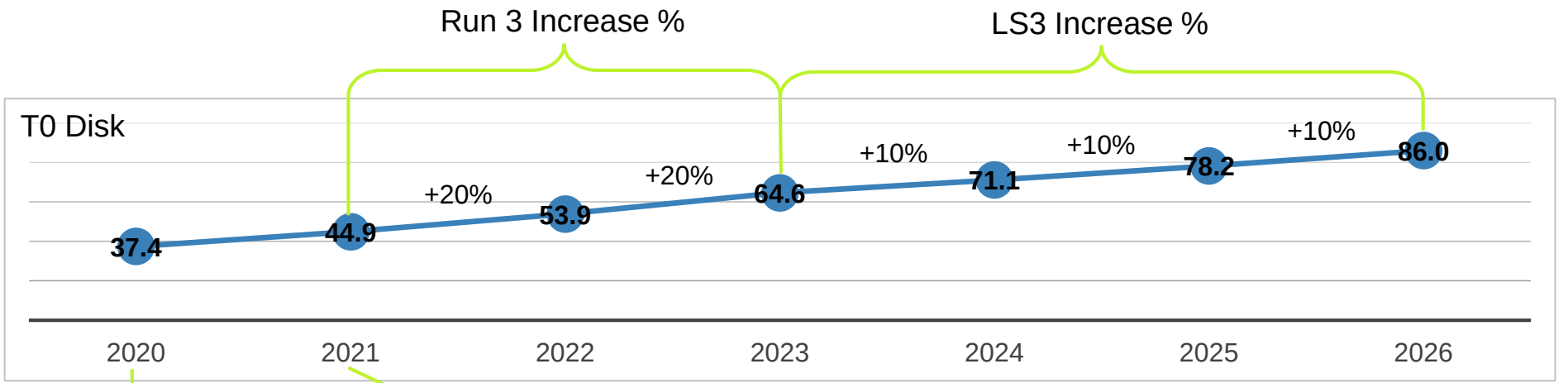
e.g. for PbPb ESD = CTF x 10%

The percentage of each type of data kept on each storage resource.

e.g.It is expected that the O2 should be able to store up to 2/3 (67%) of all CTF data.

Data Types	Derived Size as % of CTF				Storage Sharing (%)						
	PbPb	pp	pp-ref	pPb	O2	T0	T0(Tape)	T1	T1(Tape)	T2	AF
CTF	100	100	100	100	70	0	70	30	30	0	0
ESD	10	100	100	100	67	0	0	33	0	0	0
AOD	20	100	100	50	0	67	67	33	33	0	10
MC	150	150	150	150	0	0	0	0	0	100	0
MCAOD	75	75	75	75	0	67	67	33	33	0	10
HISTO	0.15	0.15	0.15	0.15	0	6.7	0	3.3	0	0	10

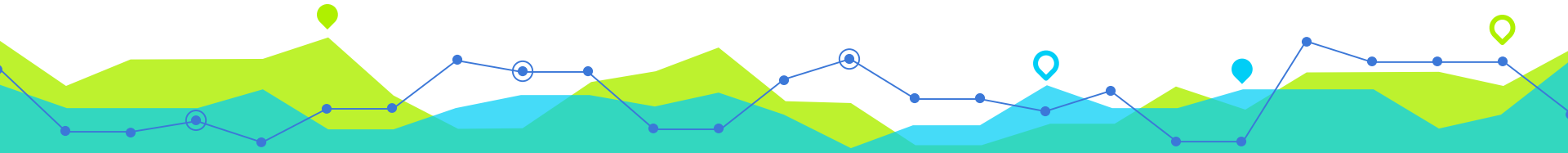
PROJECTED RESOURCES (in CoCoTime)



Site Type	2020			2021			Run 3 Increase %			LS3 Increase %		
	Disk (PB)	Tape (PB)	CPU (kHS06)	Disk (PB)	Tape (PB)	CPU (kHS06)	Disk	Tape	CPU	Disk	Tape	CPU
O2	6.0	0	1710	60	0	1710	0	0	0	0	0	0
T0	37.4	36.9	450	46.8	66.4	518	20	45	20	10	15	0
T1	45.6	42.1	364	54.7	50.8	437	20	25	20	0	15	0
T2	39.0	0	376	46.8	0	451	5	0	30	0	0	0
AF	2.0	0	10	4.0	0	50	20	0	100	20	0	10

RESOURCE USAGE BY RUN2 OPERATIONS DURING RUN3

Site Type	2021			Run2 Decrease %		
	Disk (PB)	Tape (PB)	CPU (kHS06)	Disk	Tape	CPU
O2	0	0	0	0	0	0
T0	33.49	43.16	430	20	0	20
T1	37.01	36.81	365	20	0	20
T2	33.10	0	376	20	0	20
AF	0	0	0	0	0	0



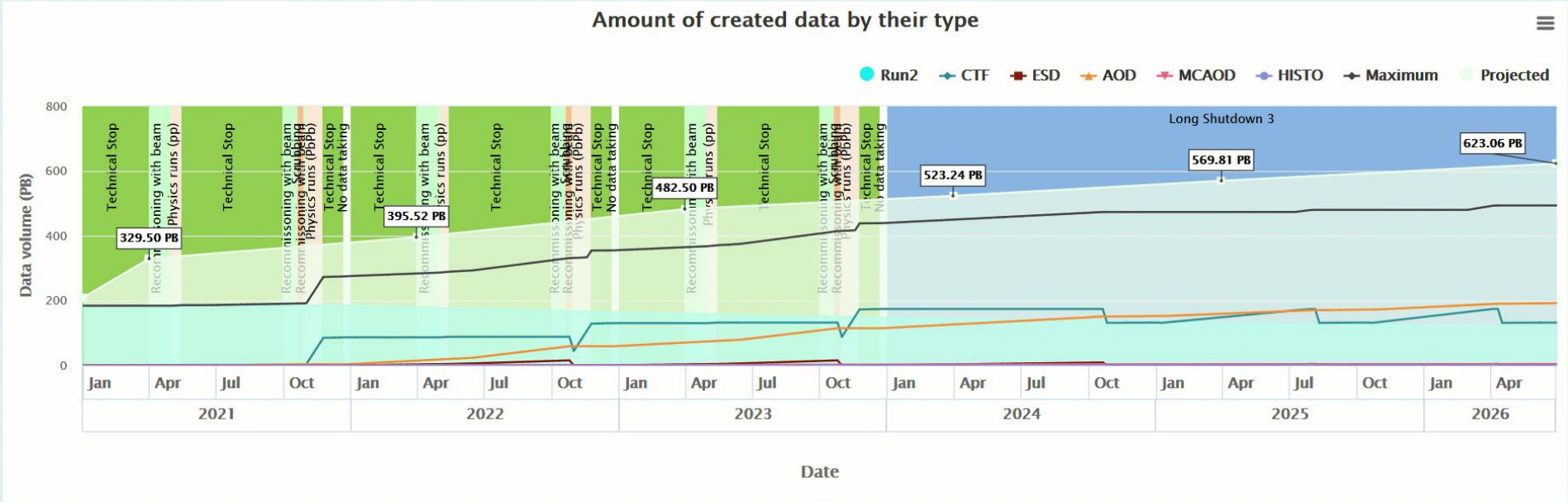
Output results

2

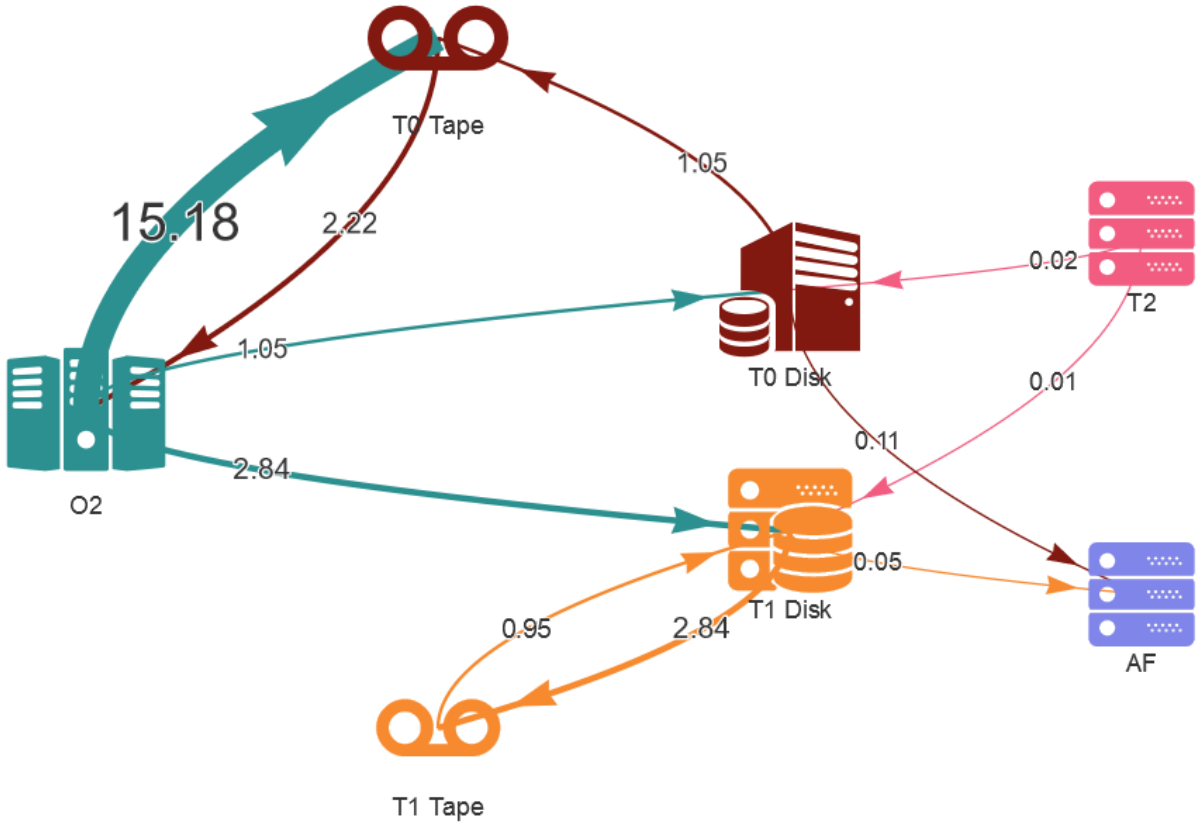
RESOURCE USAGE

Data usage | CPU usage | Network usage

All | Disk | Tape | O2 | T0 | T1 | AF | T2 | T0 Tape | T1 Tape



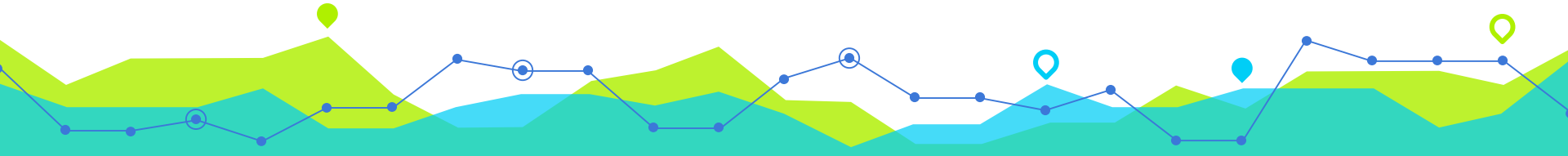
NETWORK THROUGHPUT



(GB/s)

CURRENT FUNCTIONALITY

- Highly configurable and easy to use/play
- Planning of computing operations on a daily basis (with Gantt chart)
- Estimation of Disk, Tape, CPU and Network usage during Run3 and LS3
- Include resource usage by Run2 operations during Run3.
- Save and Restore configurations and simulation results
- Exporting the results in various formats (png, pdf, CSV, …)



FUTURE PLANS for CoCoTime

- Smart planning and automatic resource usage optimization
- Universalize the Tool that it can be used by the other experiments.
- Integrate with CERN authentication and authorization services.
- Integrate the CoCoTime with the MonALISA.
- … ?

Ho-Ho Time

Merry Christmas

and a Happy New Year!