DC 2024

Combined Rates



Combine numbers

Each experiment was providing their own numbers We need to have the sum up – global view of those numbers and same units

Motivation





Up to date

Numbers were fluctuating in between presentations Keep a one document up to date

Identify limits

Numbers need to be compared with capacities Network capacities need to be compared with the plans



DC24 Planning per experiment

1	A	В	С	D	E	F	G	н	
1		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
2		12/02/2024	13/02/2024	14/02/2024	15/02/2024	16/02/2024	17/02/2024	18/02/2024	
3	ALICE	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	
4	ATLAS	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1 \rightarrow T2$	$T0 \rightarrow T1 \rightarrow T2$	$T0 \rightarrow T1 \rightarrow T2$	$T0 \rightarrow T1 \rightarrow T2$	$T0 \rightarrow T1 \rightarrow T2$	
5	CMS	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1 \rightarrow T2$	$T1 \rightarrow T2$	T1 ↔ T2	T1 ↔ T2	T1 ↔ T2	
6	LHCb		$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	
7	DUNE	$T0 \rightarrow T1 \rightarrow T2$	$T0 \rightarrow T1 \rightarrow T2$	$T0 \rightarrow T1 \rightarrow T2$	$T0 \rightarrow T1 \rightarrow T2$	$T0 \rightarrow T1 \rightarrow T2$	$T0 \rightarrow T1 \rightarrow T2$	$T0 \rightarrow T1 \rightarrow T2$	
8	Belle II	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	
9									
10	SUMMARY								
11	T0 exports minimal rates								
	(ALICE+ATLAS+LHCB+CMS)	529.7 Gbps	650.3 Gbps	650.3 Gbps	650.3 Gbps	650.3 Gbps	650.3 Gbps	650.3 Gbps	
12	T0 exports (DUNE + Belle II)								
13									
14									
15		Monday	Tuesday	Wednesday	Thursday	Friday			
16		19/02/2024	20/02/2024	21/02/2024	22/02/2024	23/02/2024	yellow: "reduced minim	al" (only T0 export)	
17	ALICE	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	blue: minimal scenario		
18	ATLAS	T0 ↔ T1 ↔ T2	$T0 \leftrightarrow T1 \leftrightarrow T2$	$T0 \leftrightarrow T1 \leftrightarrow T2$	T0 ↔ T1 ↔ T2	T0 ↔ T1 ↔ T2	red: flexible scenario		
19	CMS	AAA T1 → T2	$T0 \rightarrow T1 \leftrightarrow T2$	$T0 \rightarrow T1 \leftrightarrow T2$	$T0 \rightarrow T1 \leftrightarrow T2$	$T0 \rightarrow T1 \leftrightarrow T2$			
20	LHCb	$T0 \rightarrow T1$	T1 Tape Recall	T1 Tape Recall	T1 Tape Recall	T1 Tape Recall			
21	DUNE	$T0 \rightarrow T1 \rightarrow T2$	$T0 \rightarrow T1 \rightarrow T2$	$T0 \rightarrow T1 \rightarrow T2$	$T0 \rightarrow T1 \rightarrow T2$	$T0 \rightarrow T1 \rightarrow T2$			
22	Belle II	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	$T0 \rightarrow T1$	T0 == SURF , T1 == FN	AL, T2 == Storage sites	
23									
24	SUMMARY								
25	T0 exports high rates								
	(ALICE+ATLAS+LHCB+CMS)	449.56 Gbps	895.56 Gbps	895.56 Gbps	895.56 Gbps	895.56 Gbps			
26									
27									
28									
	⇒ ≡ DC24 Planning per e	experiment Tier0-Tier1	s (Minimal rates) Tie	er-0-Tier1s (Higher ra	tes) Tier1s to Tier1s r	ates Transatlantic lin	ks Tier2s expectatio	ns +	

Idea: Add summary numbers

- T0 exports
- Total non LHCONE Tierls traffic + TO exports
- Transatlantic traffic



Workbook Statistics

Tier0-Tier1s (Minimal rates)

7 N	OTICE: These are link rates from/to CERM	-PROD and the differer	nt Tier1s																				
8 [] https://twiki.cern.ch/twiki/bin/view/Ll	HCOPN/OverallNetwork	k Maps																				
9 [?] MONIT link: https://monit-grafana-ope	n.cern.ch/d/0000052	3/home?orgId=16	6&viewPa	anel=1																		
10																							
11 C	ERN-PROD source (Write rates)	TW-ASGC	RRC-KI	1	ES-PIC	DE-KIT	FR-CCIN2P	3	IT-INFN-CNAF	UK-RAL	NDGF (CH-LHEP)	NDGF (Scandinavia)	NL-T1(Nikh	ef, SA PL-NCBJ	CN-IHE	P RRC-JINR	CA-TRIUMF	US-BNL	US-	-FNAL	RC-KISTI	Sum total	Sum total GB/s
12 A	LICE					5	5	4	7	1 1			3	1	0	0	0	0	0		0 2	23	3 2.875
13 A	TLAS (injected + production transfers)		0	0.11	11.58	33.76	5	40.12	24.21	40.06		0 1.7	3 :	15.81	0	0	0 26.	38	63.28		0 0	257.04	4 32.13
14 C	MS		0	0	10	26	5	27	34	20		0	0	0	0	0	29	0	0	1	04	250	31.25
15 L	HCb		0	0	4.38	3 23.54	4	13.14	17.61	34.02		0	0	9.88	8.76	8.93	0	0	0		0	120.26	5 15.0325
16 T	otal		0	0.11	25.96	5 88.3	3	84.26	82.82	95.08		0 4.7	3 2	26.69	8.76	8.93	29 26.	38	63.28	1	04 2	650.3	8 81.2875
17 N	etwork Capacity[1]	10Gbps	100Gbps		100Gbps	200Gbps	100Gbps		200Gbps	200Gbps	100Gbps	100Gbps	400Gbps	20Gbps	20Gbps	s 100Gbps	100Gbps	200Gbps	200	Gbps	40Gbps		
18																							
19 C	UNE																						
20 B	elle II (from KEK via LHCONE)		0	0		1.1	1	1.7	2.2	. 0		0	0	0	0	0	0	0	3.3		0 0) 8.3	1.0375
21																							
22																							
23																							
24 C	ERN-PROD destination (Read rates)	TW-ASGC	RRC-KI	1	ES-PIC	DE-KIT	FR-CCIN2P	3	IT-INFN-CNAF	UK-RAL	NDGF (CH-LHEP)	NDGF (Scandinavia)	NL-T1(Nikh	ef, SA PL-NCBJ	CN-IHE	P RRC-JINR	CA-TRIUMF	US-BNL	US-	FNAL	RC-KISTI	Sum total Gb/s	Sum total GB/s
25 A	LICE					n/a	n/a		n/a	n/a		n/a	n/a								n/a	(0
26 A	TLAS (injected + production transfers)		0	0.08	0.27	7 1.14	4	1.06	0.61	1.48		0 2.3	5	0.54	0	0	0 1.	01	1.84		0 0	10.38	1.2975
27 C	MS		0	0	1.3	3.3.2	2	3.3	4.2	2.5		0	0	0	0	0	3.6	0	0		13	31.1	3.8875
28 L	HCb		0	0	3.44	1 14.26	5	10.31	13.74	20.62		0	0	6.87	7.65	5.41	0	0	0		0 0	82.3	10.2875
29 T	otal		0	0.08	5.01	l 18.6	5	14.67	18.55	5 24.6		0 2.3	5	7.41	7.65	5.41	3.6 1.	01	1.84		13 0	123.78	15,4725
30 1	etwork Capacity[1]	10Gbps	100Gbps		100Gbps	200Gbps	100Gbps	· · · · ·	200Gbps	200Gbps	100Gbps	100Gbps	400Gbps	20Gbps	20Gbps	100Gbps	100Gbps	200Gbps	200	Gbps	40Gbps		
31																		· ·					
32 C	UNE				1	L				1				1					1		1		
33 B	elle II																						
34																							
35																							
36		1																					
		I nt Tier0 Tier1e (M	linimal mtaa)	Tion 0 T	iorto (Hi	ah ar rataa') Tierle	to Tio	via votos T	nnantiantia	links Tier2s er	mostations											
	 DC24 Planning per experime 	inc inero-merits (M	initial rates)	rier-0-1	ierts (Hi	gner rates) heris	to rie	ints rates II	ansauantio	ining herzse	wectations +											

Experiments sum up (same language/same units ③)

- Pending to include DUNE and Belle II on it!
- Network capacity and network monitoring links



Maria Arsuaga-Rios IT-SD-PDS

Tier-0-Tierls (Higher rates)

RN-PROD	and the d	ifferent Tie	er1s																		
/LHCOPN	/OverallNe	etworkMap	s																		
open.cern	.ch/d/000	000523/hoi	me?orgId=	16&viewPanel=1														_			
Tier1s																					
rw-asgc	RRC-KI	ES-PIC	DE-KIT	FR-CCIN2P3	IT-INFN-CNAF	UK-RAL	NDGF (CH-LHEP)	NDGF (Scandinavia)	NL-T1(Nikhef, S	A PL-NCBJ	CN-IHEP	RRC	C-JINR	CA-TRIUMF	US-BNL	1	US-FNAL	RC-KISTI	Sum total	:	Sum total GB/s
			5	5 4	1 7	1			3	1	0	0		0	0	0		0	2	23	2.87
0.1	0.8	13	38.4	4 43.	5 27.7	43.5		0 24	4 18.	9	0	0		0 2	8.6	67.4		0	0	306.3	38.287
0	C	19	45	5 4	5 57	35		0	0	0	0	0		68	0	0	1	77		446	55.7
0	C	4.38	23.54	4 13.14	4 17.61	34.02		0	0 9.8	8	8.76	8.93		0	0	0		0		120.26	15.032
0.1	0.8	36.38	111.94	4 105.64	109.31	113.52		0 27.	4 29.7	8	8.76	8.93		68 2	8.6	67.4	1	77	2	895.56	111.94
LOGbps	100Gbps	100Gbps	200Gbps	100Gbps	200Gbps	200Gbps	100Gbps	100Gbps	400Gbps	20Gbps	20Gbps	1000	Gbps	100Gbps	200Gbps		200Gbps	40Gbps			
0	C	0	1.9	9 2.	3.7	0		0	0	0	0	0		0	0	5.6		0	0	14	1.7
W-ASGC	RRC-KI	ES-PIC	DE-KIT	FR-CCIN2P3	IT-INFN-CNAF	UK-RAL	NDGF (CH-LHEP)	NDGF (Scandinavia)	NL-T1(Nikhef, S	A PL-NCBJ	CN-IHEP	RRC	-JINR	CA-TRIUMF	US-BNL		US-FNAL	RC-KISTI	Sum total		Sum total GB/s
			n/a	n/a	n/a	n/a		n/a	n/a									n/a		0	
0	0.08	1.64	6.36	6 6.5	7 4.19	6.16		0 3.2	7 3.4	2	0	0		0 5	.94	10.86		0	0	48.49	6.0612
0	C	15	36	6 30	5 45	28		0	0	0	0	0		41	0	0	2	54		455	56.87
0	C	3.44	14.26	5 10.3	1 13.74	20.62		0	0 6.8	7	7.65	5.41		0	0	0		0	0	82.3	10.287
0	0.08	20.08	56.62	2 52.8	62.93	54.78		0 3.2	7 10.2	9	7.65	5.41		41 5	.94	10.86	2	54	0	585.79	73.2237
LOGbps	100Gbps	100Gbps	200Gbps	100Gbps	200Gbps	200Gbps	100Gbps	100Gbps	400Gbps	20Gbps	20Gbps	1000	Gbps	100Gbps	200Gbps		200Gbps	40Gbps			
		1				1				1				_		3.5		3.5	_		
	LHCOPN ven.cern er1s N-ASGC 0.1 00 00 00 00 00 00 00 00 00 0	LHCOPN/OverallNe en.cern.ch/d/0000 er1s W-ASGC RRC-KI 0.1 0.8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	LHCOPN/OverallNetworkMap en.cern.ch/d/00000523/ho er1s N-ASGC RRC-KI ES-PIC 0.1 0.8 133 0 0 119 0 0 119 0 0 4.38 0.1 0.8 36.38 Nobps 100Gbps 100Gbps 0 0 0 N-ASGC RRC-KI ES-PIC 0 0 0 N-ASGC RRC-KI ES-PIC 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	LHCOPN/OverallNetworkMaps ven.cern.ch/d/00000523/home?orgld= er1s	LHCOPN/OverallNetworkMaps Pen.cern.ch/d/00000523/home?orgld=16&viewPanel=1 ven.cern.ch/d/00000523/home?orgld=16&viewPanel=1 Pen.cern.ch/d/00000523/home?orgld=16&viewPanel=1 er1s Pen.cern.ch/d/00000523/home?orgld=16&viewPanel=1 wASGC RRC-KI ES-PIC DE-KIT FR-CCIN2P3 0 0 19 45 443.1 0 0 19 45 443.1 0 0 19 45 443.1 0 0 19 45 443.1 0 0 4.38 23.54 13.14 0.1 0.8 36.38 111.94 105.66 OGbps 100Gbps 100Gbps 200Gbps 100Gbps 0 0 0 1.9 2.3 W-ASGC RRC-KI ES-PIC DE-KIT FR-CCIN2P3 0 0.08 1.64 6.36 6.55 0 0 1.5 36 33 0 0.44 14.26 10.33 0 <td>LHCOPN/OverallNetworkMaps Image: Constraint of the sector of</td> <td>LHCOPN/OverallNetworkMaps International and antiparties International antinex antipartex antiparties Internatin antinternat</td> <td>LHCOPN/OverallNetworkMaps Image: Solution of the solution of the</td> <td>LHCOPN/OverallNetworkMaps Image: Market Maps Image: Market Maps</td> <td>LHCOPN/OverallNetworkMaps sen.cern.ch/d/000000523/home?orgld=16&viewPanel=1 Image: Comparison of the comparison o</td> <td>LHCOPN/OverallNetworkMaps image <th< td=""><td>$\begin{array}{c c c c c c c c c c c c c c c c c c c$</td><td>LHCOPN/OveralINetworkMaps sencern.ch/d/000000523/hmm=?orgid=16&viewPanel=1 sencern.ch/d/00000000000000000000000000000000000</td><td>$\begin{array}{c c c c c c c c c c c c c c c c c c c$</td><td>LHCOPN/OverallNEtworkMaps sen.er.th/d/OverallS sen.er.th/d/OverallS</td><td>LHCOPN/OverallNetworkMaps sencer.ch/d/000005523/nm e7orgld=16&viewPanel=1 n/a n/a</td><td>LHCOPN/OverallNetworkMaps sen.er.or. <t< 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Identified FR-CCIN2P3 to pass the link capacity. They plan to update to 200Gbps link for DC24



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Tierls – Tierls rates (High rates)

Routing Policies: https://	twiki.cern.ch	/twiki/bin/	view/LH	COPN/Routi	ingPolicies	UNITS: Gbps			CERN Network capacity (full-duplex)	2.1 Tbps											
TOTAL																					
Source/Destination	TW-ASGC	RRC-KI	ES-PIC	DE-KIT	FR-CCIN2P3	IT-INFN-CNAF	UK-RAL	NDGF (CH-LHEP)	NDGF (Scandinavia)	NL-T1(Nikhef,	SAI PL-NCBJ	CN-IHEP	RRC-JINR	CA-TRIUMF	US-BNL	US-FNAL	RC-KISTI	∑ [all T1s	-> T1]	Exclude LHC	CONE
TW-ASGC	0.0	0.0)	0.0 0	0.0	0.0	0.0	0.0	.0 (0.0	0.0	0.0	0.0 0	0.0 0.	.0 0	.0 0.	0.0 0.0	.0 0.0		0.0	
RRC-KI	0.0	0.0)	0.0 0.0	0.1	0.1	0.0	0.1 0	.0 0	0.1	0.1	0.0	0.0 0	0.0 0.	.0 0	.1 (0.0 0.0	.0 0.5		0.5	
ES-PIC	0.0	0.0)	0.1 1	9	1.8	1.6	1.4 0	.0 1	1.9	l.1	0.0	0.0 0	0.7 0	.7 1	.1 :	2.0 0	.0 14.3		12.7	
DE-KIT	0.0	0.1	L	1.7 1	2	5.3	4.0	5.5 0	.0 .0	5.6	2.6	0.0	0.0 1	.4 2	.5 5	.2 4	1.4 0	.0 39.5		34.2	
FR-CCIN2P3	0.0	0.1	L	1.8 5	i.3	0.8	3.3	5.3 0	.0 6	5.4	1.4	0.0	0.0 1	.3 3	.1 5	.6	l.1 0	.0 41.5		32.8	
IT-INFN-CNAF	0.0	0.1	L	1.2 4	.1	4.2	0.4	3.5 0	.0 .0	5.3	2.3	0.0	0.0 1	.7 1	.6 2	.7	5.2 0	.0 32.3		24.1	
UK-RAL	0.0	0.2	2	1.7 5	i.4	5.7	3.2	7.2 0	.0 6	5.6	2.3	0.0	0.0 1	.2 2	.6 4	.7	8.6 0	.0 44.4		44.4	
NDGF (CH-LHEP)	0.0	0.0)	0.0 0	0.0	0.0	0.0	0.0 0	.0 (0.0	0.0	0.0	0.0 0	0.0	.0 0	.0 0.0	0.0 0.0	.0 0.0		0.0	
NDGF (Scandinavia)	0.0	0.2	2	0.4 1	3	1.4	0.9	1.9 0	.0 (0.5).9	0.0	0.0 0	0.0	.8 1	.8 (0.0 0.0	.0 10.1		10.1	
NL-T1(Nikhef, SARA)	0.0	0.0)	0.4 1	6	2.4	0.9	1.3 0	.0	2.9	0.6	0.0	0.0 0	0.0 1	.1 2	.0 0.	0.0 0.0	.0 13.2		13.2	
PL-NCBJ	0.0	0.0)	0.0 0	0.0	0.0	0.0	0.0	.0 (0.0	0.0	0.0	0.0 0	0.0	.0 0	.0 0.0	0.0 0.0	.0 0.0		0.0	
CN-IHEP	0.0	0.0)	0.0 0	0.0	0.0	0.0	0.0	.0 (0.0	0.0	0.0	0.0 0	0.0	.0 0	.0 0.	0.0 0.0	.0 0.0		0.0	
RRC-JINR	0.0	0.0)	0.7 1	5	1.4	1.7	1.3 0	.0 (0.0	0.0	0.0	0.0 0	0.0 0.	.0 0	.0	5.6 0	.0 12.1		12.1	
CA-TRIUMF	0.0	0.1	L	0.6 3	3.7	3.2	2.3	2.4 0	.0 4	4.4	2.2	0.0	0.0 0	0.0	.5 3	.1 (0.0 0.0	.0 22.5		19.4	
US-BNL	0.0	0.2	2	1.6 12	.9	6.4	4.6	6.3 0	.0 .0	9.1	5.7	0.0	0.0 0	0.0 3	.9 2	.0 0.	0.0 0.0	.0 53.6	;	49.7	
US-FNAL	0.0	0.0)	3.1 6	5.5	6.1	7.6	5.5 0	.0 (0.0	0.0	0.0	0.0	8.1 0	.0 0	.0 0.0	0.0 0.0	.0 36.9		36.9	
RC-KISTI	0.0	0.0)	0.0 0	0.0	0.0	0.0	0.0 0	.0 (0.0	0.0	0.0	0.0	0.0	.0 0	.0 (0.0 0	.0 0.0		0.0	
Σ [T1 -> all T1s]	0.0	0.9)	45	i.3 3	8.7	30.7	41.6	.0 42	2.7 2	3.1	0.0	0.0 14	.4 16	.8 28	.4 24	.8 0	.0 307.3		290.0	

After summing up ATLAS, CMS and ALICE average we have this total matrix! 290Gbps (TIs non LHCONE)+ 895.56Gbps (T0 exports Heavy rates) = 1185.56Gbps planned to pass via CERN network + PROD



CERN Network capacity full duplex is 2.1 Tbps

Maria Arsuaga-Rios IT-SD-PDS

Network capacity for TIs full Matrix (High rates)

Routing Matrix

Preferred primary path: OPN for LHCOPN connectivity; 1 for LHCONE connectivity; No for connectivity outside LHCOPNE/ONE

From \\ To	CA-T	СН-С	DE-K	ES-P	FR-I	IT-C	KR-K	NDGF	NLT1	RRCK	RRCJ	TW-A	UK-R	US-F	US-B
CA-TRIUMF		OPN	n/a	1											
CH-CERN	OPN		OPN												
DE-KIT	OPN	OPN		OPN	1	1	OPN	1	OPN						
ES-PIC	OPN	OPN	OPN		OPN										
FR-CCIN2P3	OPN	OPN	1	OPN		1	OPN	1	OPN						
IT-INFN-CNAF	OPN	OPN	1	OPN	1		OPN								
KR-KISTI	No	OPN	1	1	1	1		1	1	OPN	No	1	No	1	1
NDGF	OPN		OPN												
NL-T1	OPN		OPN	OPN	OPN	OPN	OPN	OPN							
RRC-KI-T1		OPN													
RRC-JINR-T1		OPN													
TW-ASGC	OPN	OPN	OPN	OPN	OPN	OPN	1	OPN	OPN	OPN	OPN		OPN	1	1
UK-T1-RAL	OPN		OPN	OPN											
US-FNAL-CMS	OPN	OPN	1	OPN	1	OPN	OPN	OPN	OPN	OPN	OPN	1	OPN		1
US-T1-BNL	1	OPN	OPN	OPN	OPN	OPN	1	OPN	OPN	OPN	1	1	OPN	1	

https://twiki.cern.ch/twiki/bin/view/LHCOPN/RoutingPolicies

LHC PN



https://twiki.cern.ch/twiki/bin/view/LHCOPN/OverallNetworkMaps

Combination of sources to obtain the network links capacities. This is important since traffic not going through LHCONE will pass via CERN network.



Network capacity for TIs full Matrix (High rates)

Network Capabilities	https://twiki.	.cern.ch/tv	viki/bin/vie	w/LHCOPN	/RoutingPolicies		Take into accou	nt that the communica	tion in between Tier1s is passing throu	ght CERN if not LH	CONE! This is the	he maximum cap	oacity in between	the links (we are	a taking the slowe	st link capacity)		
Source/Destination	TW-ASGC	RRC-KI	ES-PIC	DE-KIT	FR-CCIN2P3	IT-INFN-CNAF	UK-RAL	NDGF (CH-LHEP)	NDGF (Scandinavia)	NL-T1(Nikhef, SA	PL-NCBJ	CN-IHEP	RRC-JINR	CA-TRIUMF	US-BNL	US-FNAL	RC-KISTI	
TW-ASGC		10	10	10	10	10	10	10	10	10	1	0 :	10 1	0 :	10 LHCONE	LHCONE	LHCONE	
RRC-KI	10		100	100	100	100	100	100	100	100	2	0 2	20 10	0 10	JO 10	0 1	00	20
ES-PIC	10	100)	100	100	100	100	100	100	100	2	0 2	20 10	0 10	00 10	0 1	00 LHCONE	
DE-KIT	10	100	100)	LHCONE	LHCONE	200	100	100	200	2	0 2	20 10	0 10	00 20	0 LHCONE	LHCONE	
FR-CCIN2P3	10	100	100	LHCONE		LHCONE	100	100	100	100	2	0 2	20 10	0 10	00 10	0 LHCONE	LHCONE	
IT-INFN-CNAF	10	100	100	LHCONE	LHCONE		200	100	100	200	2	0 2	20 10	0 10	20 20	0 2	00 LHCONE	
UK-RAL	10	100	100	200	100	200		100	100	200	2	0 2	20 10	0 10	20 20	0 2	00 LHCONE	
NDGF (CH-LHEP)	10	100	100	100	100	100	100		100	100	2	0 2	20 10	0 10	JO 10	0 1	00 LHCONE	
NDGF (Scandinavia)	10	100	100	100	100	100	100	100	•	100	2	0	20 10	0 10	00 10	0 1	00 LHCONE	
NL-T1(Nikhef, SARA)	10	100	100	200	100	200	200	100	100		2	0 2	20 10	0 10	20 20	0 2	00 LHCONE	
PL-NCBJ	10	20	20	20	20	20	20	20	20	20			20 2	0	20 2	.0	20 LHCONE	
CN-IHEP	10	20	20	20	20	20	20	20	20	20	2	0	2	0	20 2	.0	20 LHCONE	
RRC-JINR	10	100	100	100	100	100	100	100	100	100	2	0	20		20 10	10	20 LHCONE	
CA-TRIUMF	10	100	100	100	100	100	100	100	100	100	2	0	20 10	0	LHCONE	LHCONE	LHCONE	
US-BNL	LHCONE	100	100	200	100	200	200	100	100	100	2	0	20 LHONE	LHCONE		LHCONE	LHCONE	
US-FNAL	LHCONE	100	100	LHCONE	LHCONE	200	200	100	100	100	2	0	20 10	0 10	J0 LHCONE		LHCONE	
RC-KISTI	LHCONE	20	LHCONE	LHCONE	LHCONE	LHCONE	LHCONE	LHCONE	LHCONE	LHCONE	LHCONE	LHCONE	LHCONE	LHCONE	LHCONE	LHCONE		

Voila! Thanks to Edoardo for the final review!



Transatlantic links (request by ATLAS)

	Network capacity									
Current Esnet links (3x100Gbps and 1x400Gbps)	700Gbps									
Expected before DC24 (3x100Gbps and 3x400Gbps)[1]	1500Gbps									
[1] https://indico.cern.ch/event/1280363/contribution	s/5602789/attachments/27	36898/4759659/LHCONE%	2051%20N	leeting%20	-%20ESnet	x%20Update	e%202023-	10-18.pdf		
	Transalanitc Traffic from/t	o Tier1s and Tier2s								
	Europe → US + CA [Gbps]	US + CA → Europe [Gbps]								
ATLAS Transatlantic traffic	265	270								
CMS Transatlantic traffic										
Total	265									
										i i
		T 0 T 4 (1) 1	\ 			T 11		-		
$\Rightarrow \equiv DC24$ Planning per experiment Tier0	-Tier1s (Minimal rates)	Tier-0-Tier1s (Higher rate	s) Tie	rls to Tier	1s rates	Iransatla	nuc links	Tier2s e	expectations	+

Vorkbook Statistics



Tier2 ingress/egress (ATLAS, CMS and DUNE)

T2 - network capabilities: <u>https://wlcg-cric.cern.ch/core/netsite/list/</u> (not yet all numbers IN) 9 shared T2s between ATLAS and CMS (interesting the naming conversion effort ^(C)) We need DUNE input to get the full combination

T2 Table: DC24	ATLAS		CMS		DUNE		Total		Capacity declared CRIC
Site	∑ ingress	∑ egress	∑ ingress	∑ egress	∑ ingress	∑ egress	∑ ingress	∑ egress	
CA-VICTORIA-WESTGRID-T2	3.2	1.4	0	0	0	0	3.2	1.4	100
Australia-ATLAS	0	0.3	0	0	0	0	0	0.3	10
CA-WATERLOO-T2	1	1	0	0	0	0	1	1	40
CA-SFU-T2	3.6	5.4	0	0	0	0	3.6	5.4	100
praguelcg2	18.7	16.2	0	0	0	0	18.7	16.2	100
MPPMU	1.8	1.4	0	0	0	0	1.8	1.4	none
wuppertalprod	2.8	1.9	0	0	0	0	2.8	1.9	none
DESY-ZN	15.4	13.2	0	0	0	0	15.4	13.2	40
DESY-HH/T2_DE_DESY	16.3	13.4	27.3	7.4	0	0	43.6	20.8	80
UNI-FREIBURG	1.9	1.8	0	0	0	0	1.9	1.8	none
CYFRONET-LCG2/T2_PL_Cyfrone	2.9	1.4	1.8	0.5	0	0	4.7	1.9	10
GoeGrid	3.1	1.4	0	0	0	0	3.1	1.4	none
IEPSAS-Kosice	0.7	0.4	0	0	0	0	0.7	0.4	none
LRZ-LMU	1.6	1.8	0	0	0	0	1.6	1.8	none
CSCS-LCG2/T2_CH_CSCS	25	22.4	18.5	3.2	0	0	43.5	25.6	none
DESY-HH/T2_DE_DESY UNI-FREIBURG CYFRONET-LCG2/T2_PL_Cyfrone GoeGrid IEPSAS-Kosice LRZ-LMU CSCS-LCG2/T2_CH_CSCS	16.3 1.9 2.9 3.1 0.7 1.6 25	13.4 1.8 1.4 1.4 0.4 1.8 22.4	27.3 0 1.8 0 0 0 0 18.5	7.4 0 0.5 0 0 0 3.2		0 0 0 0 0 0 0 0	43.6 1.9 4.7 3.1 0.7 1.6 43.5	20.8 1.8 1.9 1.4 0.4 1.8 25.6	none none none none none

DC24 Planning per experiment Tier0-Tier1s (Minimal rates)

Tier-0-Tier1s (Higher rates)

Tier1s to Tier1s rates Transatlantic links

inks Tier2s ingress-egress +



What else we need to know/combine?

- Average file size
- HTTP for the vast majority of transfers
 - plus XRootD for AAA in the case of CMS
 - ALICE is XRootD only
- T2s' verification of network capacity



Rates for DC 2024

Combined numbers: Experiments/Network/CRIC

Up to date and same language (site names + units)

One collaborative document Editors: <u>link</u> Viewer: <u>link</u>

Thanks to Experiments, Network team and CRIC team

