

INEX Operations Update December 2023

Barry O'Donovan
INEX Members' Meeting
December 14th, 2023, Dublin



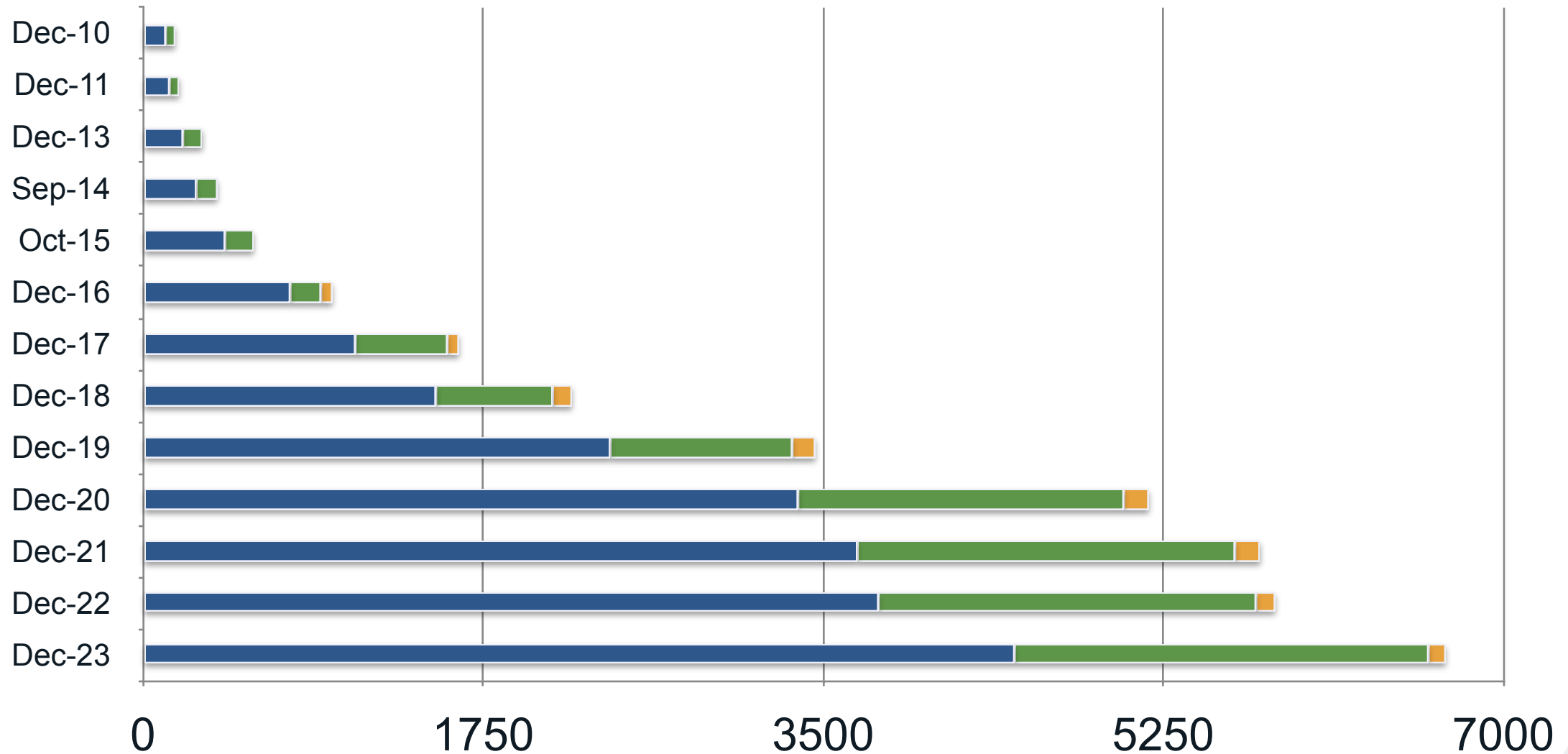
INTERCONNECTING NETWORKS AND PEOPLE FOR OVER 25 YEARS

Overview

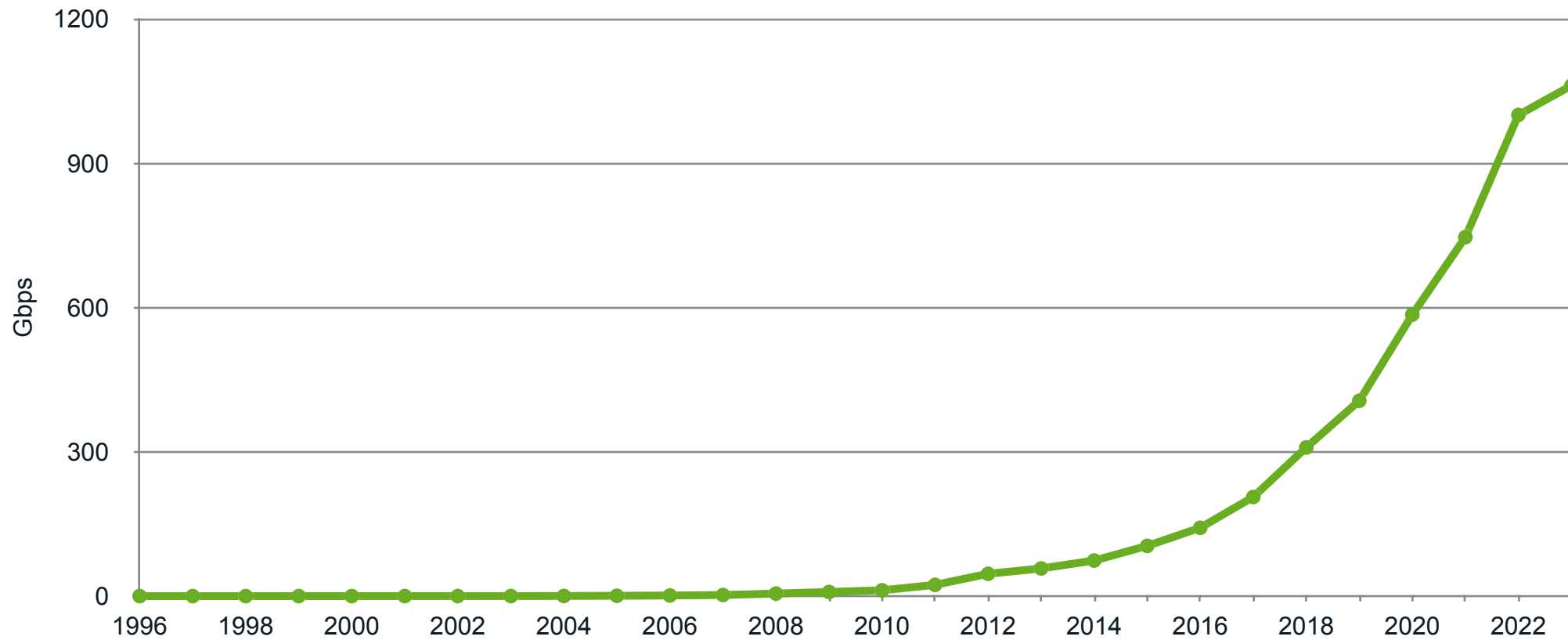
- PoP rebuilds complete - Equinix DB1 and Equinix DB2
- ISO27001 achieved - now “living and breathing” this
- INEX Cork upgraded
- Number of core network augments during 2023
- Planning for 400Gb introduction

Traffic & Trends

Connected Edge Capacity

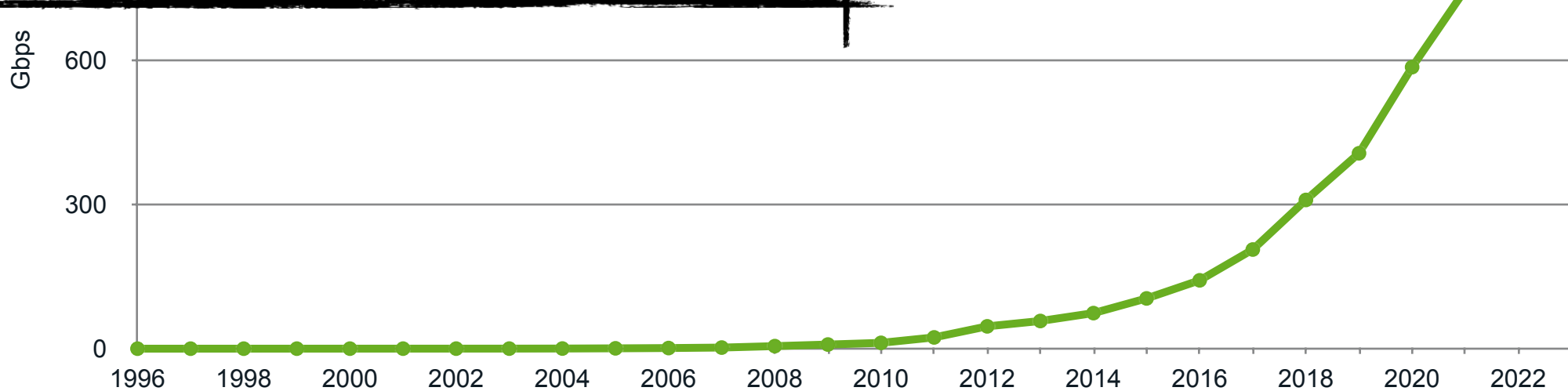
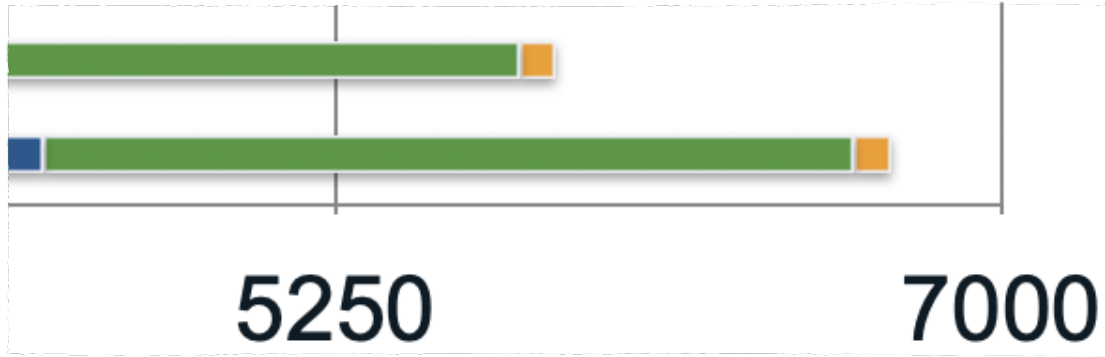


Traffic Peaks :: 1996 - Now

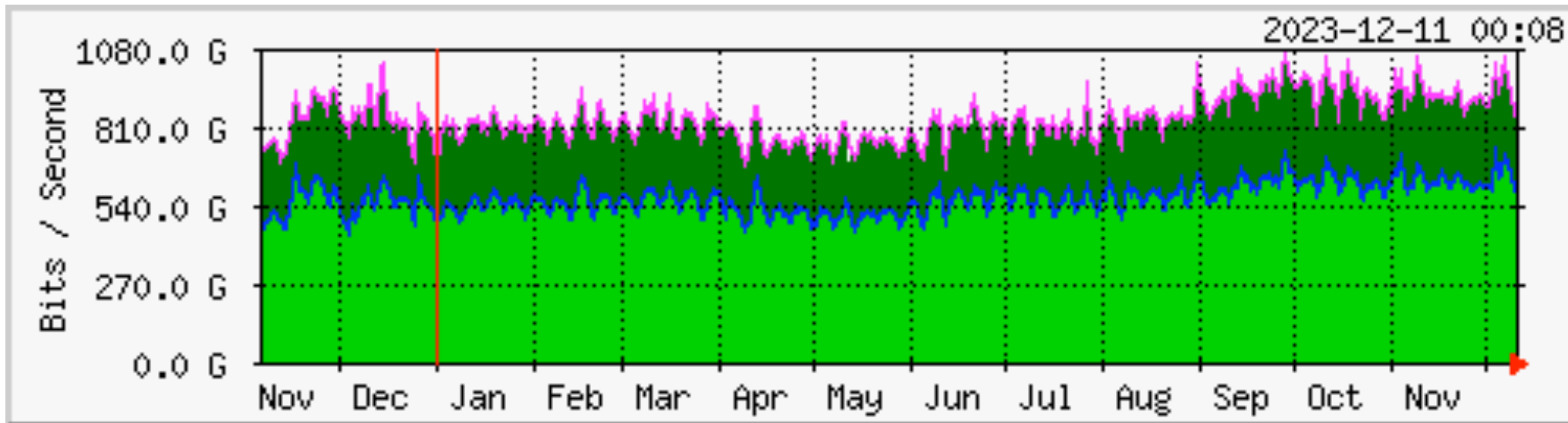


Traffic Peaks :: 1996 - Now

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



1Tbps Now Commonplace



Operations Update

Core Network

Peering Platform

INEX LAN1 (15 'switches')

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

• *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.
 - Opendgear console servers and managed PDUs.

INEX LAN2 (5+6 'switches')

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

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

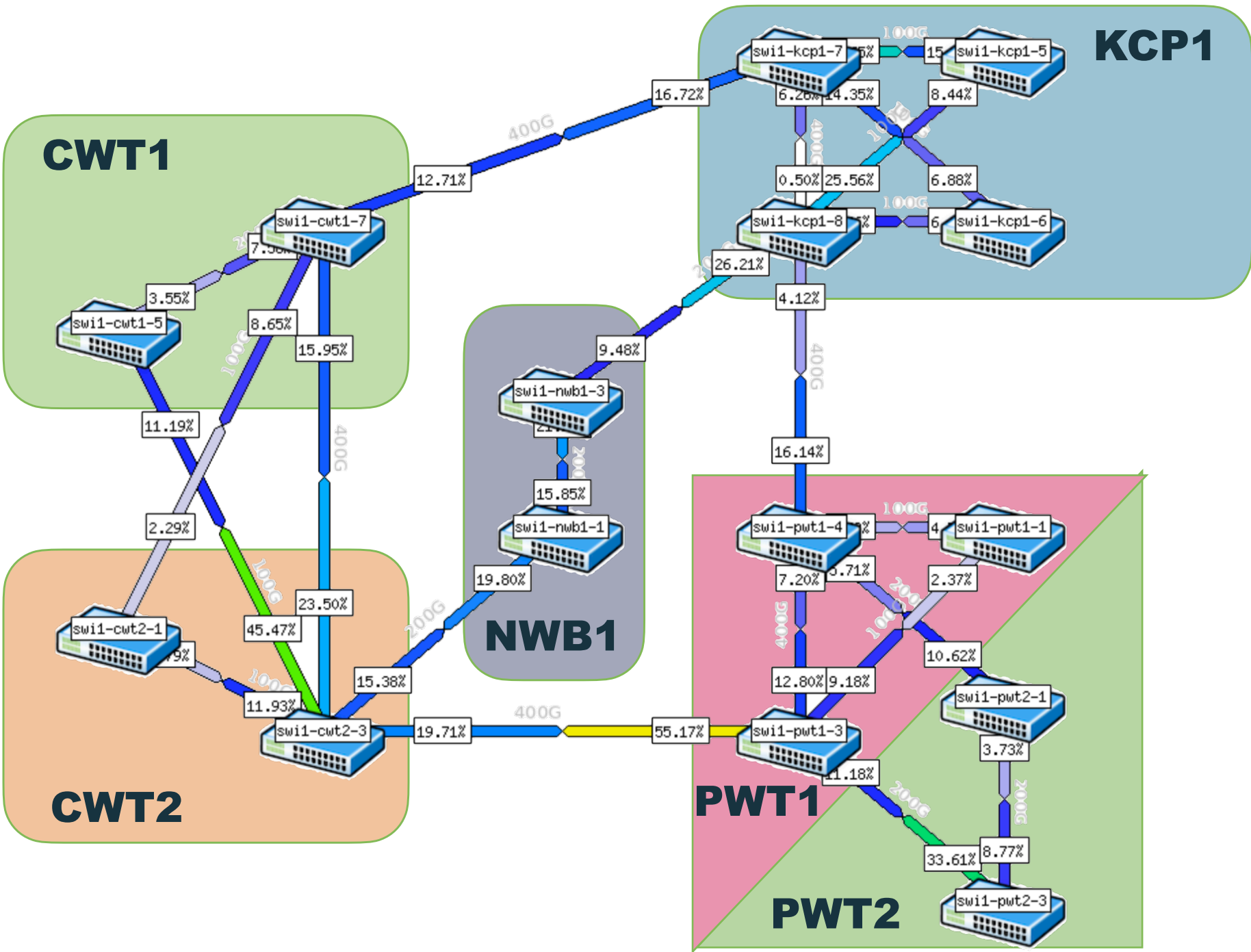


Mellanox SN2100 (now Nvidia)



Extreme X670-G2

INEX LAN1



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 $\geq 300\text{Gb}$
- INEX LAN2 ring adequate at 200Gb currently



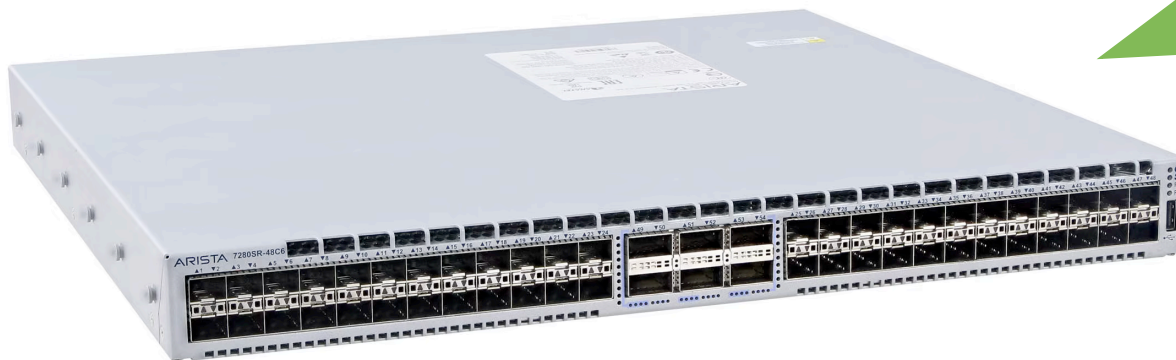
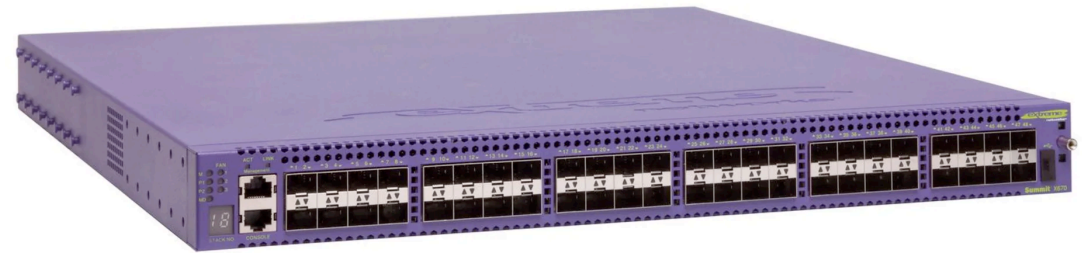
Product Lifecycle

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



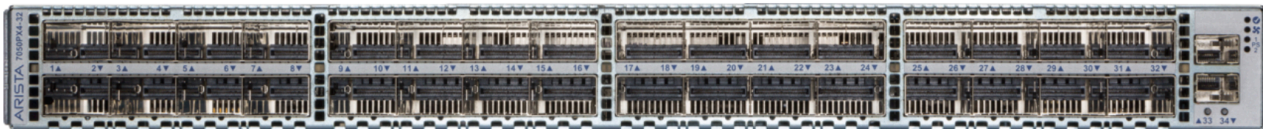
7280R - 48 x 10Gb, 6 x 100Gb



7060X2 - 32 x 100Gb

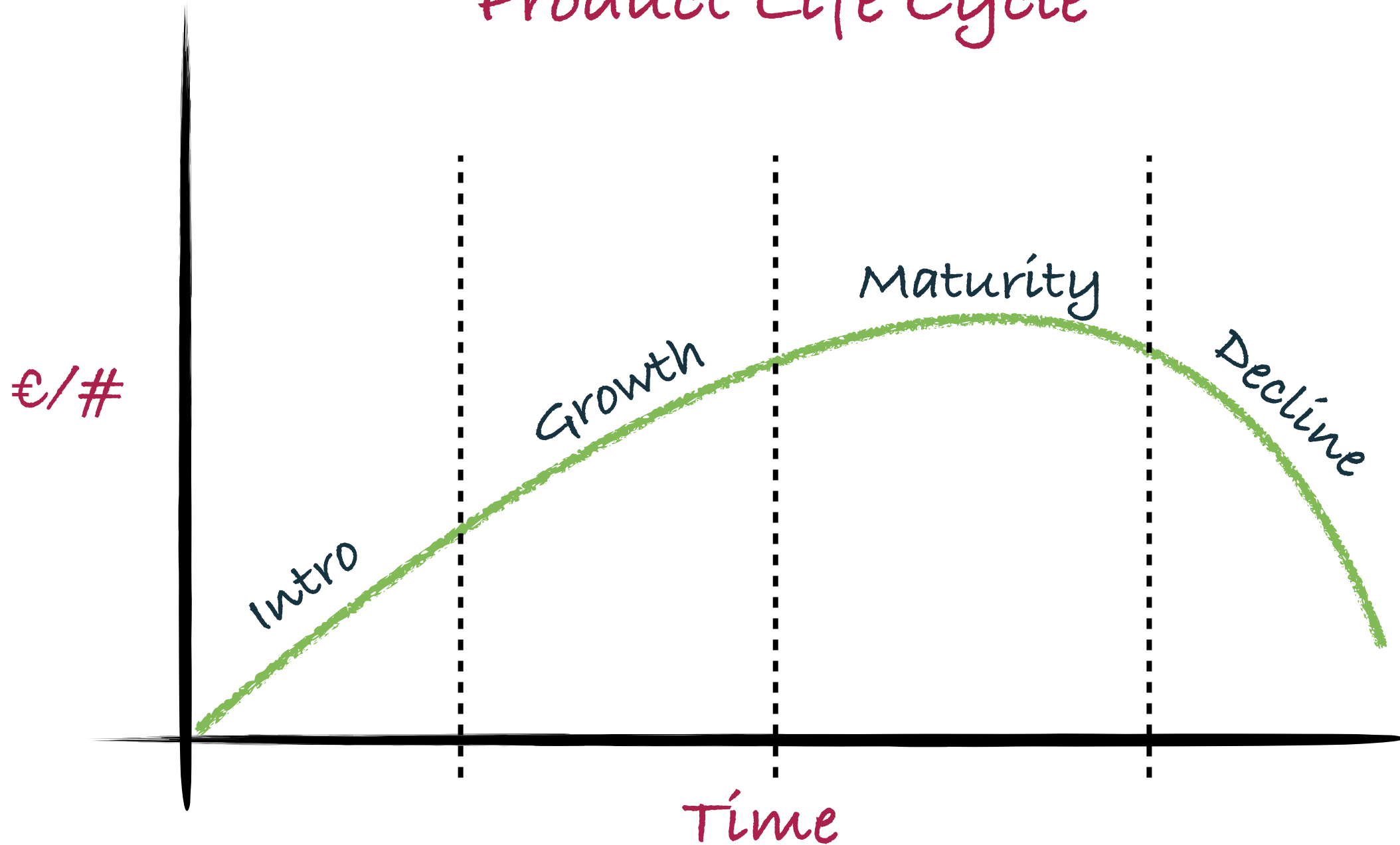


7280R3 - 32 x 100Gb, 4 x 400Gb

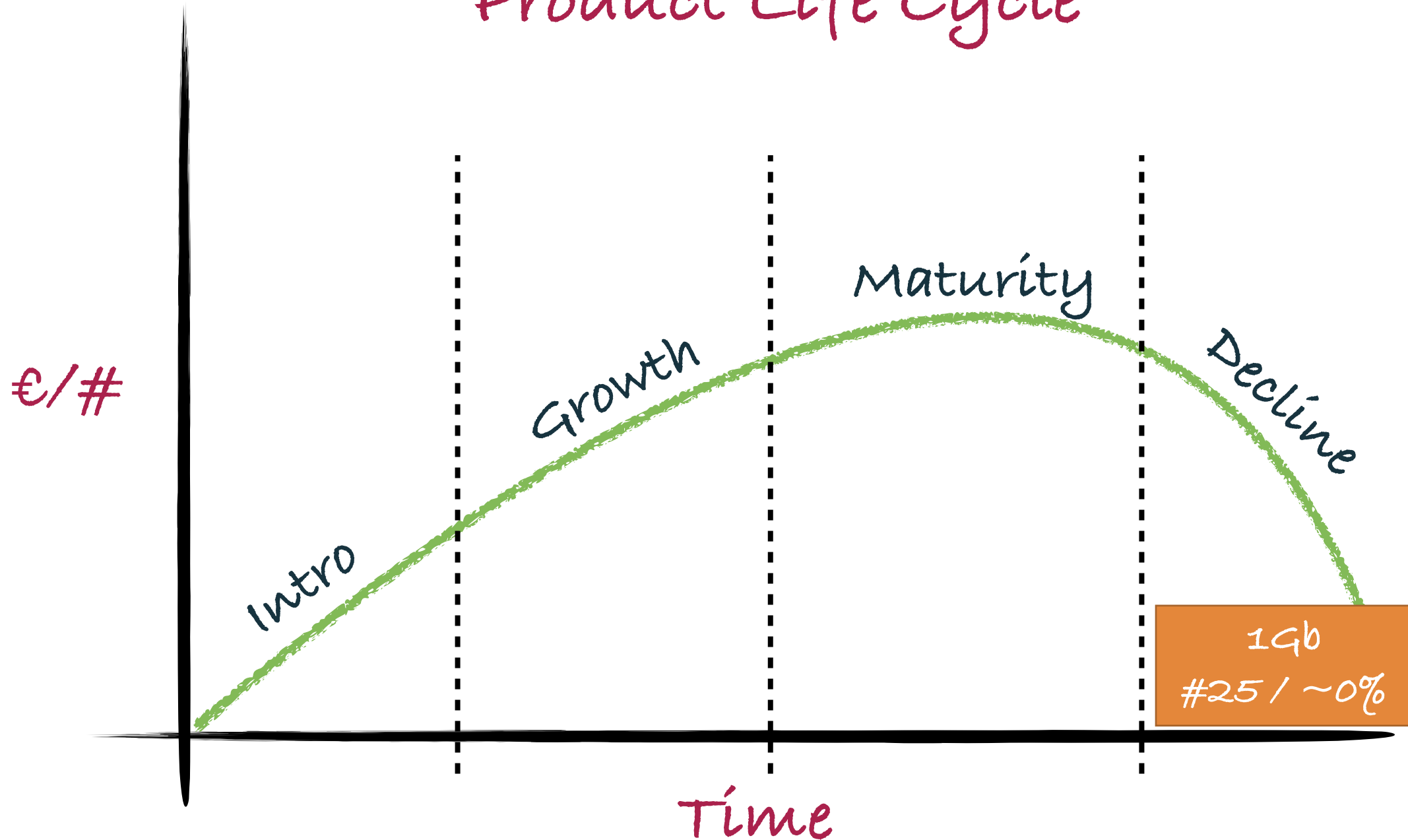


7050X4 - 32 x 400Gb (e.g.)

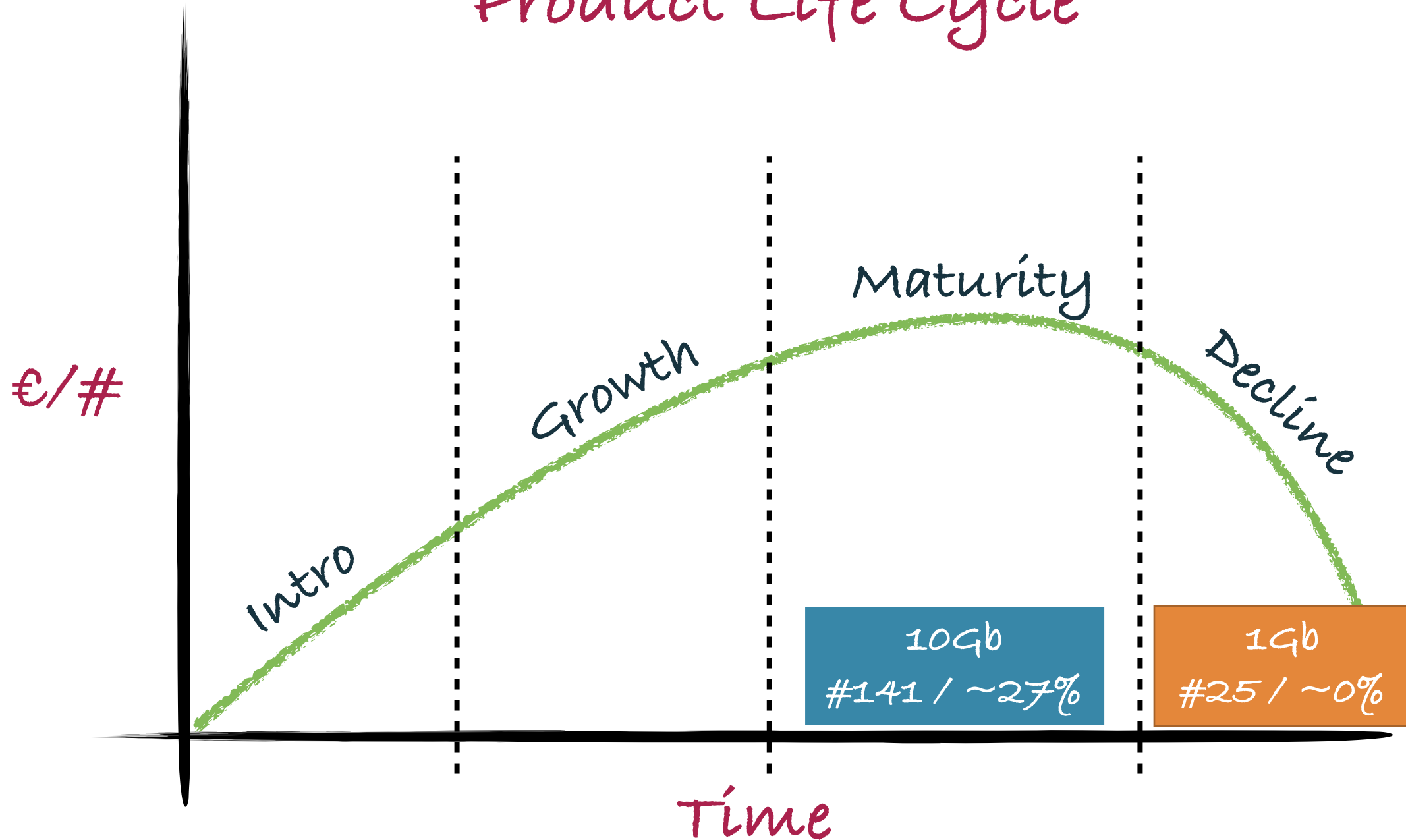
Product Life Cycle



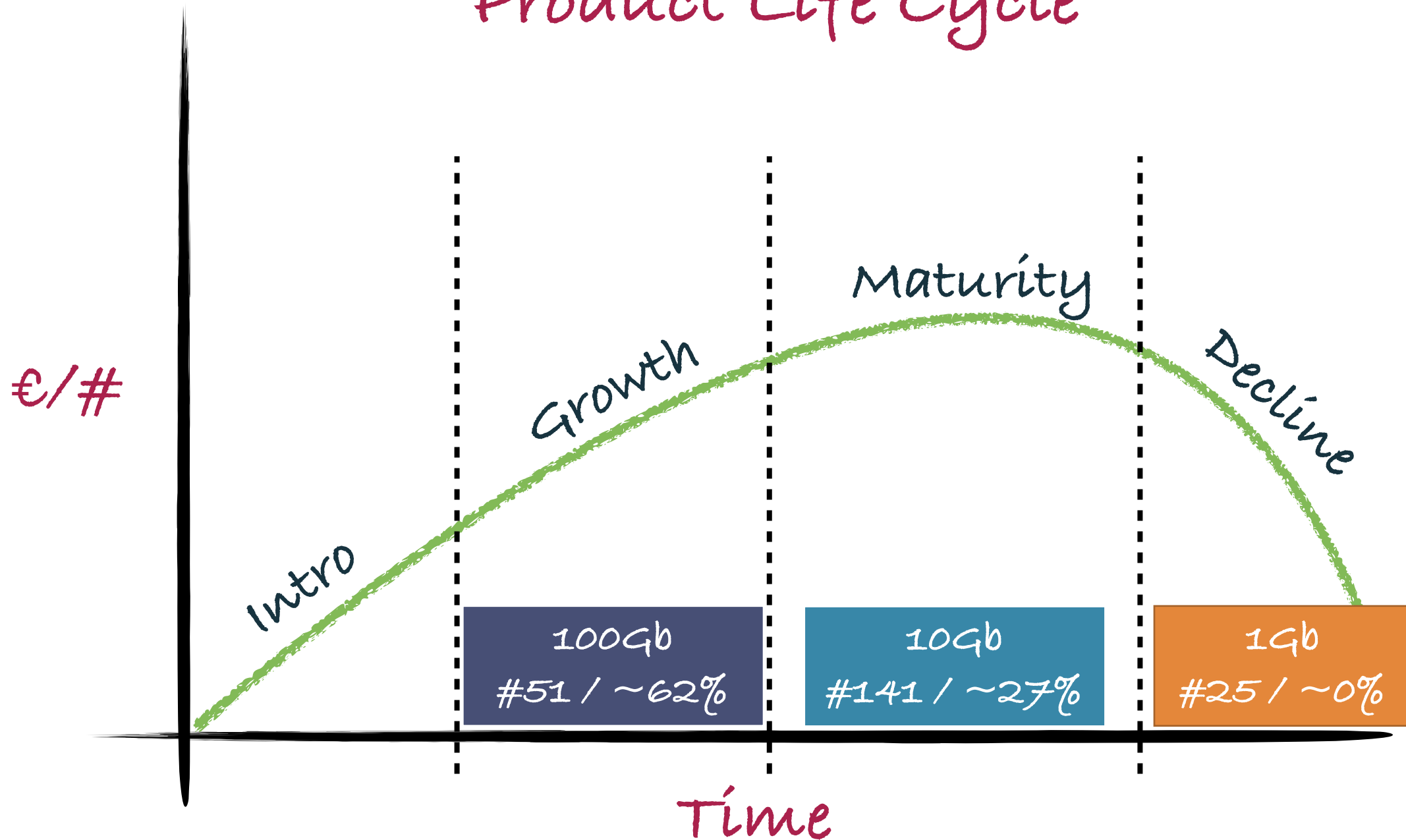
Product Life Cycle



Product Life Cycle

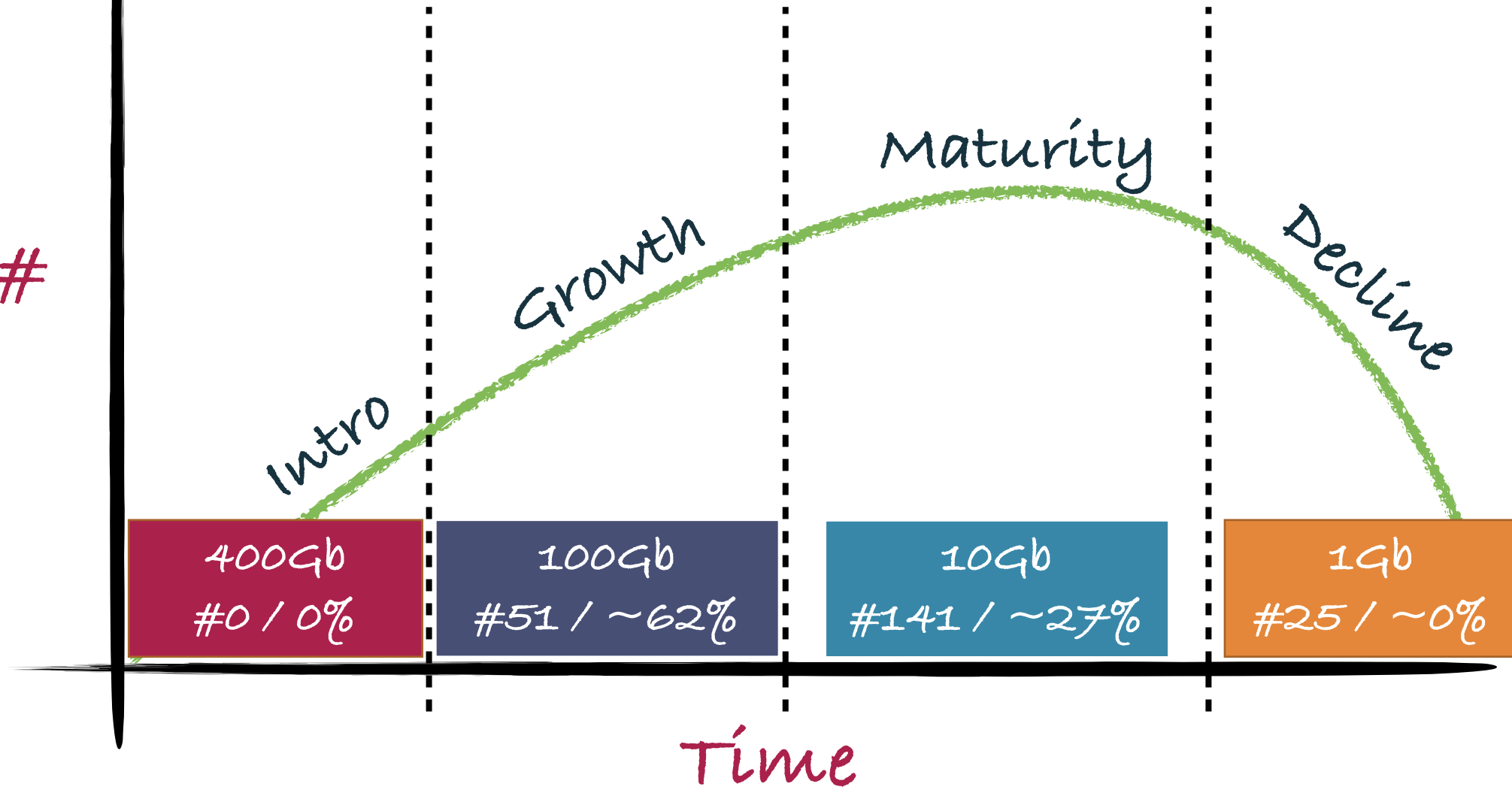


Product Life Cycle

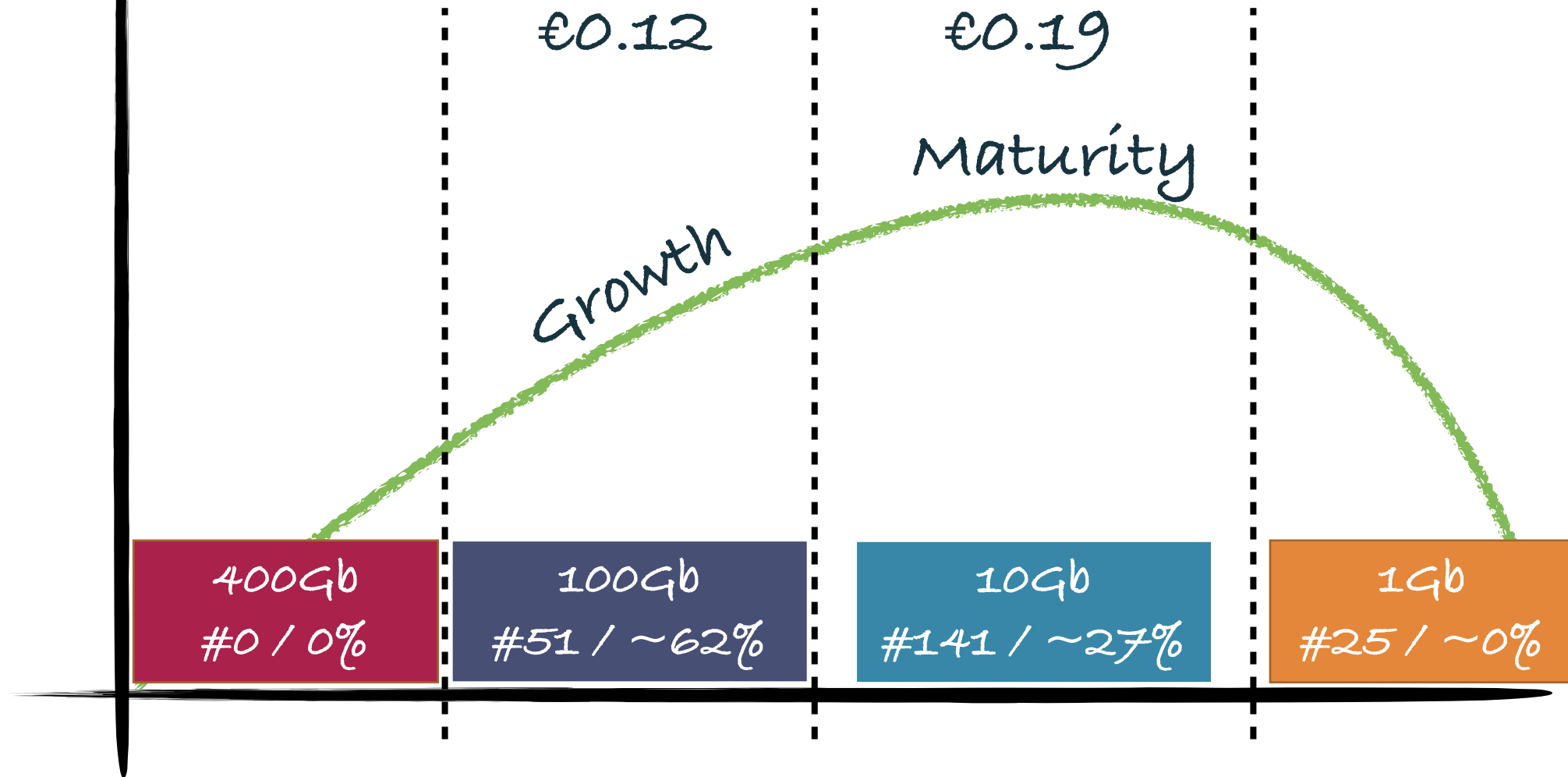


Product Life Cycle

€/£



Effective Revenue per Mbps per Product





Thank you



INEX

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AND PEOPLE FOR OVER 25 YEARS