

Long Data Centre Links vs. Length

Alan Flatman

**Principal Consultant
LAN Technologies, UK**

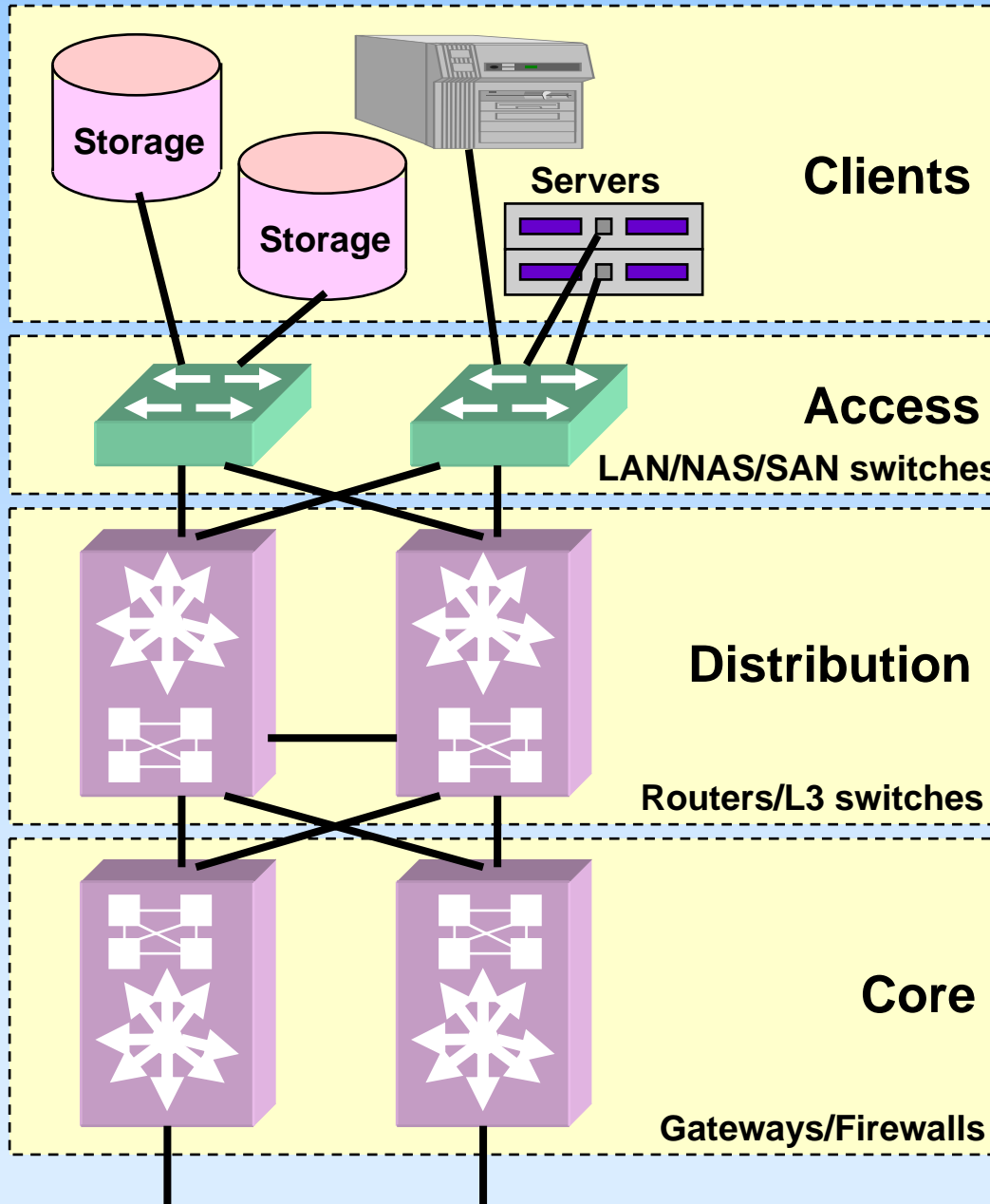
a_flatman@compuserve.com

flatman_01_0108 Data Centre Cabling Survey

- main focus = link length distribution at all levels
- 9 enterprise data centres from US, UK, Germany
- total data centre floor space was 715,000 sq. feet
- small, medium, large, v. large sizes (IDC classes)

v. large DC	>100K sq.ft	74% links
large DC	~35K sq.ft	20% links
medium DC	~20K sq.ft	5% links
small DC	~15K sq.ft	1% links

flatman_01_0108 Link Volumes



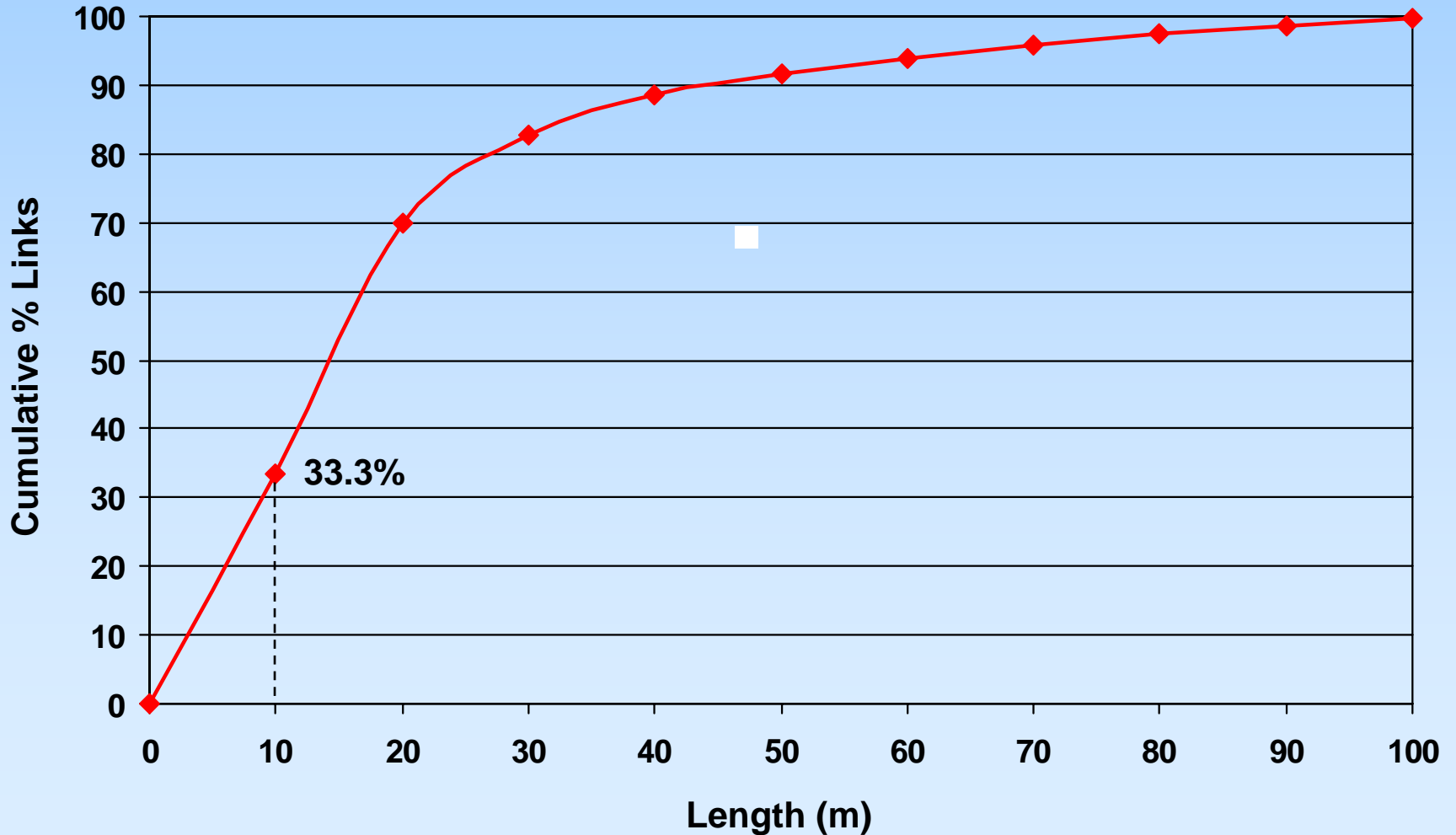
250,000 links

16,000 links

3,000 links

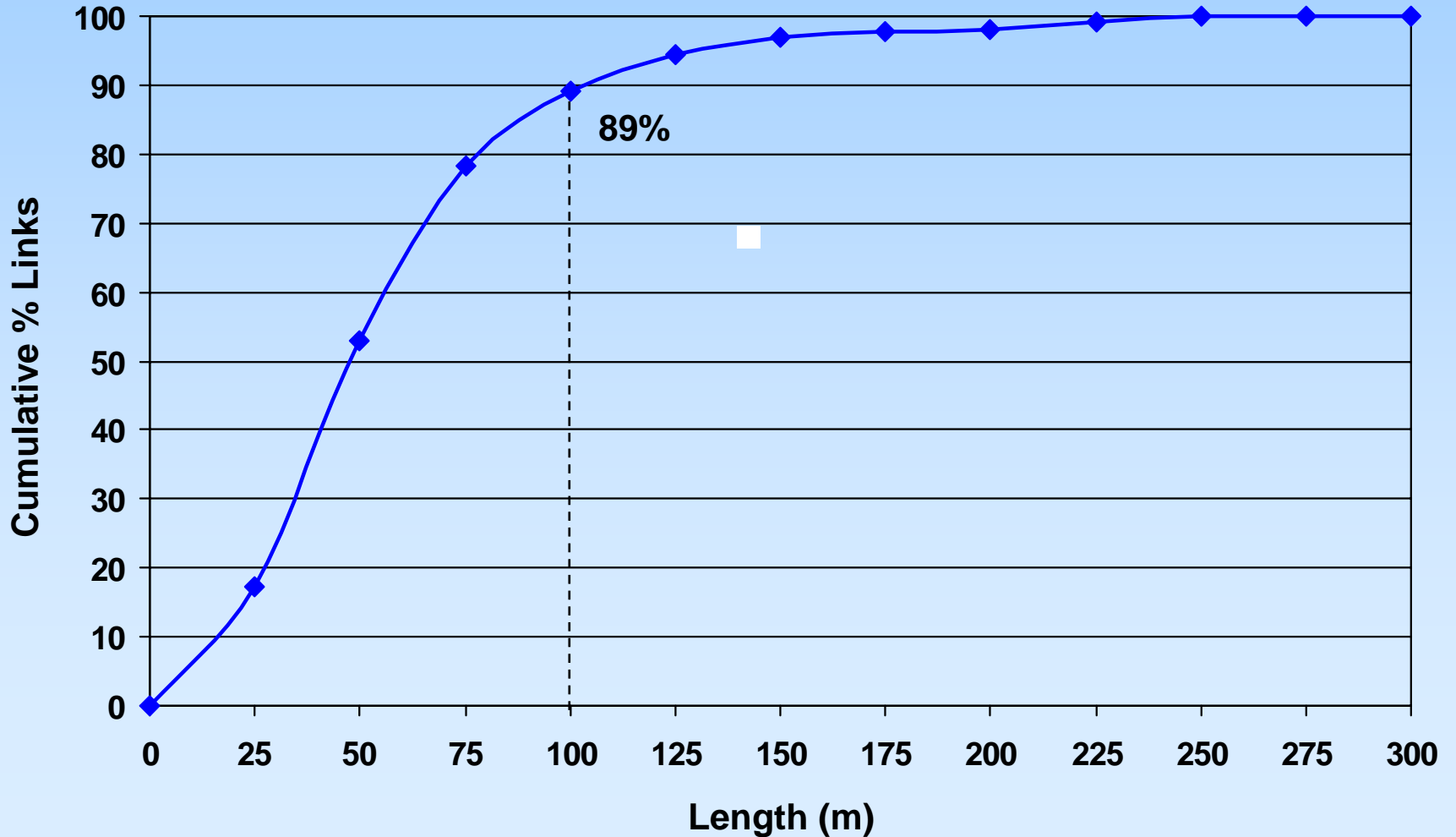
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Client-to-Access Channel Length Distribution



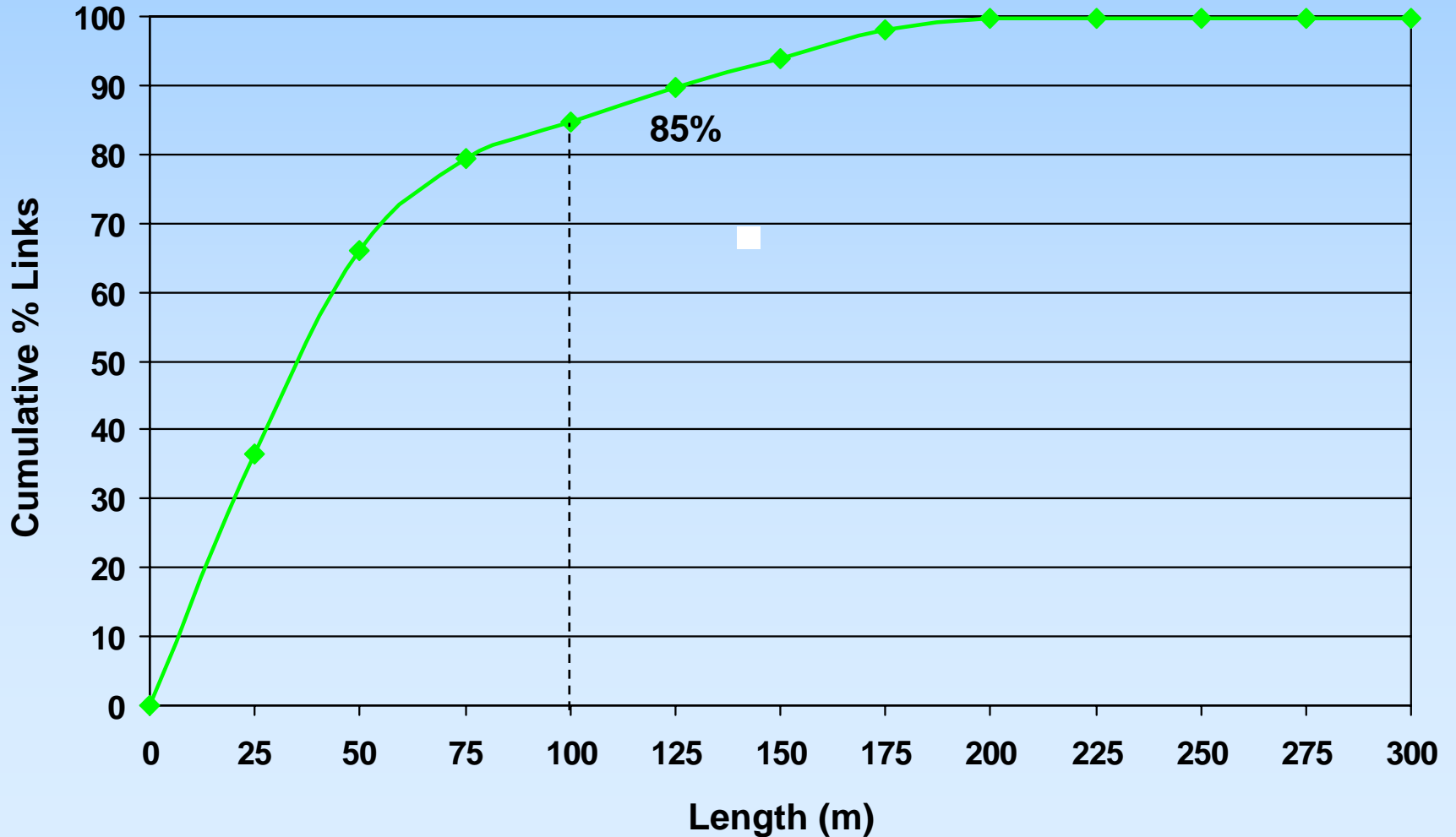
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Access-to-Distribution Channel Length Distribution



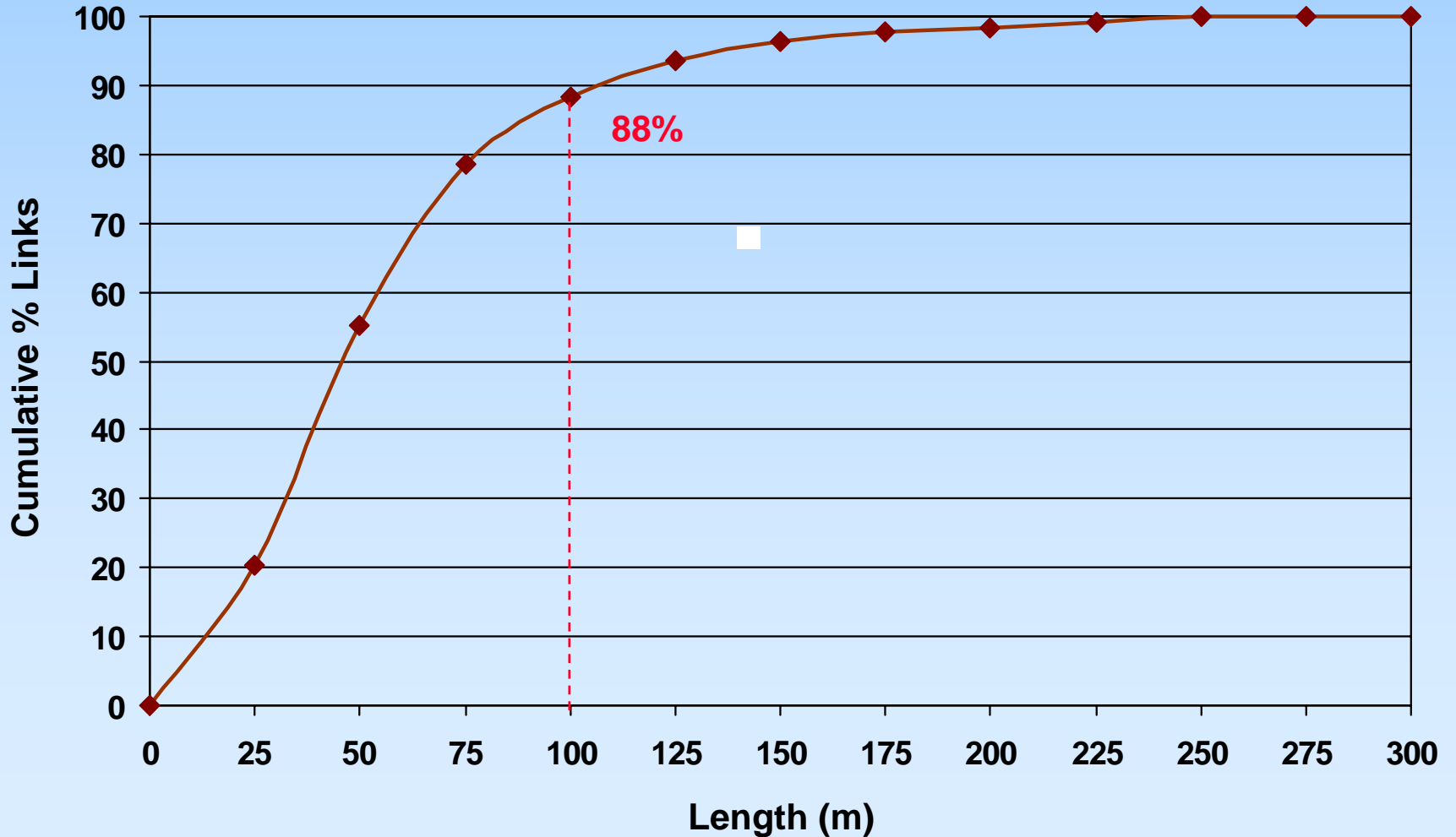
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Distribution-to-Core Channel Length Distribution



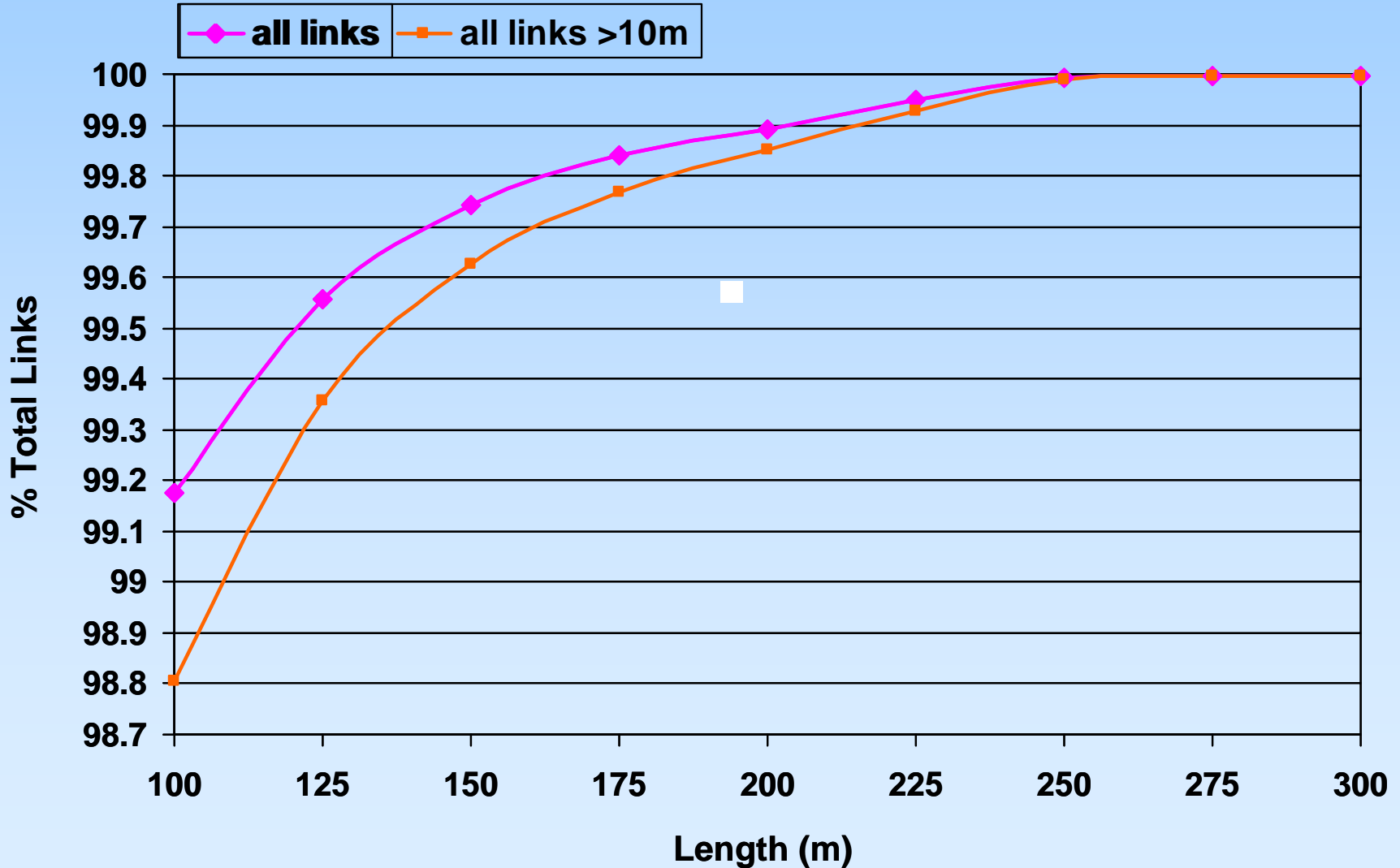
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Average Backbone Channel Length Distribution



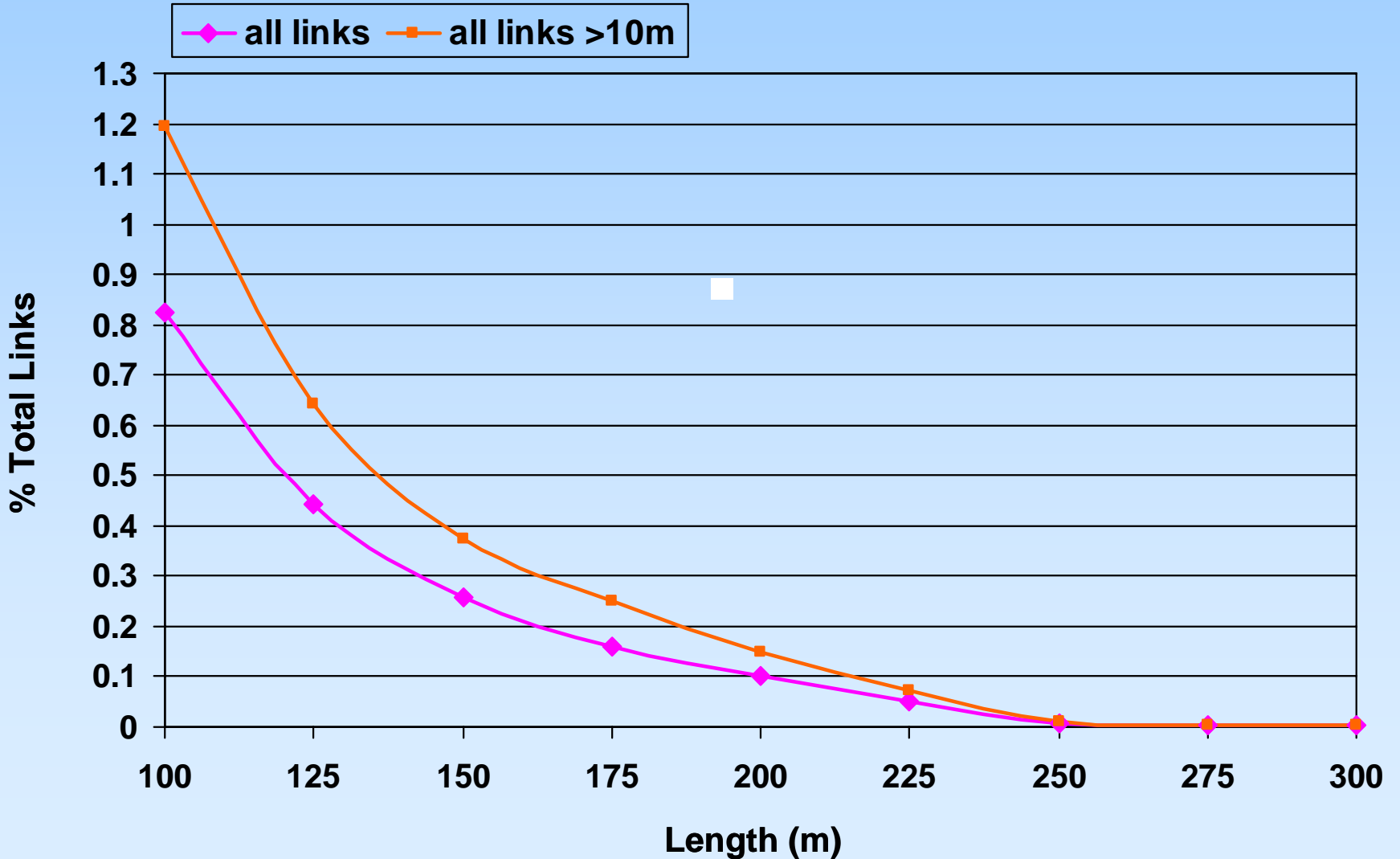
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Total Links **Gained** vs. Length

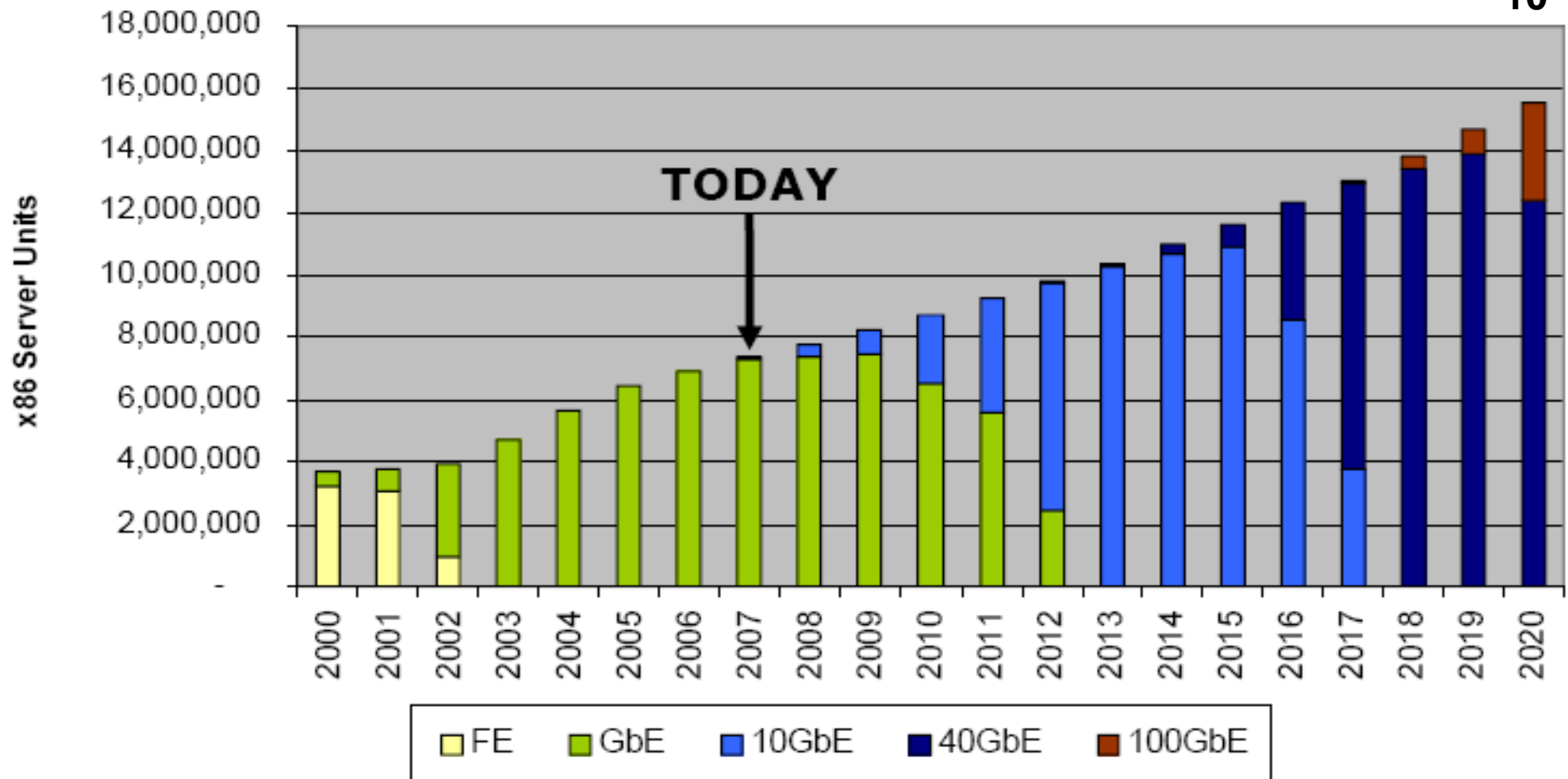


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Total Links **Lost** vs. Length



x86 Server Forecast by Ethernet Connection Type



FE
 GbE
 10GbE
 40GbE
 100GbE

from http://www.ieee802.org/3/hssg/public/apr07/hays_01_0407.pdf **updated:** July 2007

40G & 100G Data Center Ports	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	TOTAL
40GbE Server Connections (Kports)	17	37	98	208	660	1,399	7,407	18,303	26,859	27,857	24,843	
40GbE Switch Downlinks (Kports)	17	37	98	208	660	1,399	7,407	18,303	26,859	27,857	24,843	
40GbE TOTAL (Kports)	35	74	196	416	1,321	2,798	14,814	36,606	53,718	55,715	49,686	215,379
100GbE Switch Uplinks (Kports)	1	3	8	17	55	117	617	1,525	2,238	2,321	2,070	
100GbE Server Connections (Kports)	-	-	-	-	-	23	74	261	831	1,466	6,211	
100GbE Server Downlinks (Kports)	-	-	-	-	-	23	74	261	831	1,466	6,211	
100GbE TOTAL (Kports)	1	3	8	17	55	163	765	2,048	3,900	5,254	14,492	26,707

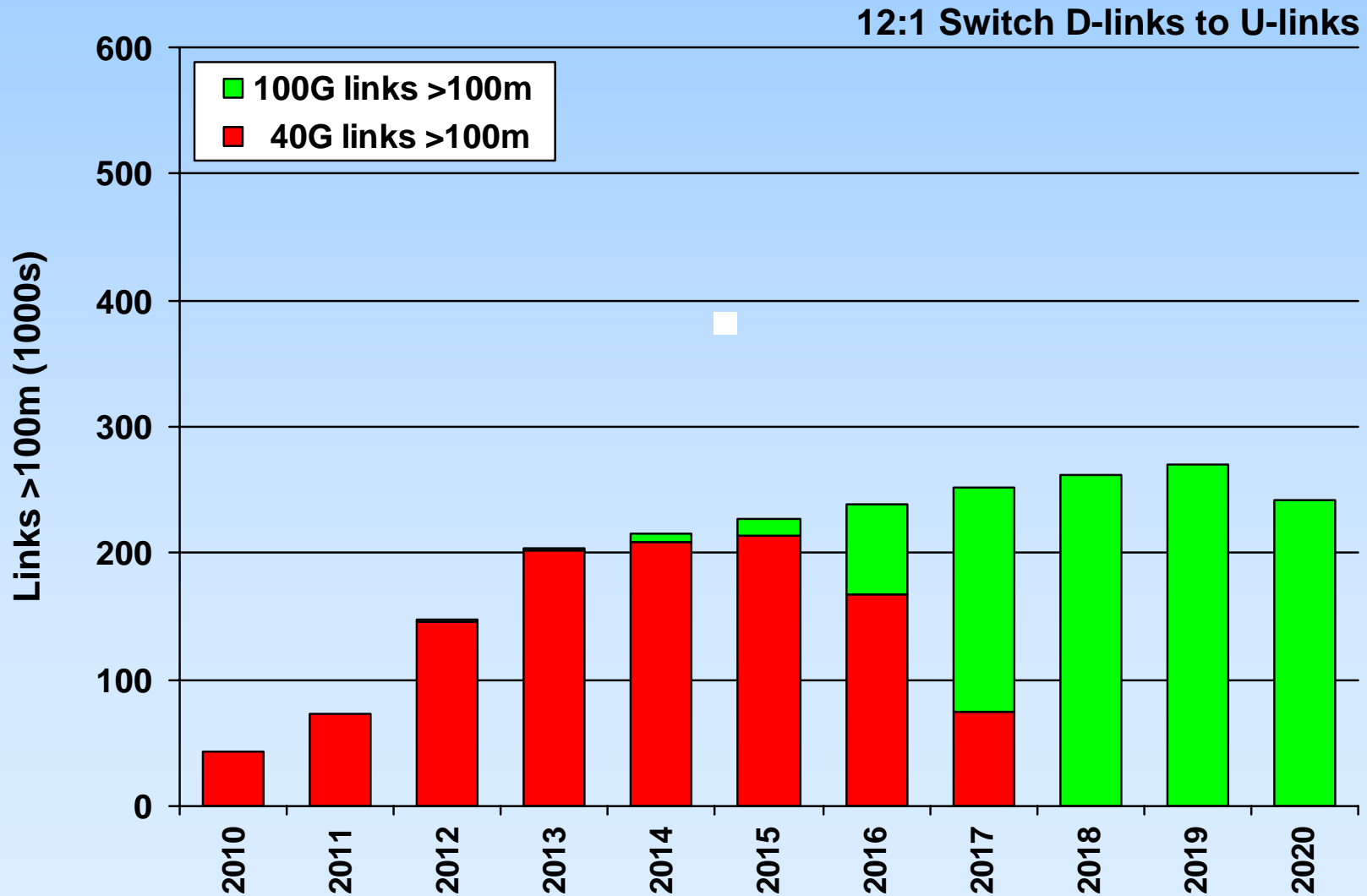
40GBE & 100GBE Server & Switch Links

- applied data & assumptions from hays_01_0407
 - X.86 server shipments IDC July'07
 - 2 Ethernet connections per server
 - 12:1 switch downlinks to uplinks
- 40GBE aggregation added for 10GBE servers
 - 6:1 switch downlinks to uplinks also considered

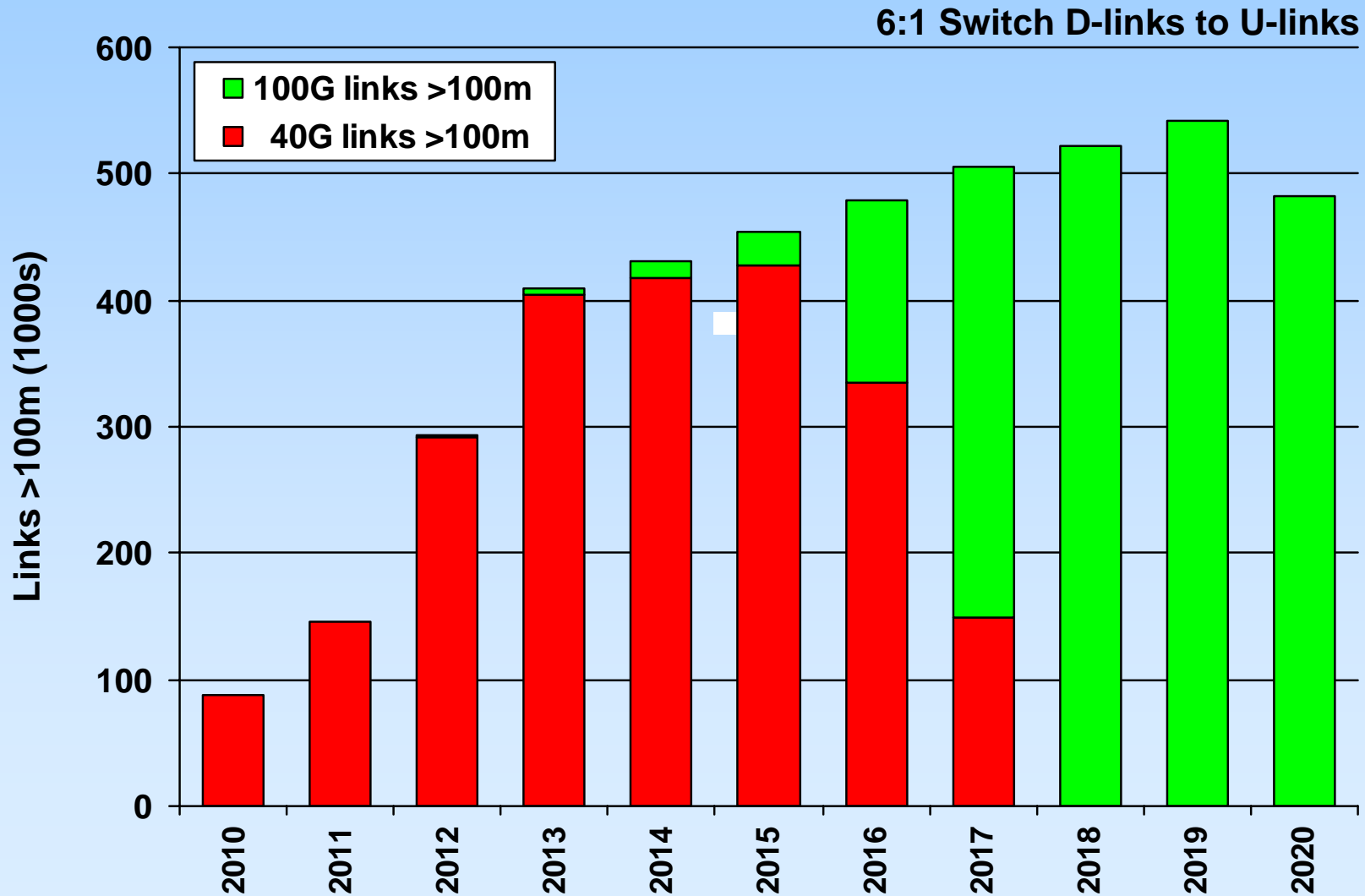


Data Centre Links (millions)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	TOTAL
10GBE Server Links	4.490	7.500	15.000	20.840	21.500	22.000	17.200	7.700				
40GBE Switch U-links	.374	.625	1.250	1.737	1.792	1.833	1.433	.642				
<u>40GBE Server Links</u>	<u>.017</u>	<u>.037</u>	<u>.098</u>	<u>.208</u>	<u>.660</u>	<u>1.399</u>	<u>7.407</u>	<u>18.303</u>	<u>26.859</u>	<u>27.857</u>	<u>24.843</u>	
40BGE Total Links	.391	.662	1.348	1.945	2.452	3.232	8.840	18.945	26.859	27.857	24.843	117.374
100GBE Switch U-links	.001	.003	.008	.017	.055	.117	.617	1.525	2.238	2.321	2.070	
<u>100GBE Server Links</u>						<u>.023</u>	<u>.074</u>	<u>.261</u>	<u>.831</u>	<u>1.466</u>	<u>6.211</u>	
100GBE Total Ports	.001	.003	.008	.017	.055	.140	.691	1.786	3.069	3.787	8.281	17.838

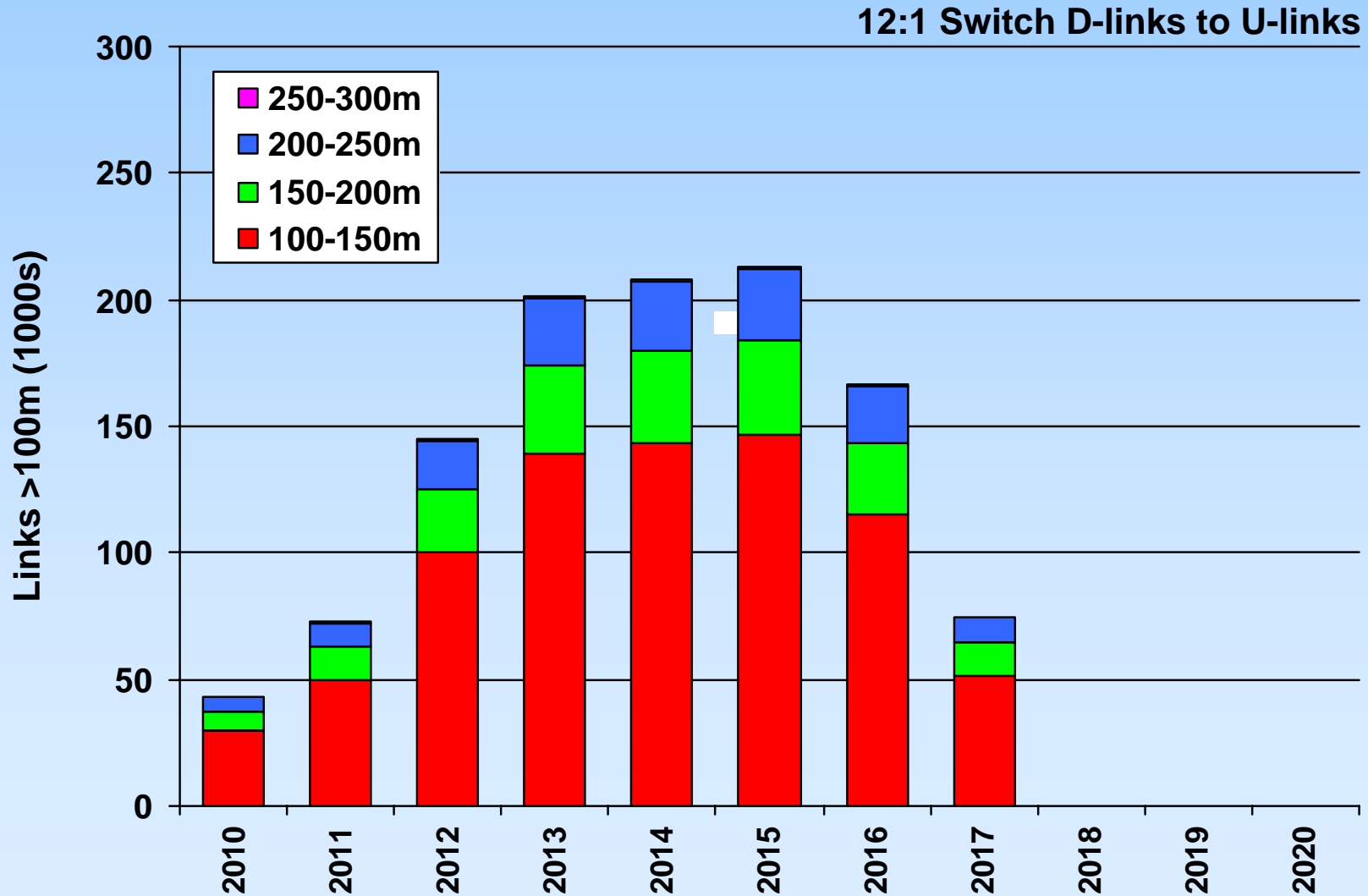
Enterprise Data Centre 40GBE & 100GBE Links based on hays_01_0407 rev & flatman_01_0108



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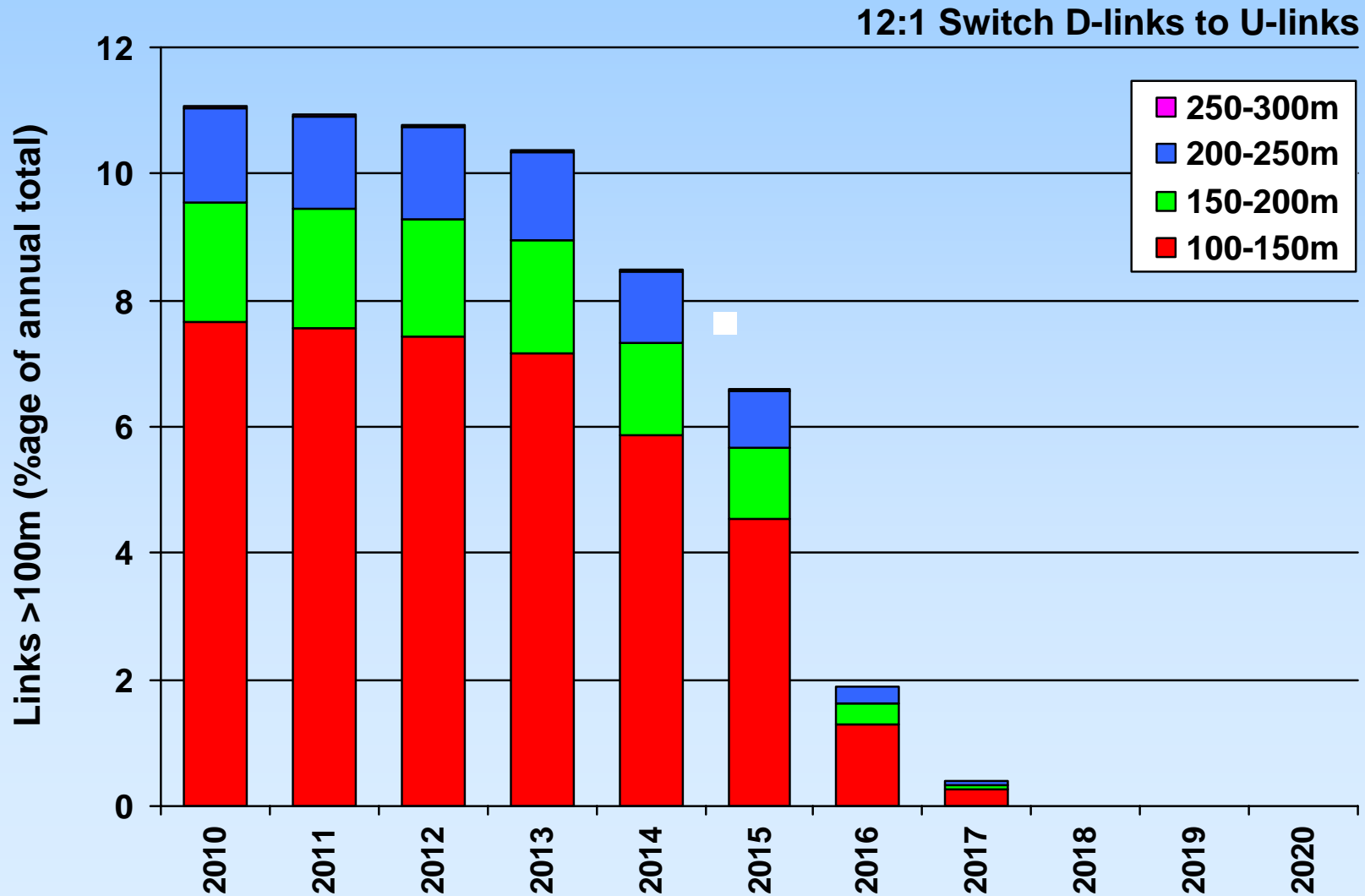


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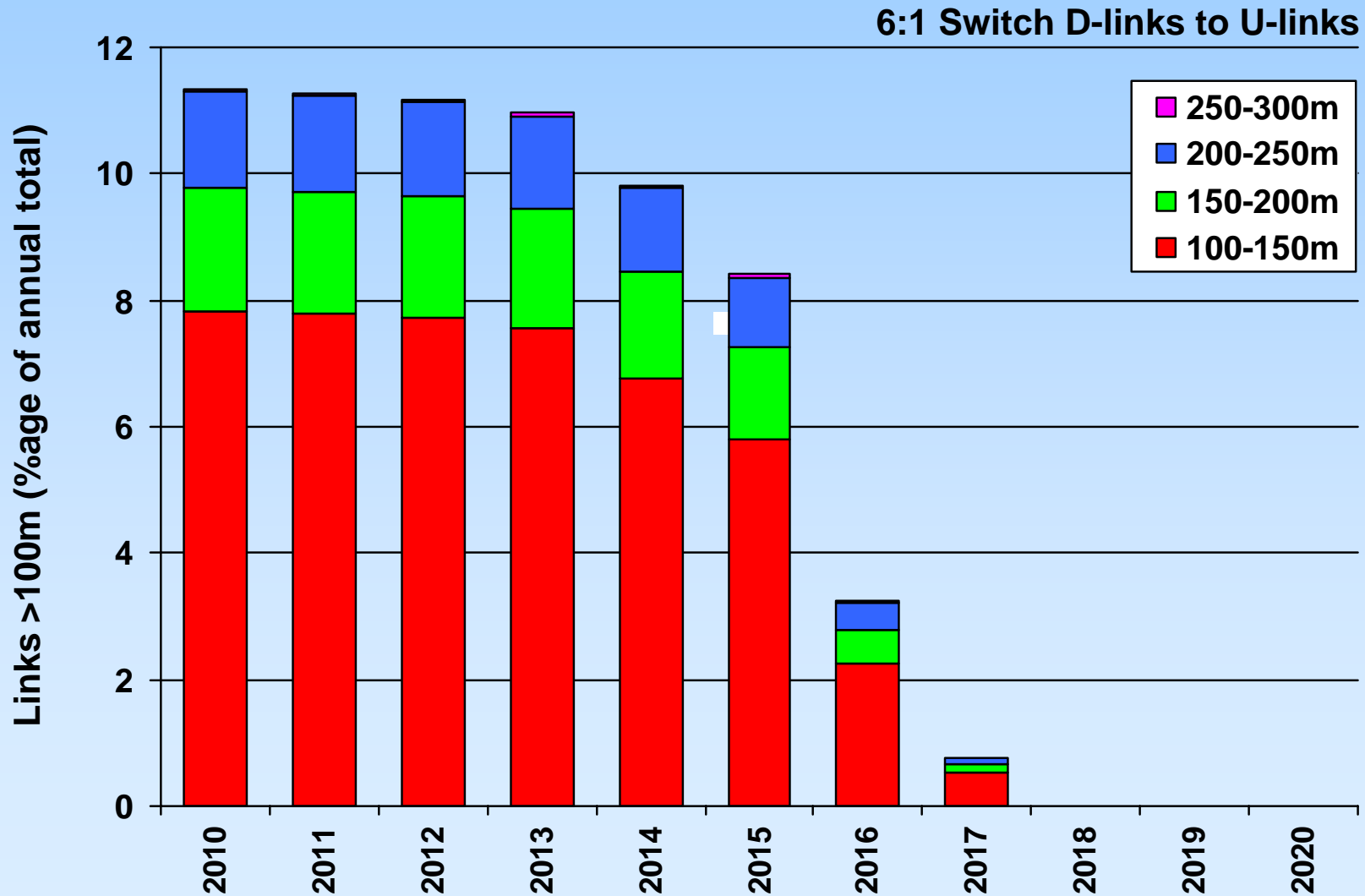


Enterprise Data Centre 40GBE

based on hays_01_0407 rev & flatman_01_0108



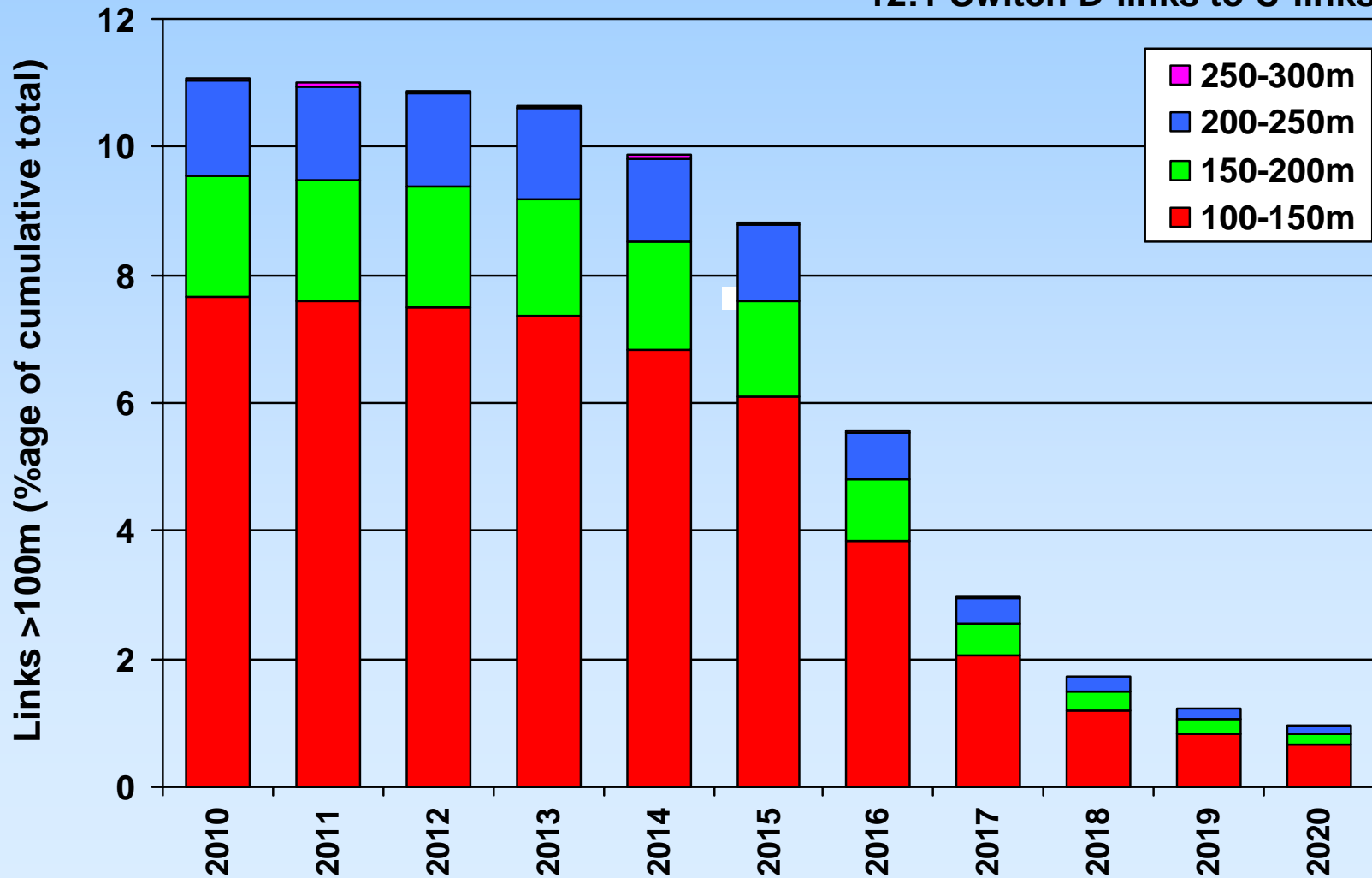
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Enterprise Data Centre 40GBE

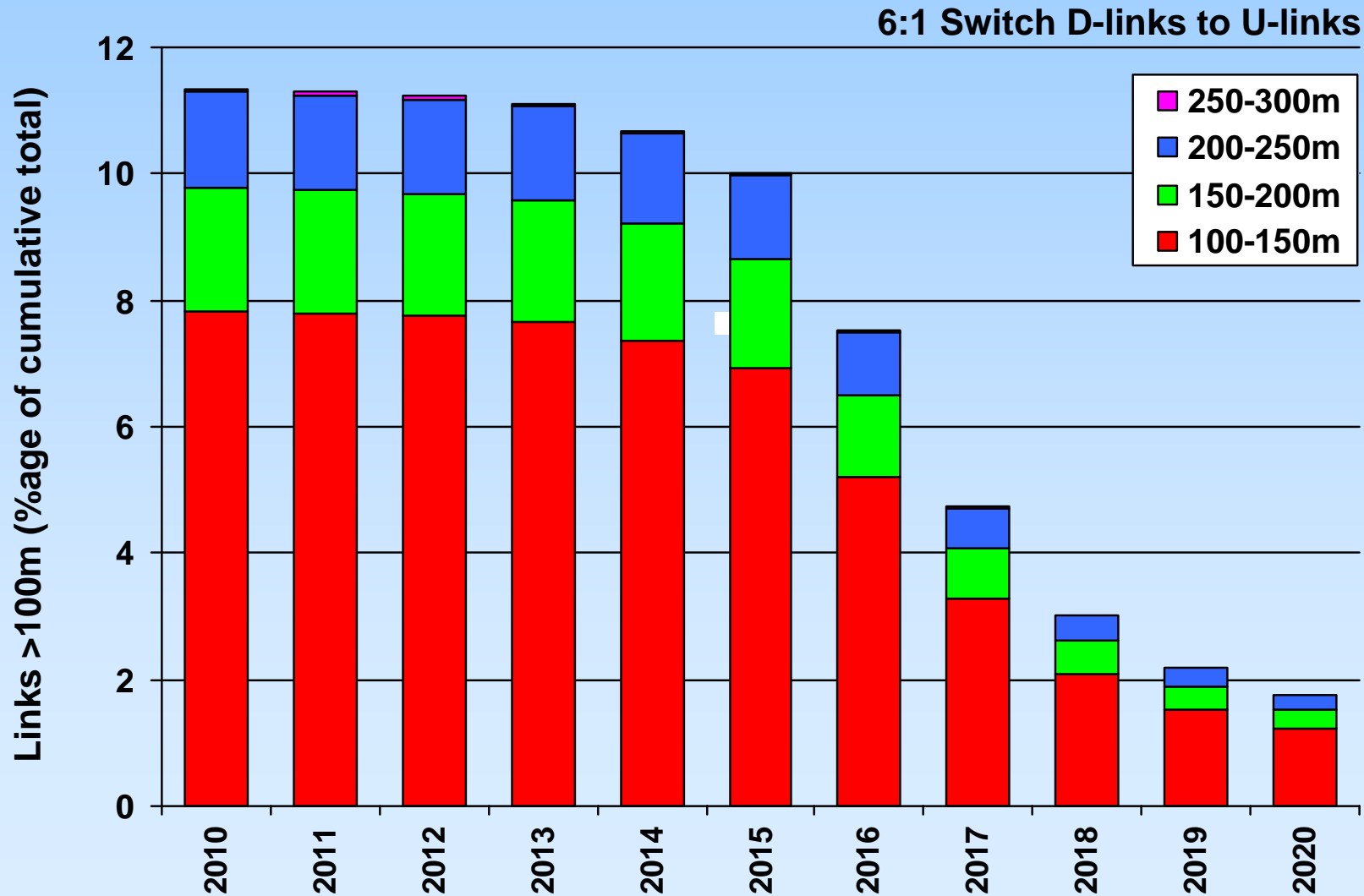
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12:1 Switch D-links to U-links

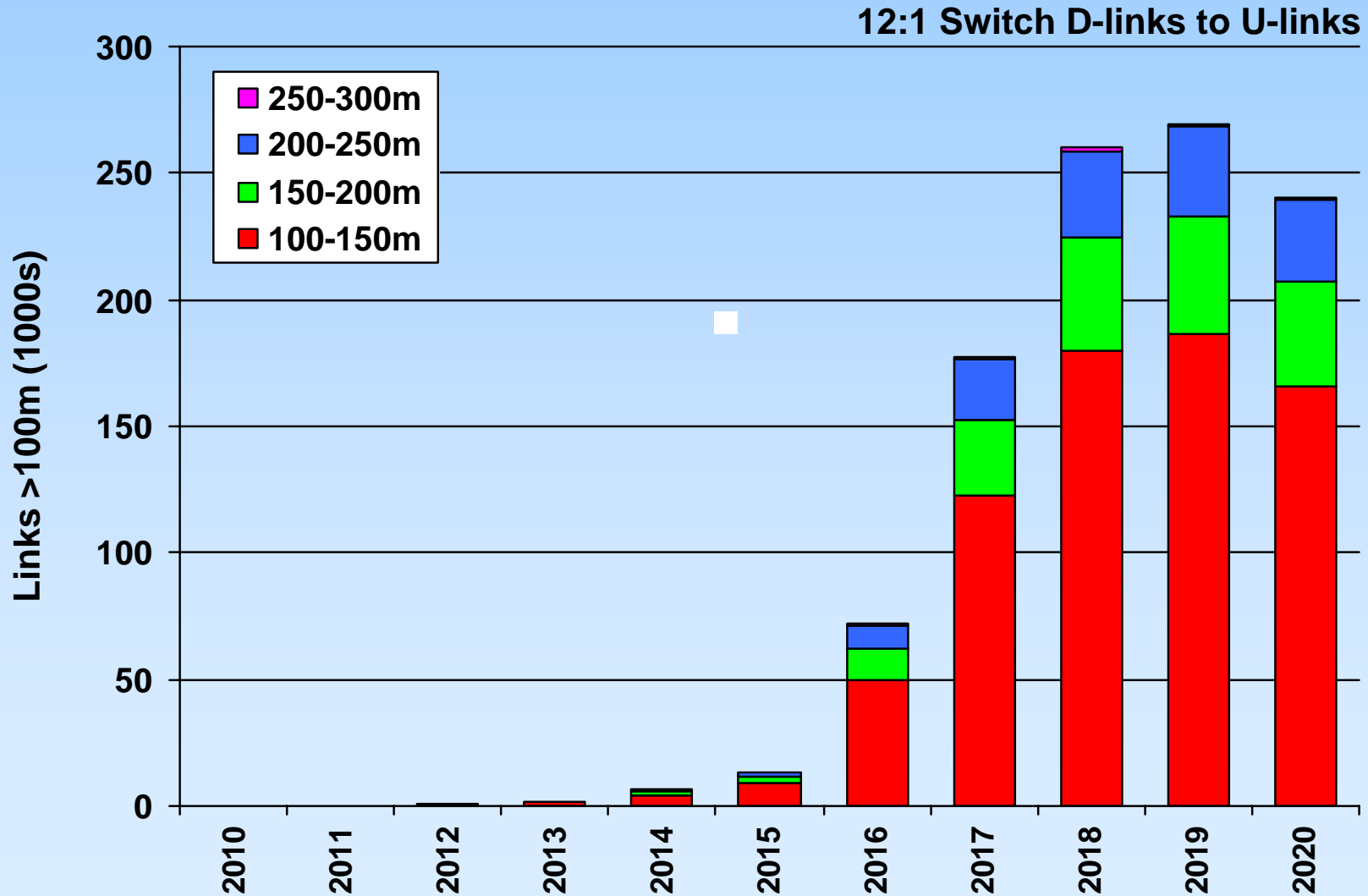


Enterprise Data Centre 40GBE

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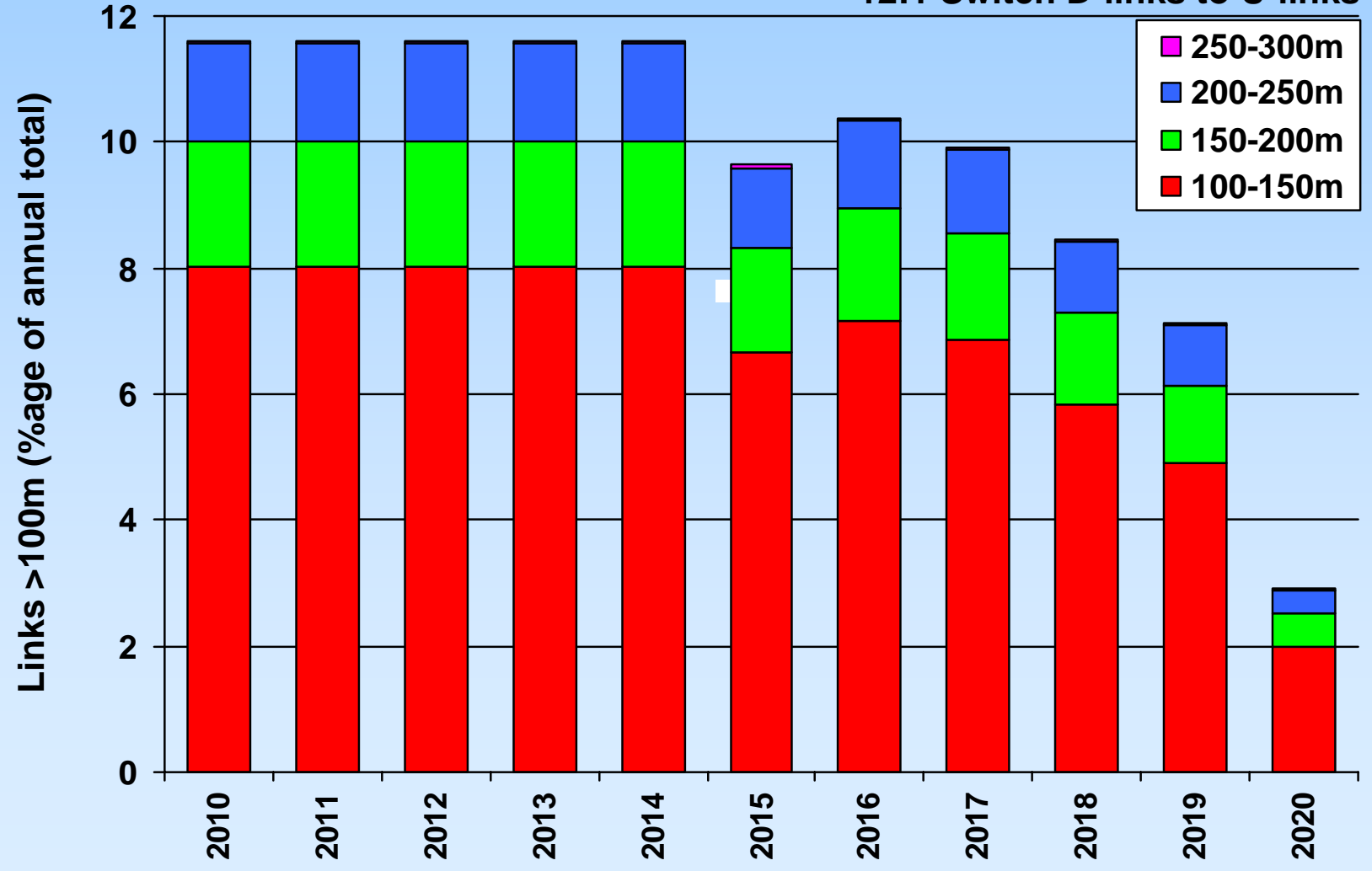


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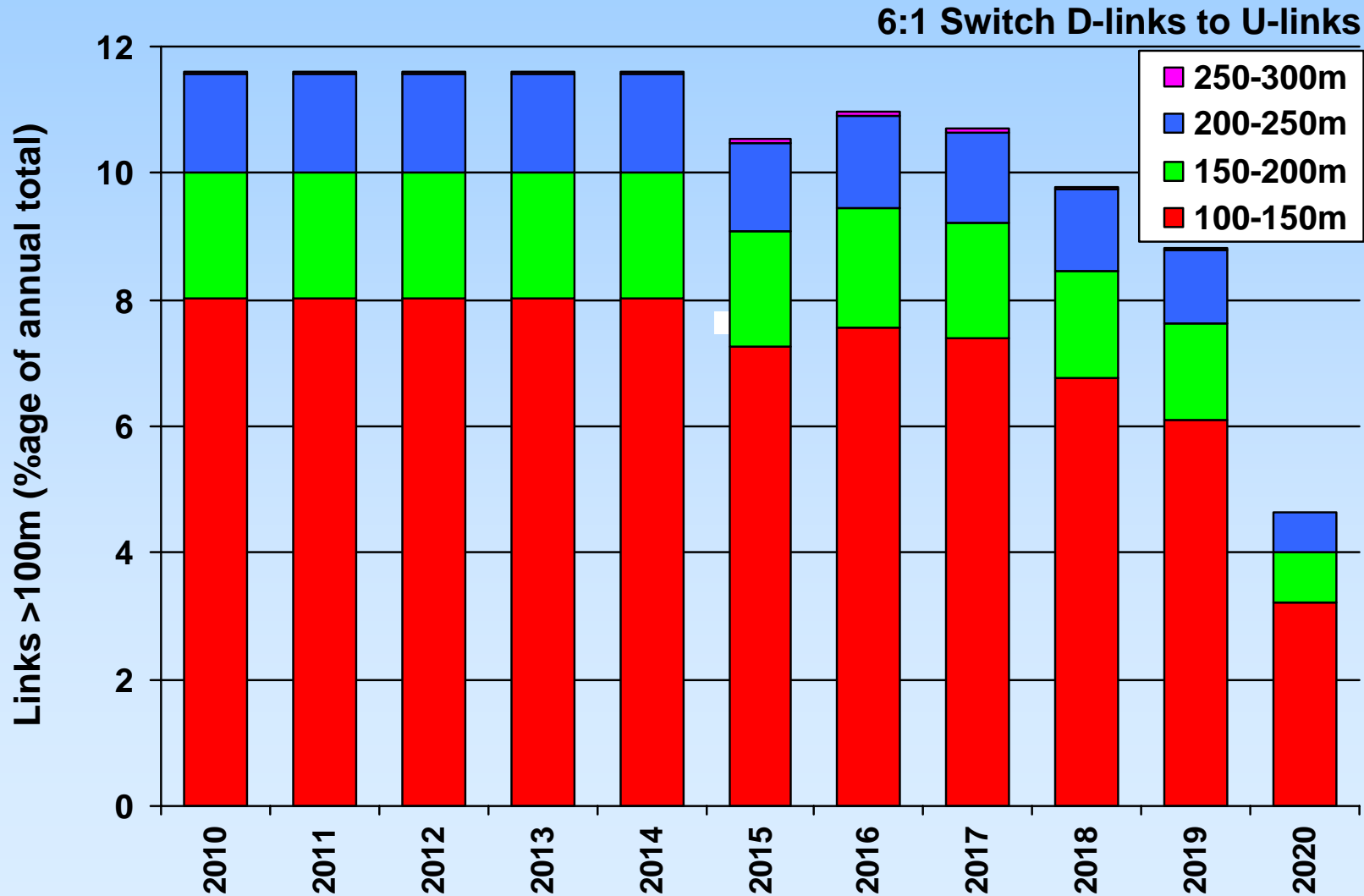


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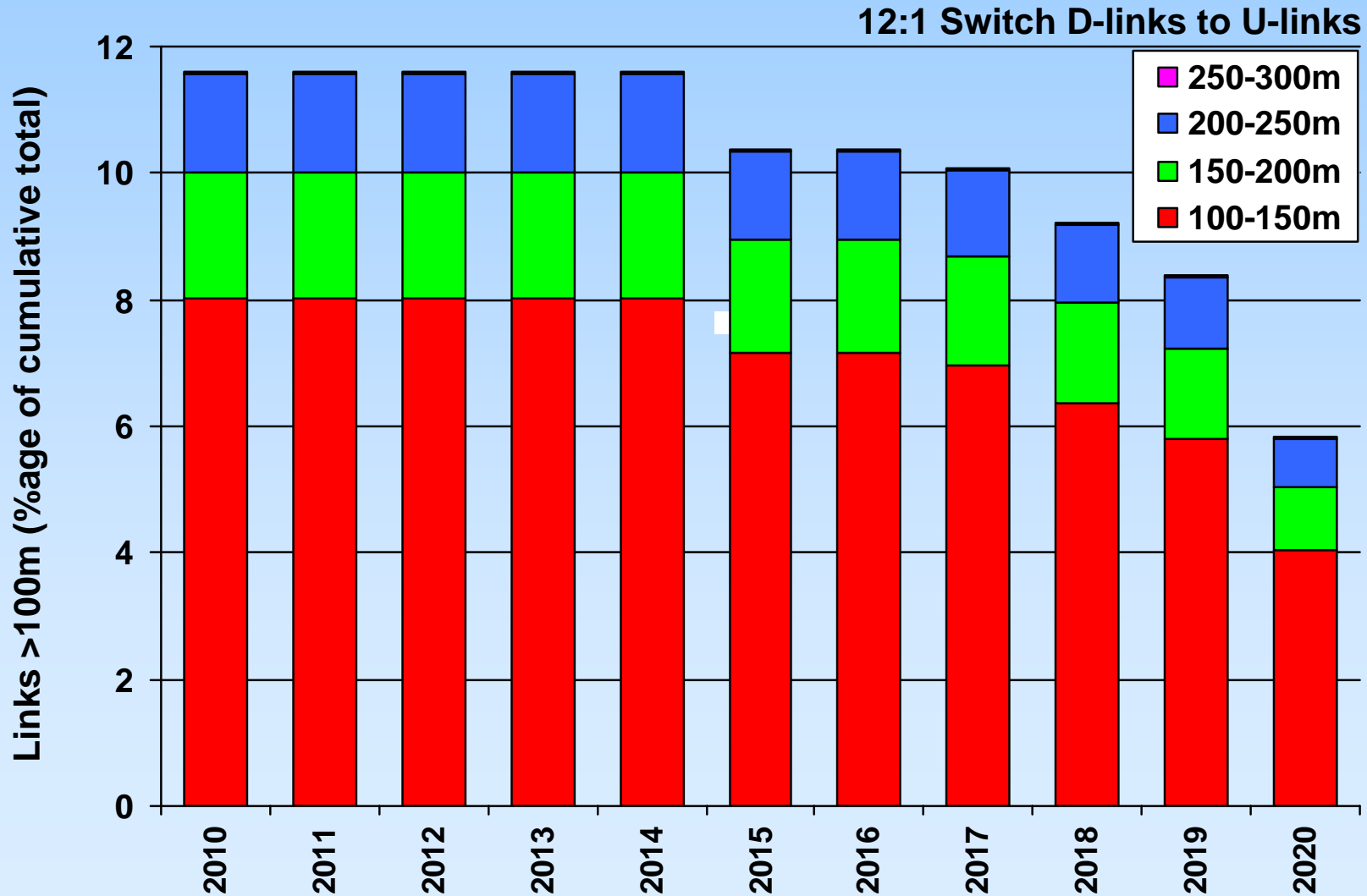


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