INEX Operations Update December 2023

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INEX Members' Meeting

December 14th, 2023, Dublin

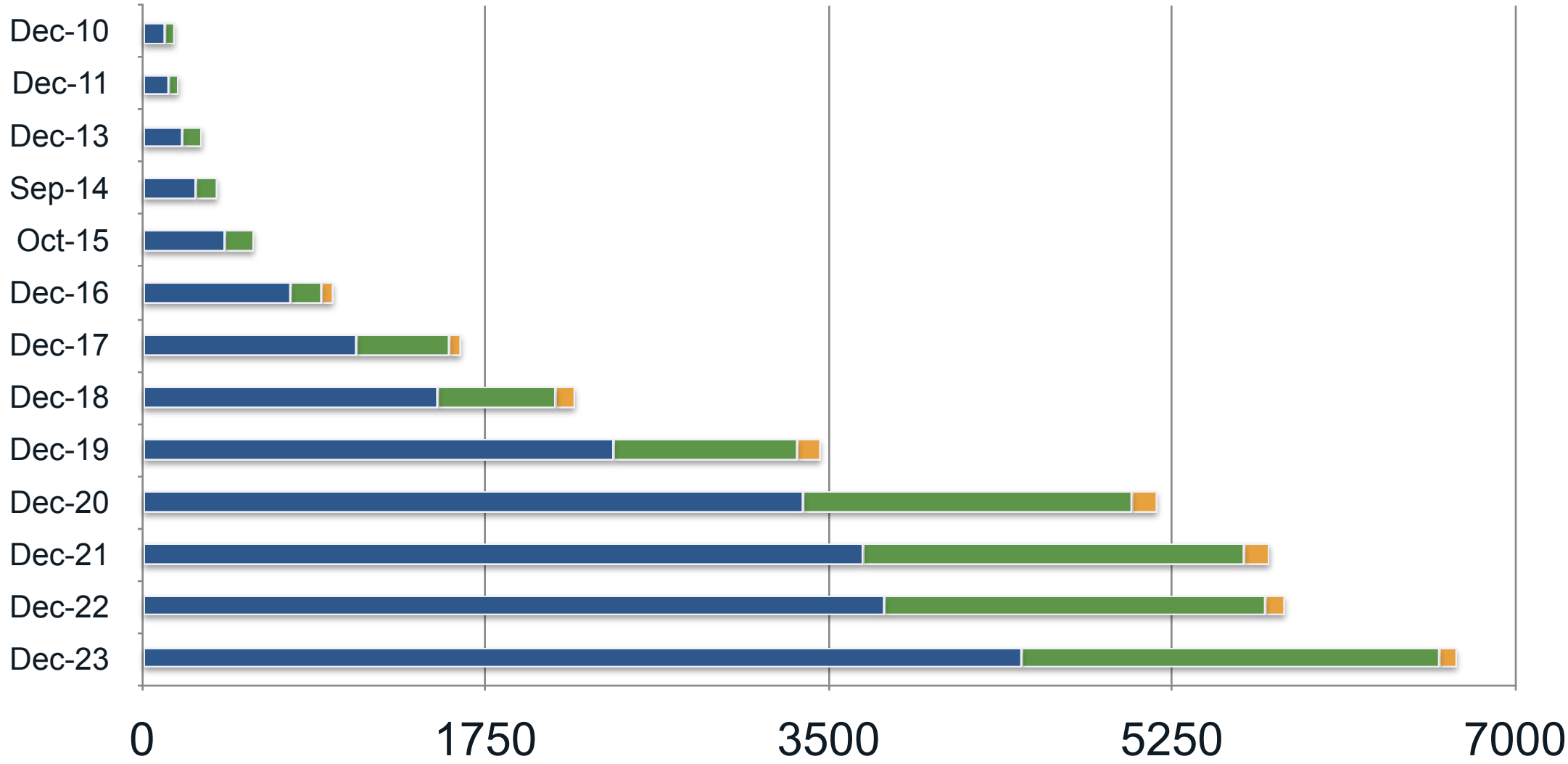
INTERCONNECTING NETWORKS AND PEOPLE FOR OVER 25 YEARS

Overview

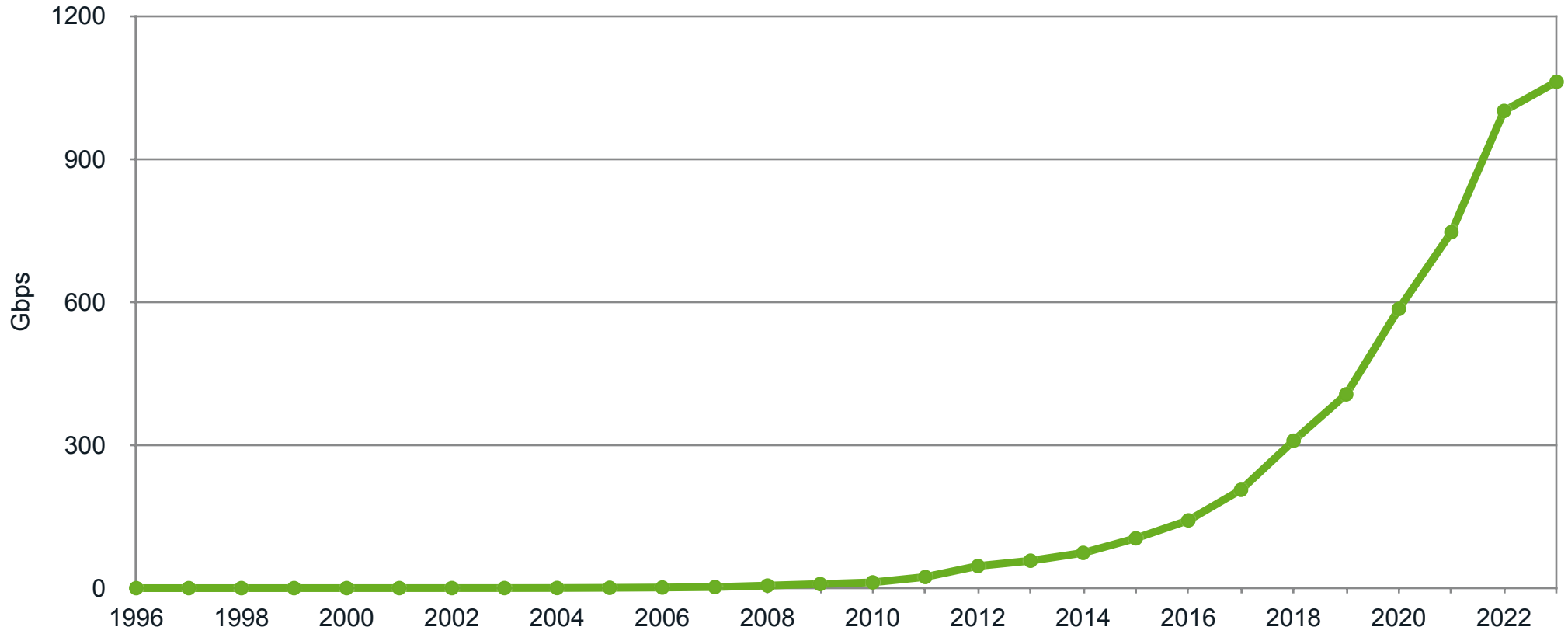
- PoP rebuilds complete - Equinix DB1 and Equinix DB2
- ISO27001 achieved - now “living and breathing” this
- INEX Cork upgraded
- Number of core network augments during 2023
- Planning for 400Gb introduction


INEX
Traffic & Trends

Connected Edge Capacity

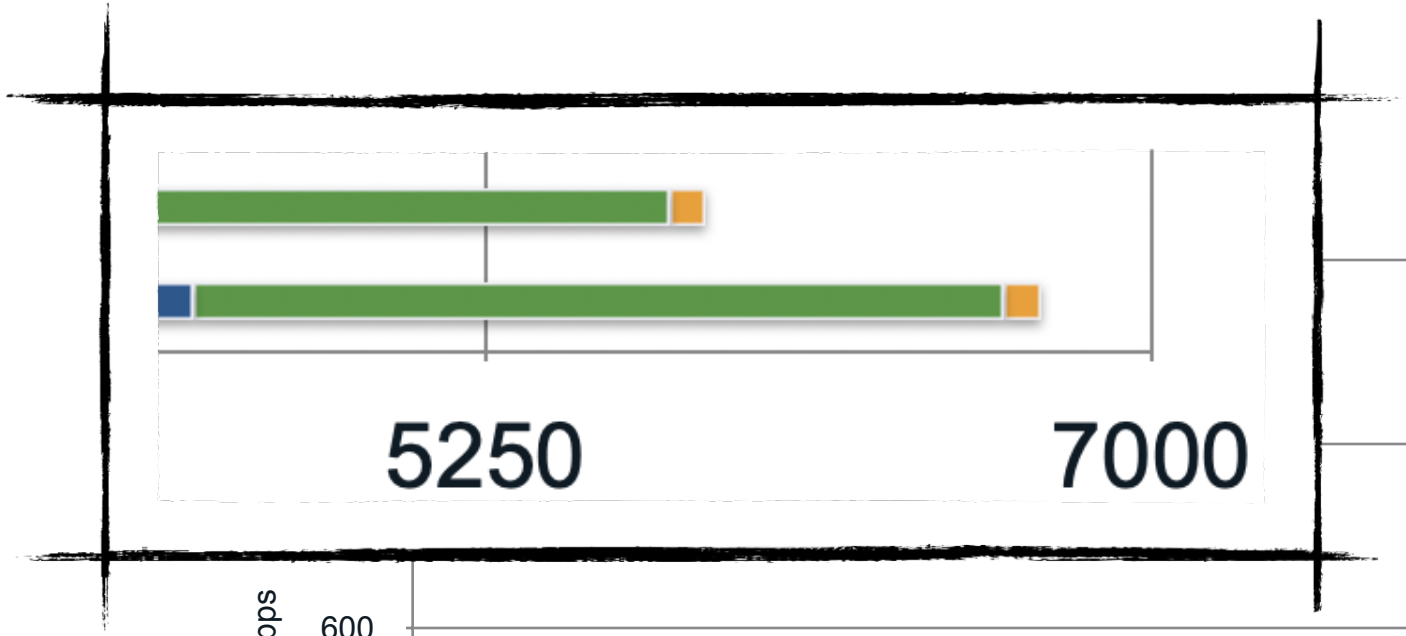


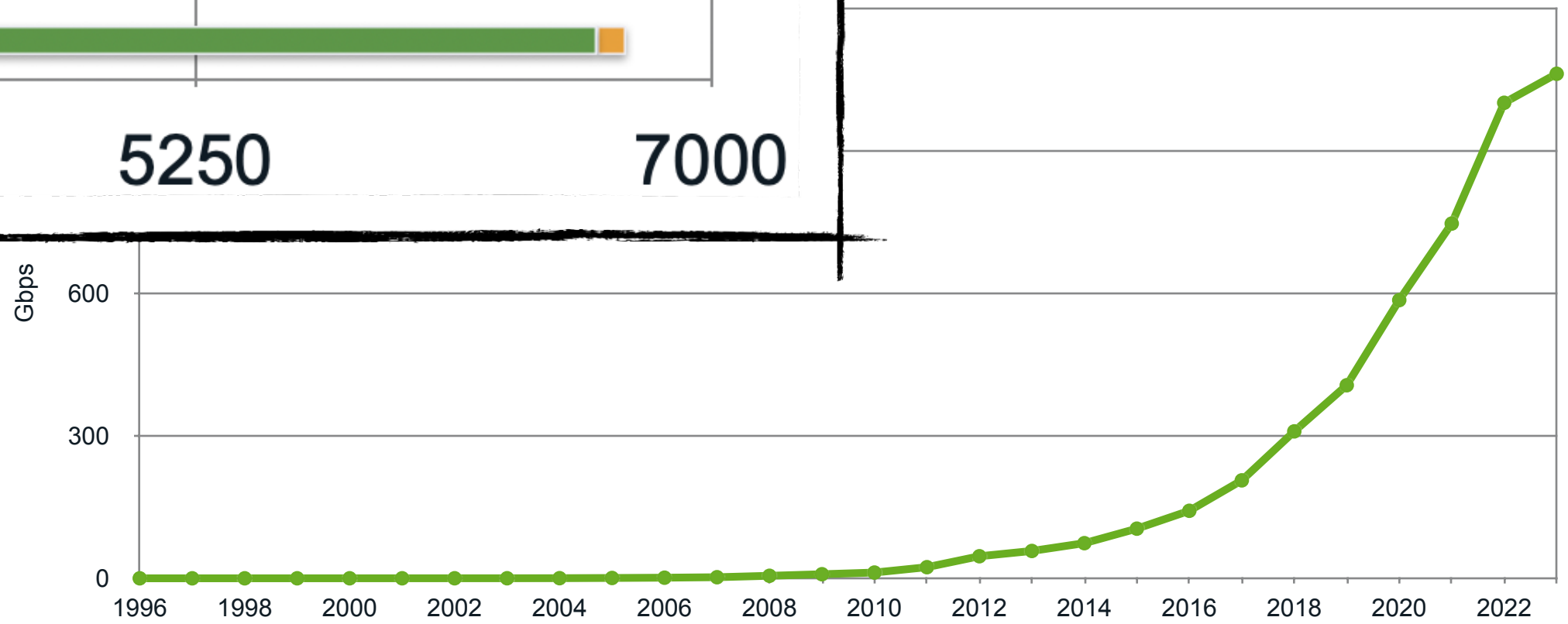
Traffic Peaks :: 1996 - Now



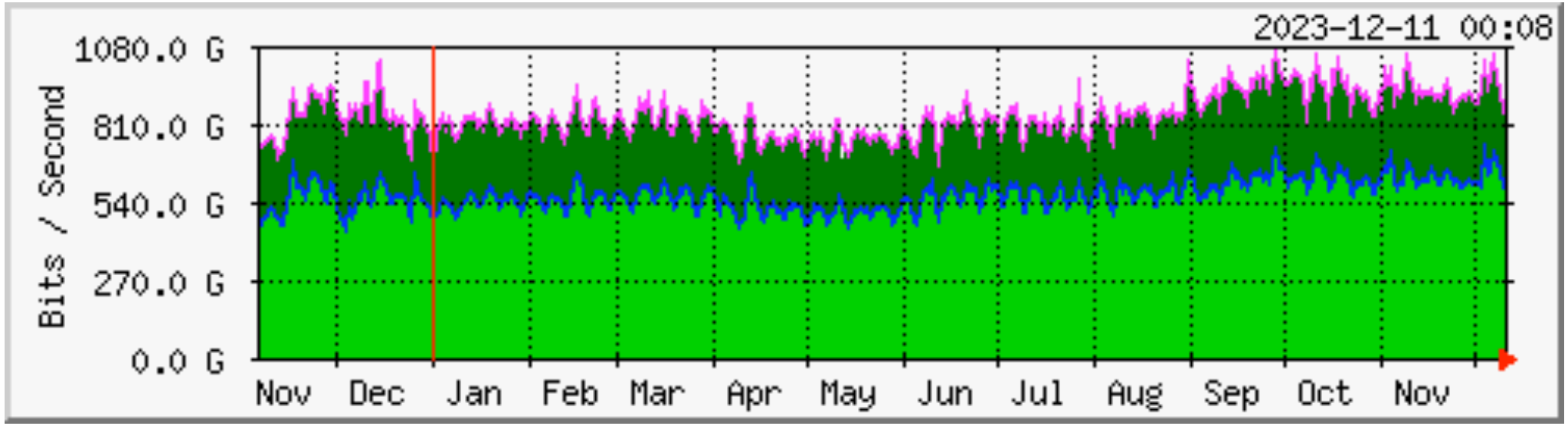
Traffic Peaks :: 1996 - Now

$$I = \frac{V}{\Omega}$$





1Tbps Now Commonplace



Operations Update

Core Network

Peering Platform

INEX LAN1 (15 ‘switches’)

- Full L3 ECMP via BGP routed underlay
- Full VXLAN Overlay

INEX LAN2 (5+6 ‘switches’)

- L3 ECMP via BGP routed underlay
- VXLAN Overlay
  - Extreme access switches standard L2

- *All LANs: RC, RS’, AS112*

- **INEX Cork** - single L2 Arista switch. 100Gb ports now available.

- **Mgmt network** - own BGP routers, firewalls, hypervisors, services, …
  - L2 Mgmt network spanning all PoPs on dedicated DWDM waves.
  - Opengear console servers and managed PDUs.

Switching Equipment - INEX LAN1

Arista DCS-7280SR-48C6

Arista DCS-7060CX2-32S

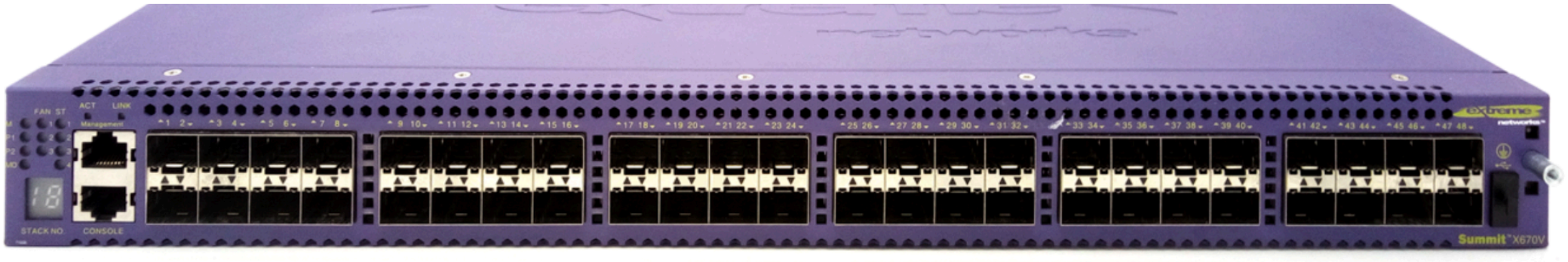
Switching Equipment - INEX LAN1 - 400Gb

Arista DCS-7280CR3

- 32 x 100Gb and 4 x 400Gb
- Edge and core function
- Expected Q1 2024
- Using QSFP-DD transceivers
- Product Life Cycle - Introduction phase of 400Gb

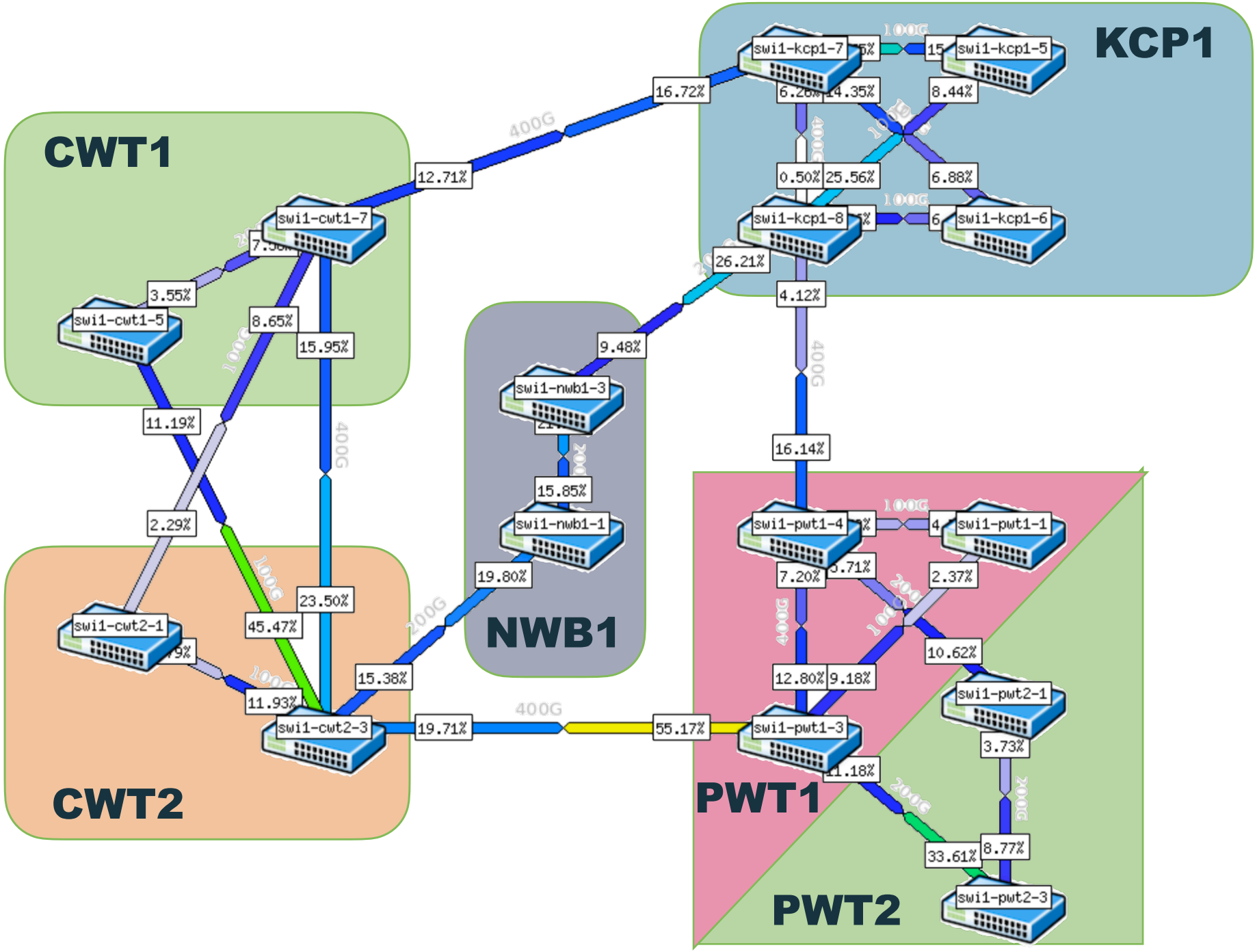
Switching Equipment - INEX LAN2

Mellanox SN2100 (now Nvidia)



Extreme X670-G2

INEX LAN1


KCP1
CWT1
NWB1
PWT1
PWT2
CWT2
swi1-kcp1-7
swi1-kcp1-5
swi1-kcp1-8
swi1-kcp1-6
swi1-cwt1-7
swi1-cwt1-5
swi1-nwb1-3
swi1-nwb1-1
swi1-pwt1-4
swi1-pwt1-1
swi1-pwt2-1
swi1-pwt1-3
swi1-pwt2-3
swi1-cwt2-1
swi1-cwt2-3
16.72%
12.71%
6.26%
14.35%
8.44%
0.50%
25.56%
6.88%
26.21%
4.12%
9.48%
3.55%
8.65%
15.95%
11.19%
2.29%
15.85%
19.80%
16.14%
7.20%
2.37%
10.62%
12.80%
9.18%
3.73%
11.18%
33.61%
8.77%
23.50%
45.47%
11.93%
15.38%
19.71%
55.17%
400G
200G
100G

Core Network

- 7Tbps of provisioned capacity

- Own dark fibre links east/west between PoPs:
  - Specify and install appropriate MUXes to suit:
  - Coriant's Groove G30 platform *(now Infinera)*
    - *2 x 600Gb WAN => 12 x 100Gb or 3 x 400Gb LAN*
  - Distances range from 7.7Km to 39Km

- Some campus connections:
  - Active or Passive DWDM where cost effective / appropriate
  - Also campus cross connects with 100Gb BiDi optics

Core Network - Capacity Planning

- INEX LAN1 ring - 400Gb
- INEX LAN2 ring - 200Gb

- Typical trigger to activate capacity increases is 50% utilisation.

- Maintenance window for Dec 7th was to begin the process of increasing INEX LAN1 ring to 600Gb
  - Postponed until early Q1 2024

- INEX LAN1 NWBP span at 200Gb -> will increase to >= 300Gb
- INEX LAN2 ring adequate at 200Gb currently

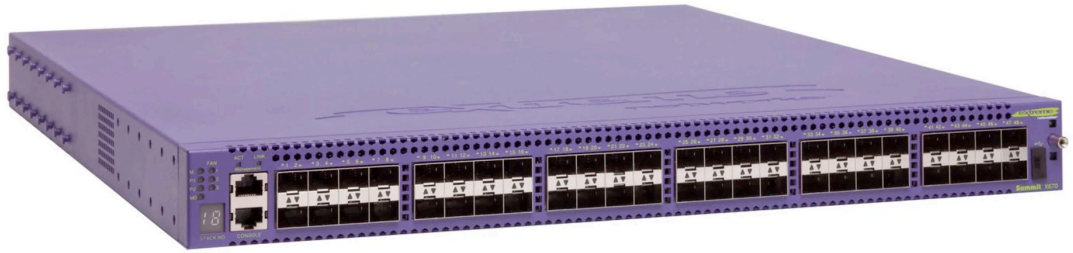
Product Lifecycle

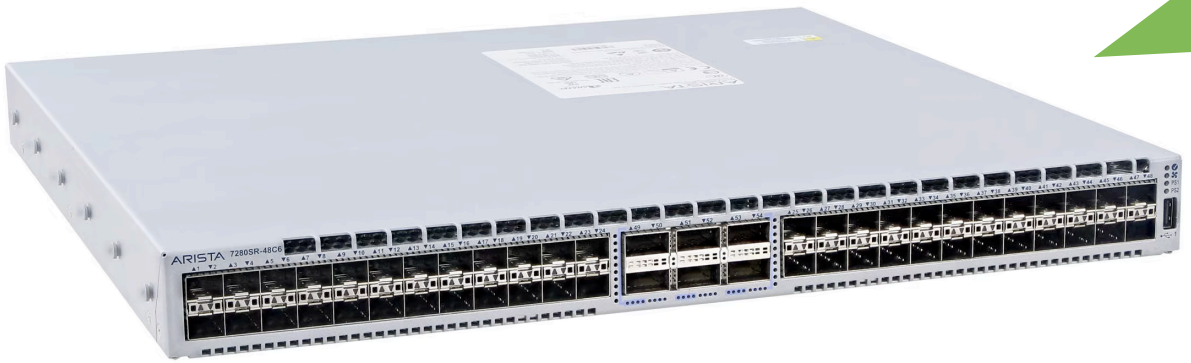
Introducing 400Gb Ports

Introducing a New Product

- Due to size and location, INEX is not a first-mover
  - Avoid peak cost
  - Avoid betting on the wrong technology
  - Benefit from the experience of other IXPs and of vendors
- Decision to proceed based on a combination of:
  - Vendors settle on a technology / merchant silicon available
  - Member enquiries / commitments
  - Core network capacity
  - Gain operational experience for team via lab work
  - Mandated: INEX's mission is to "*meet and exceed our members' internet exchange needs, both now and in the future*".

Repetitive Process - 10Gb to 100Gb

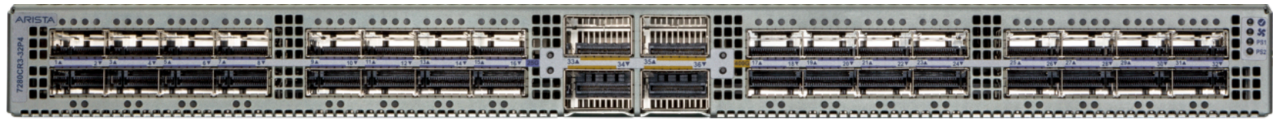




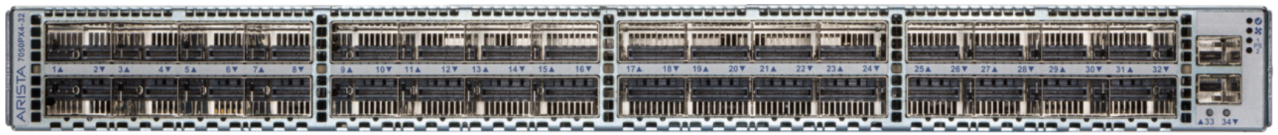
Repetitive Process - 100Gb to 400Gb

7280R - 48 x 10Gb, 6 x 100Gb

7060X2 - 32 x 100Gb

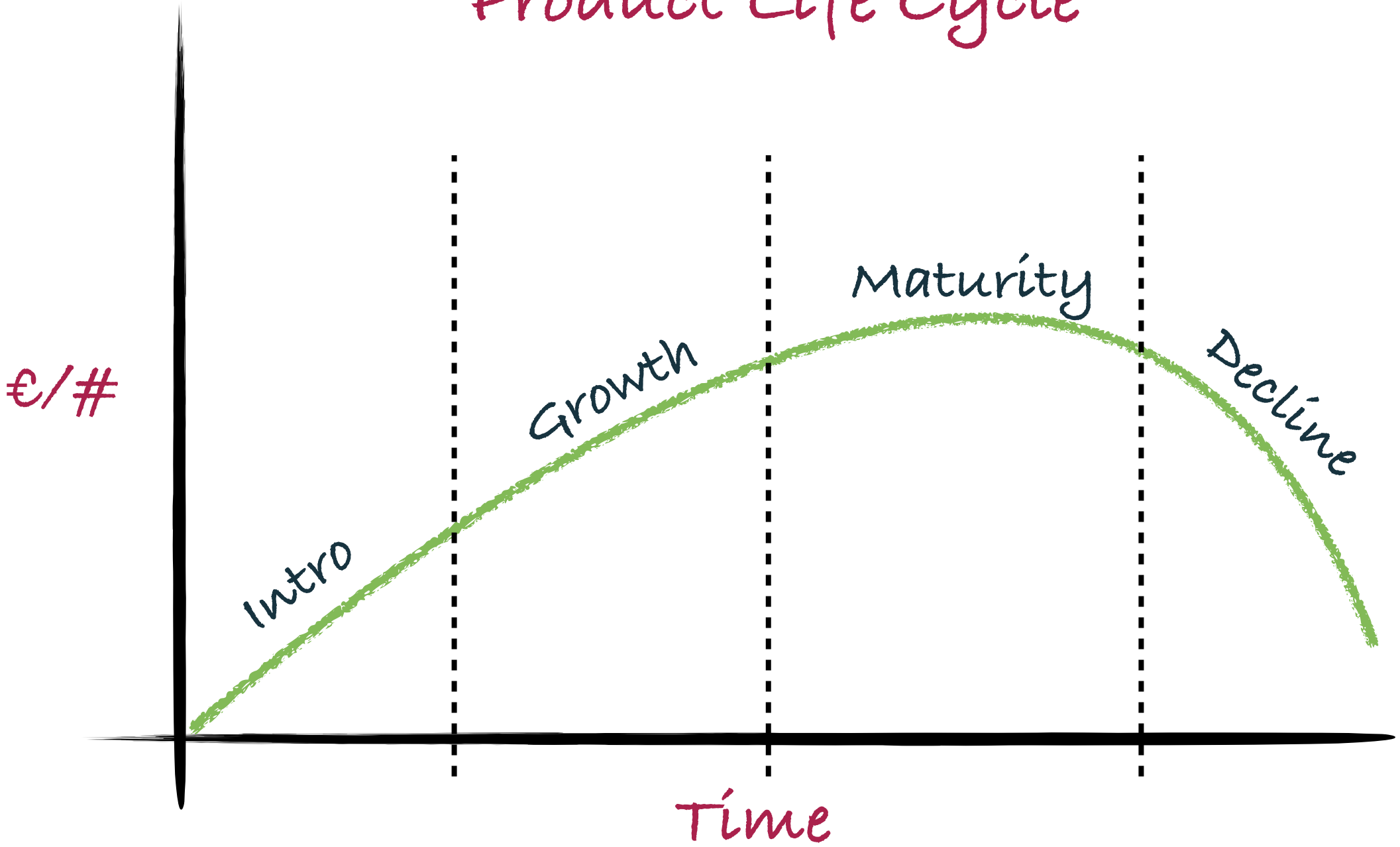


7280R3 - 32 x 100Gb, 4 x 400Gb

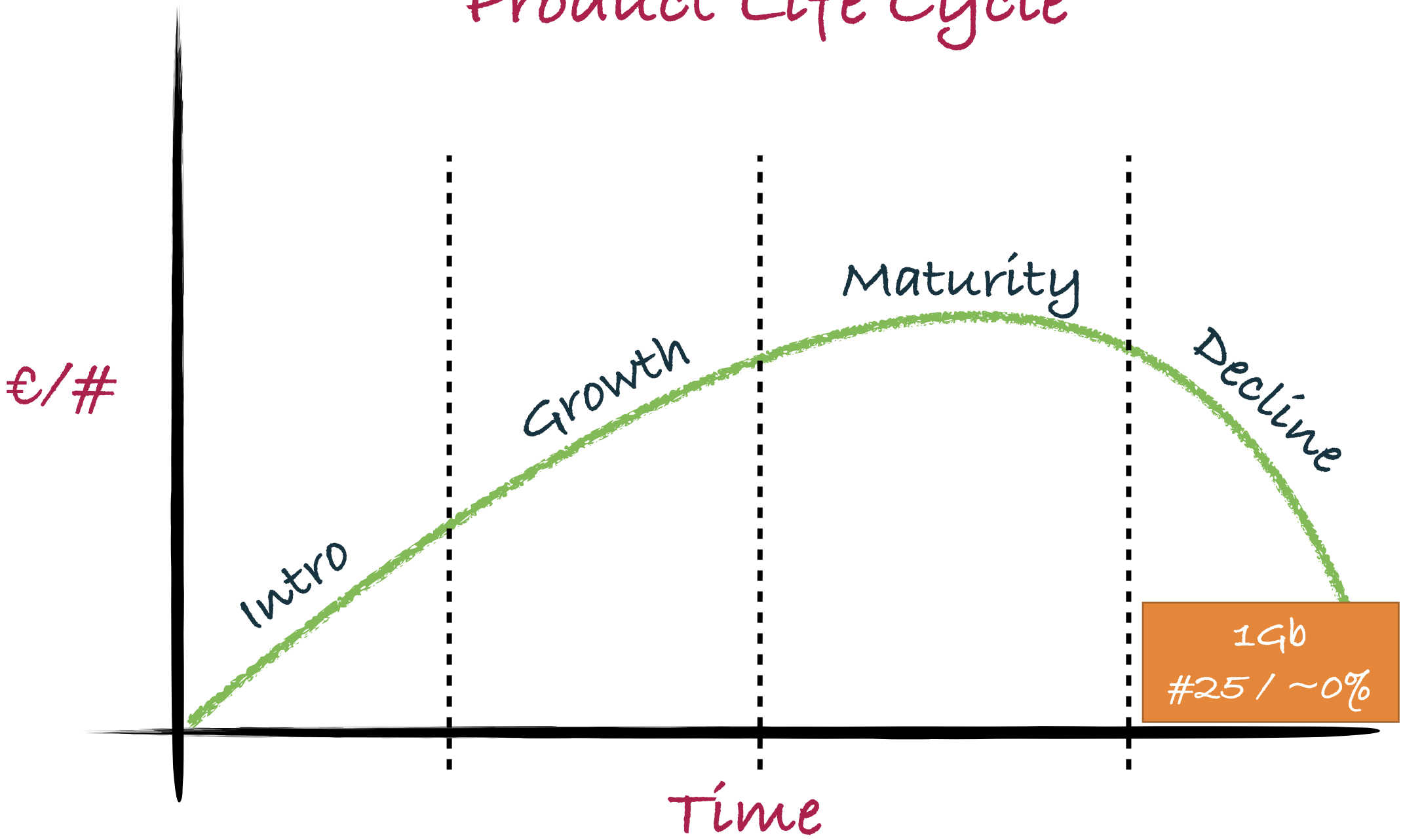


7050X4 - 32 x 400Gb (e.g.)

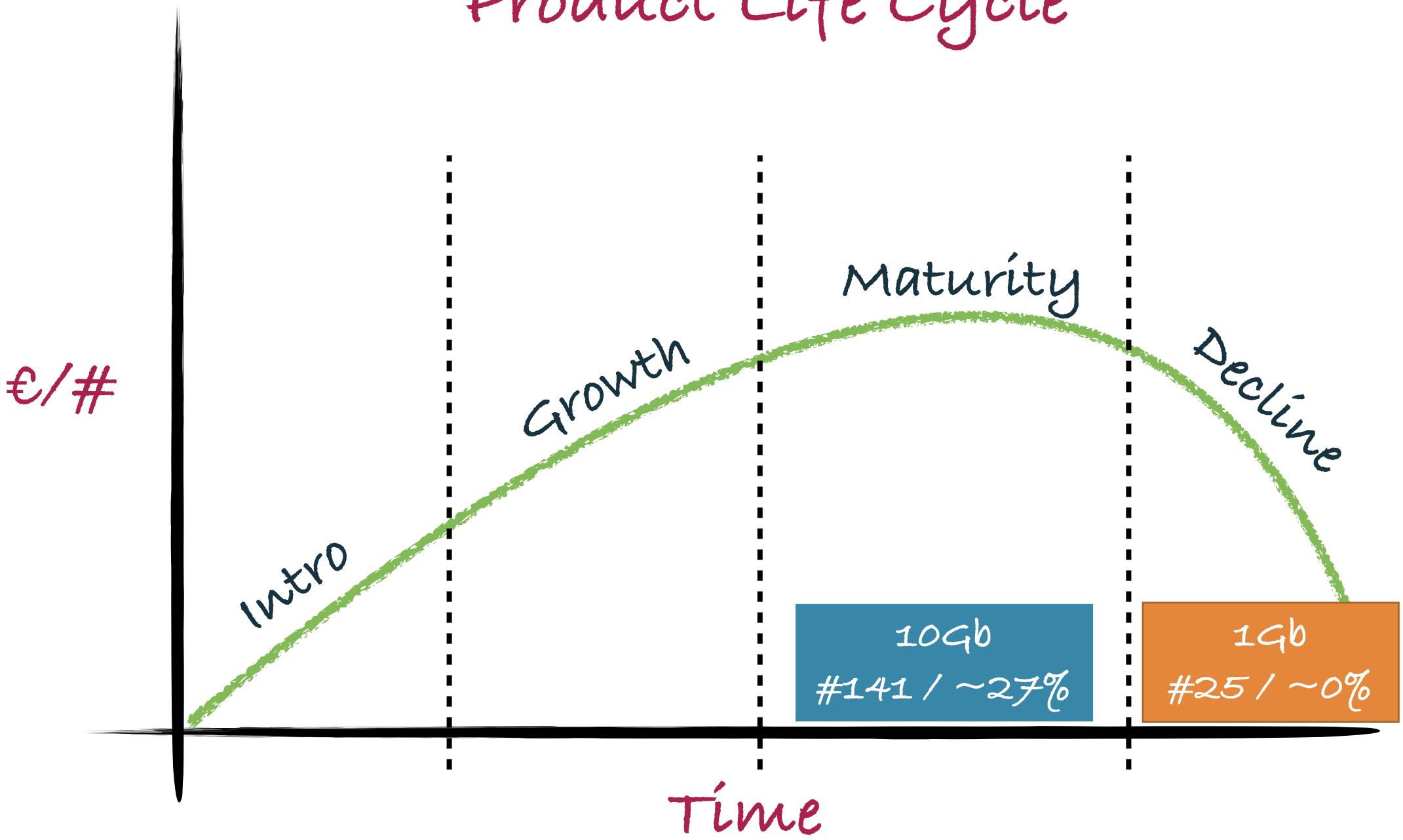
Product Life Cycle



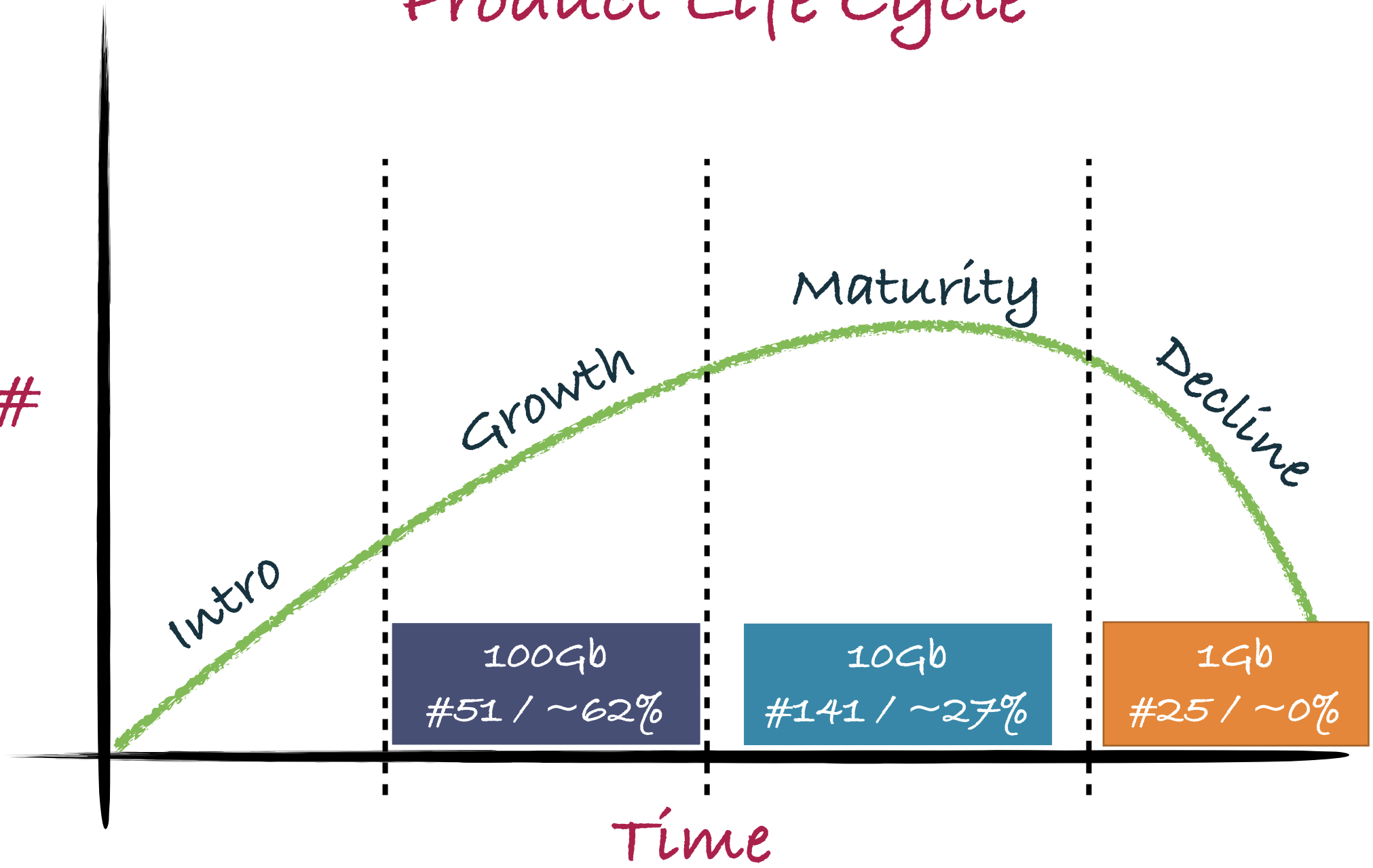
Product Life Cycle



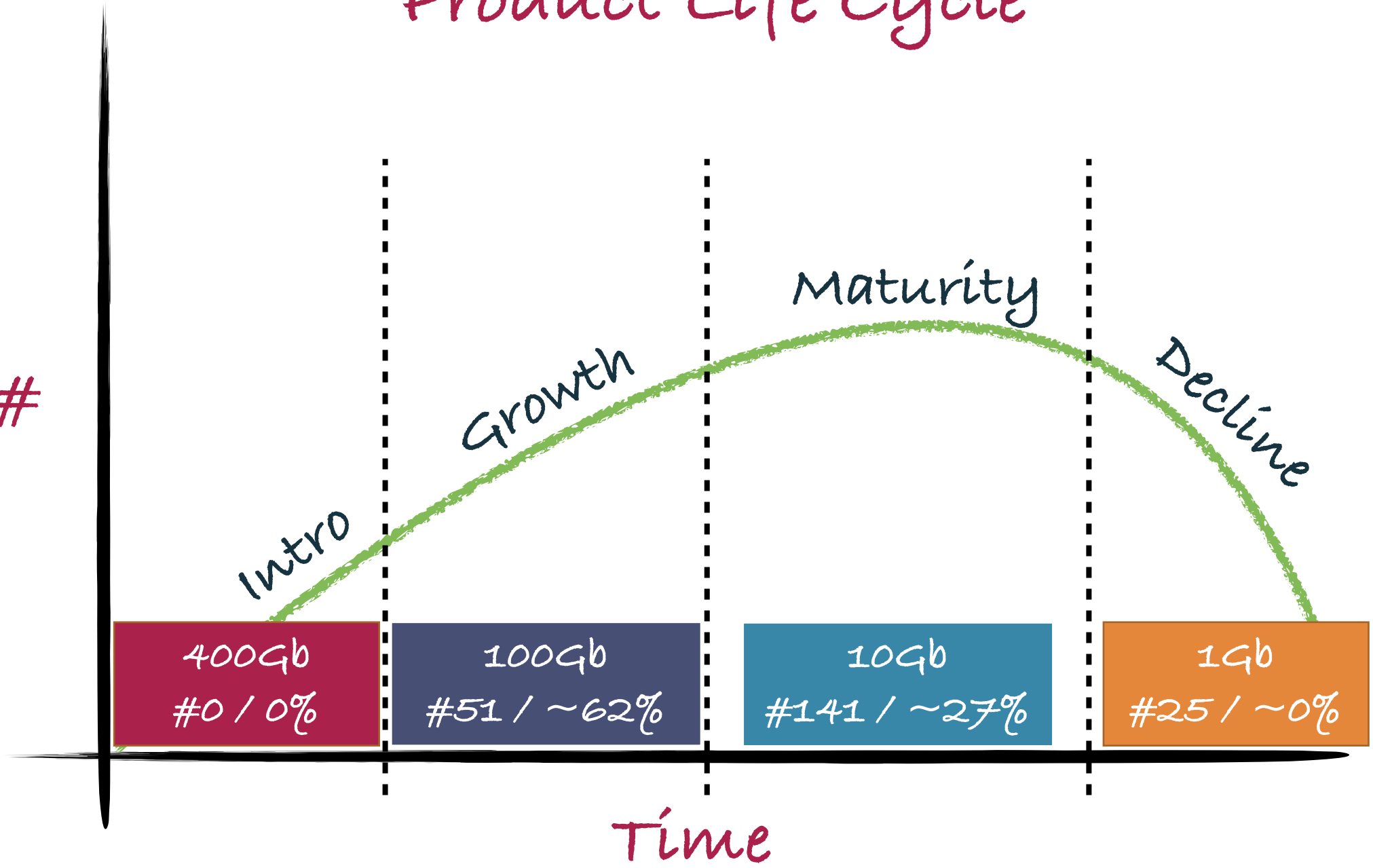
Product Life Cycle



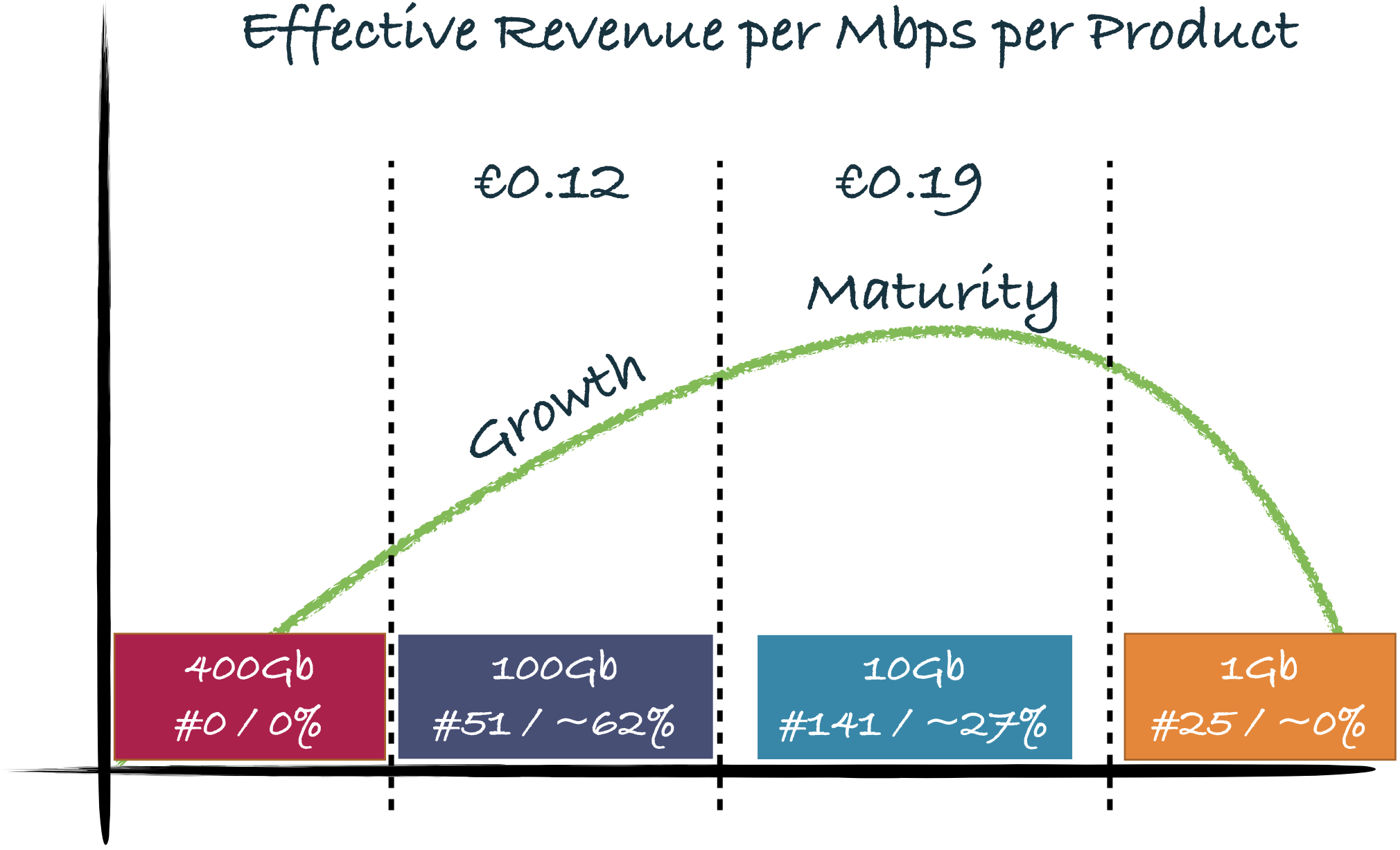
Product Life Cycle



Product Life Cycle



Effective Revenue per Mbps per Product




Thank you
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AND PEOPLE FOR OVER 25 YEARS