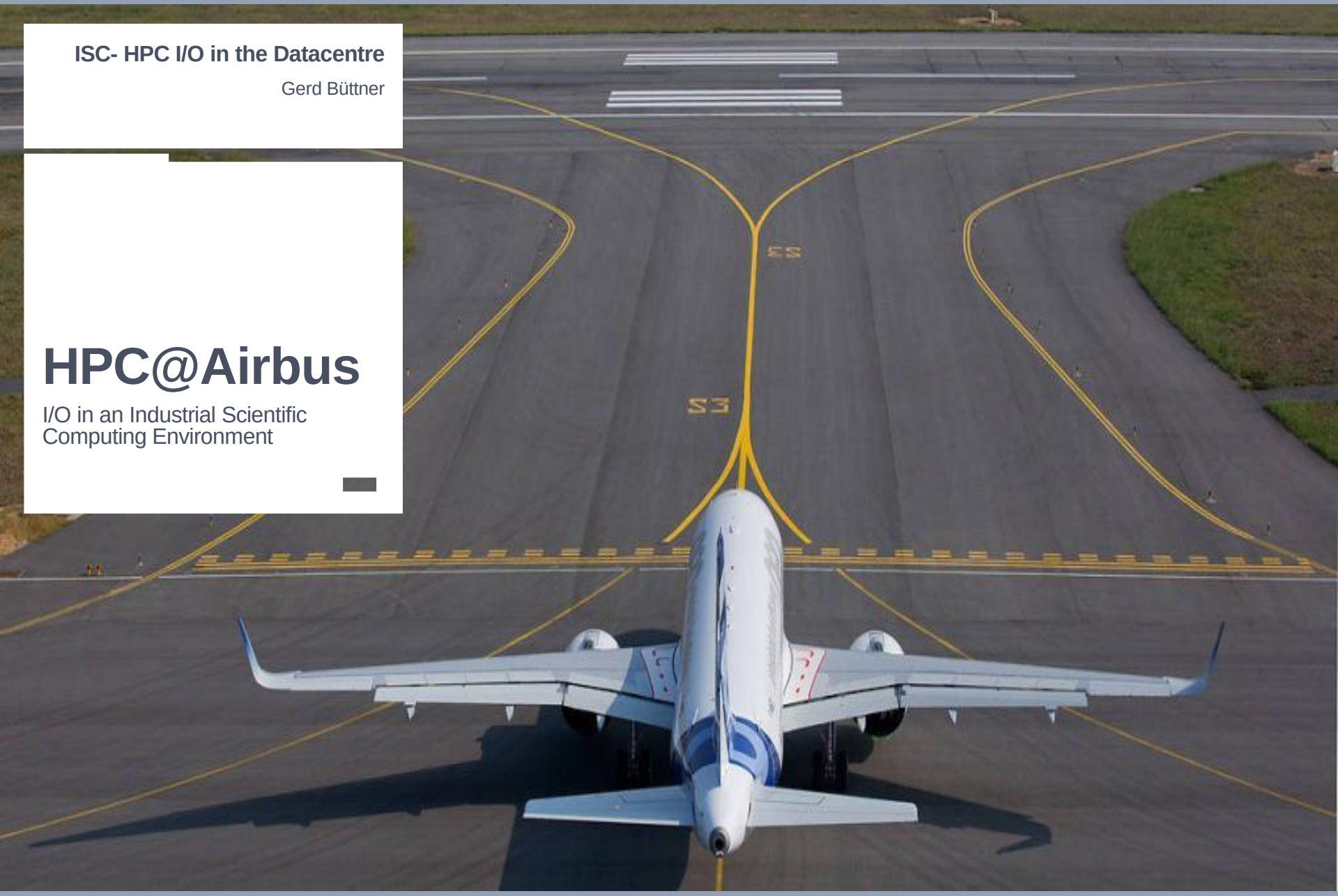
ISC- HPC I/O in the Datacentre

Gerd Büttner

HPC@Airbus

I/O in an Industrial Scientific Computing Environment



Airbus is a global aircraft manufacturer

Passion

Our global workforce is united by a passion for aviation and restless desire to create better ways to fly

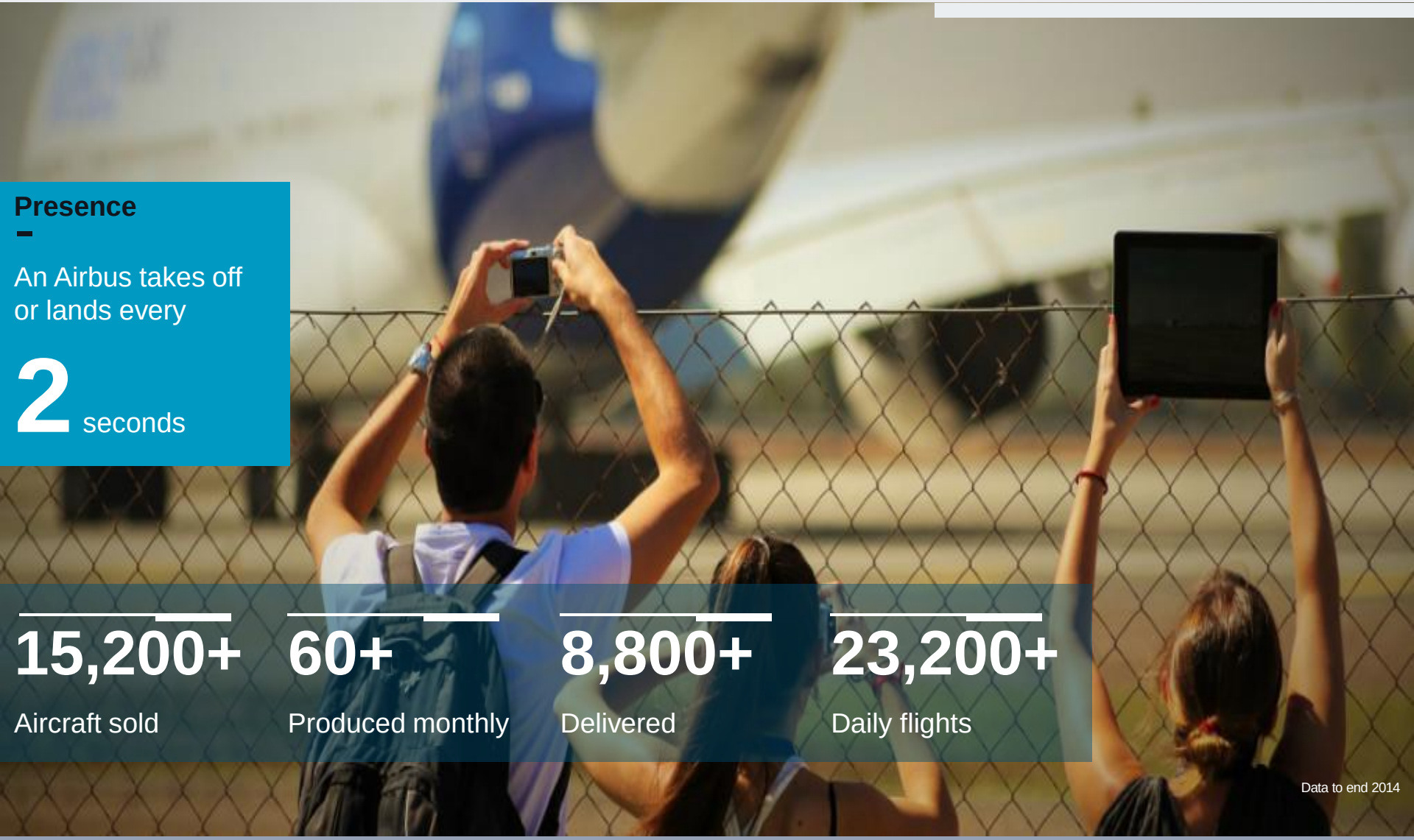
55,000	€40billion	9yrs	400
Employees	Annual revenue*	Backlog	Operators

Data to end 2014

*Annual Revenue 2013

AIRBUS

Our aircraft are a familiar sight around the world



Presence

An Airbus takes off or lands every

2 seconds

15,200+
Aircraft sold

60+
Produced monthly

8,800+
Delivered

23,200+
Daily flights

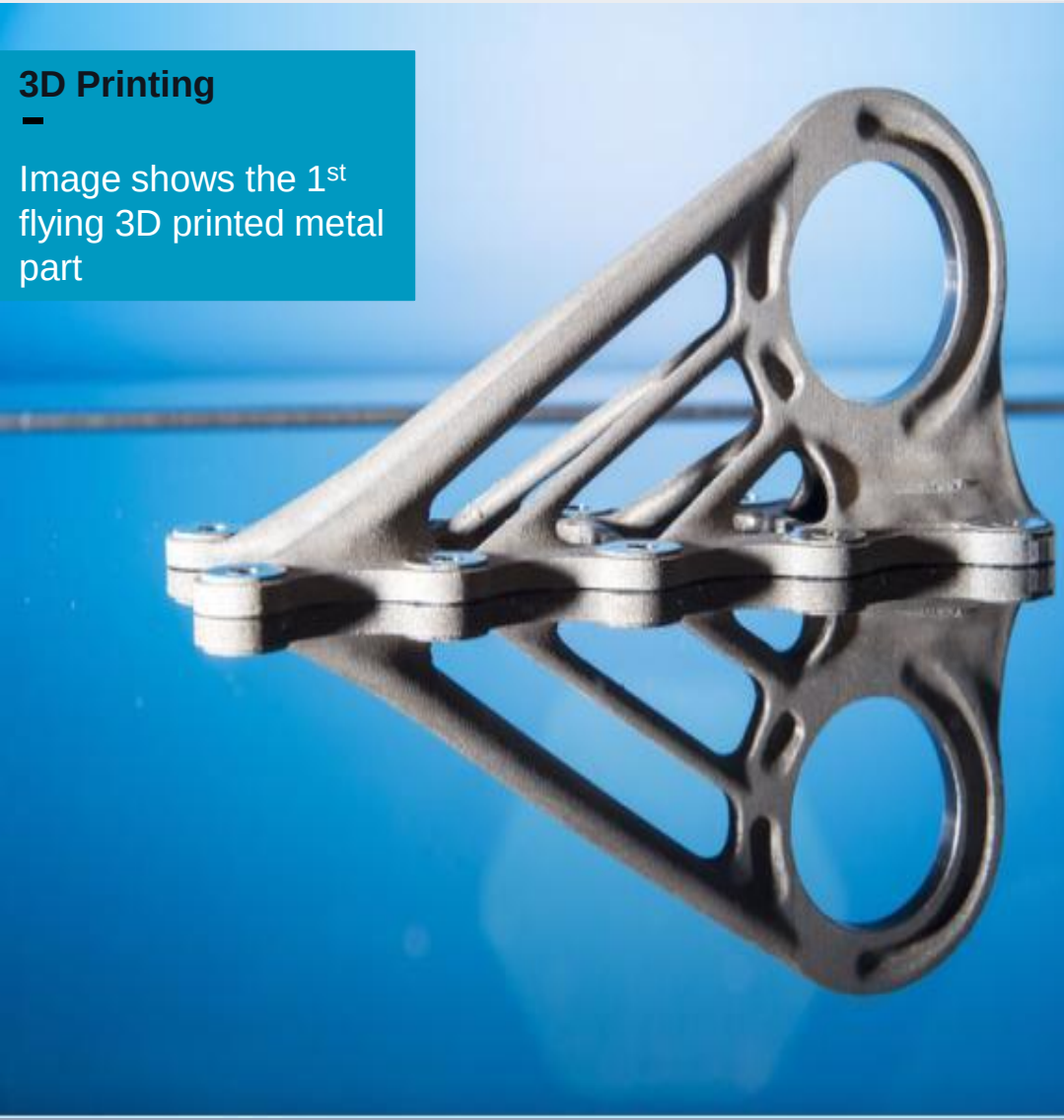
Data to end 2014

AIRBUS

Innovation is in our DNA and has been for over 4 decades – 600 patents per year

3D Printing

Image shows the 1st flying 3D printed metal part



Industry **FIRSTS**

1st twin-engine widebody aircraft, A300

1st full fly-by-wire commercial airliner

1st double decker airliner, A380

1st manufacturer to make extensive use of composites

AIRBUS

The most global aerospace player – close to our customers worldwide

The numbers

-

11 Production sites

4 Assembly line locations

5 Training centres

4 Engineering centres

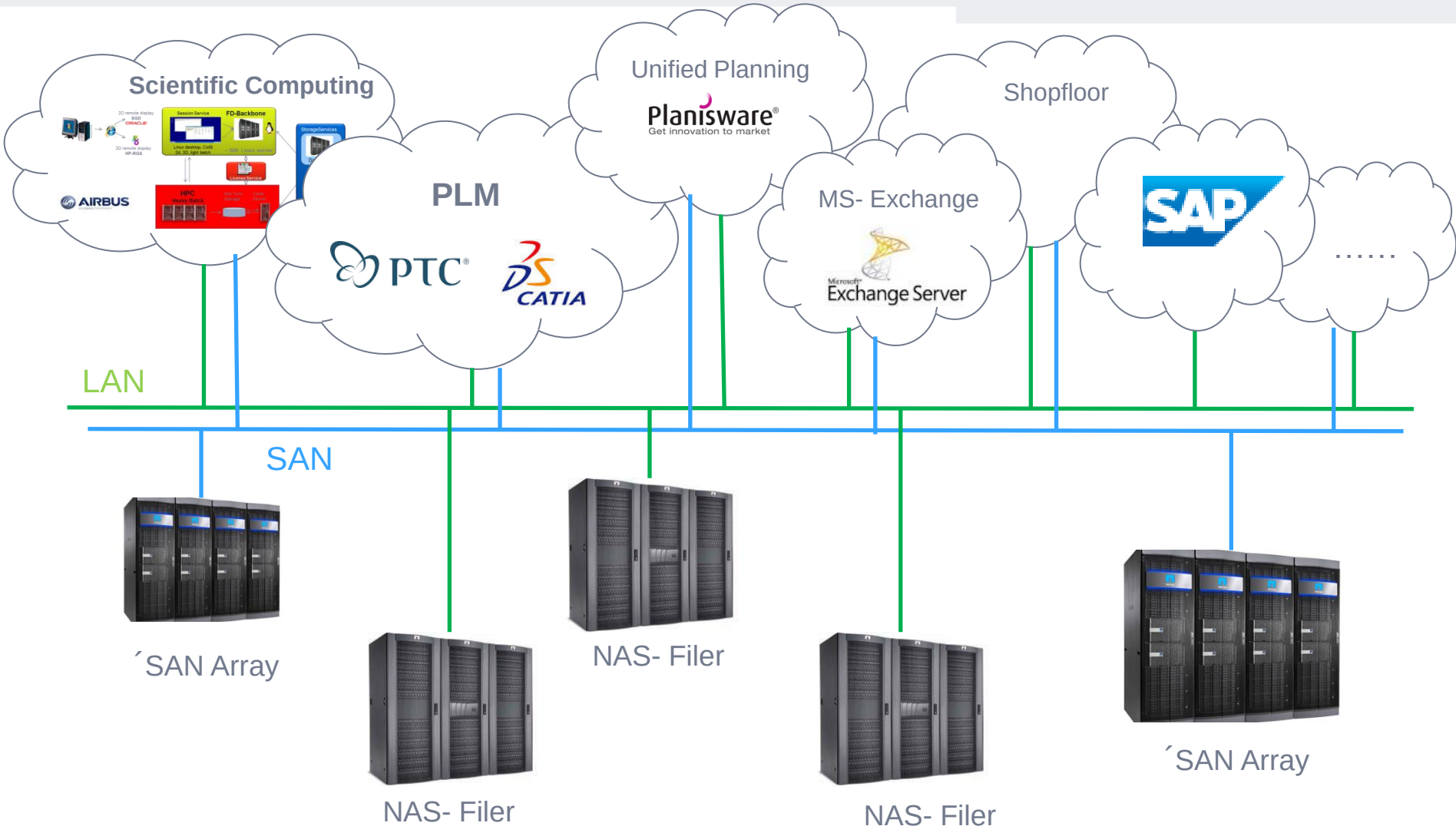
3 Customer support centres

10 Materials & logistics centres*

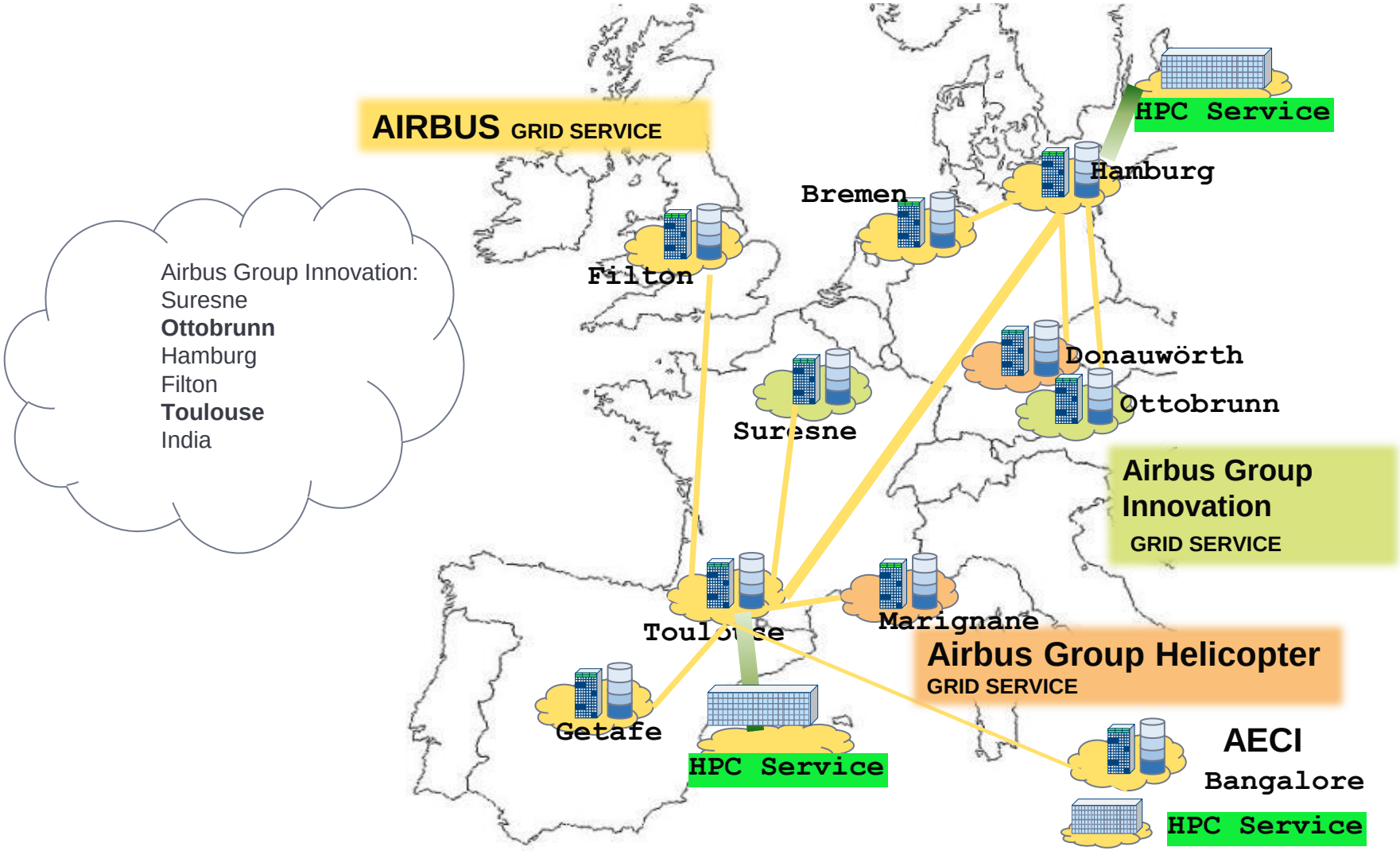
Data to end 2014

*Satair Group

Global Storage Architecture



Global Scientific Computing Architecture



Challenges for „Best“ Design of a HPC

- Requirements from
  - Applications
    - Application profile (CPU, Memory, I/O, Communication)
  - EndUser locations
  - System Distribution

- Constrains
  - Data distribution
  - Budget
  - Existing environment
  - Company harmonisation

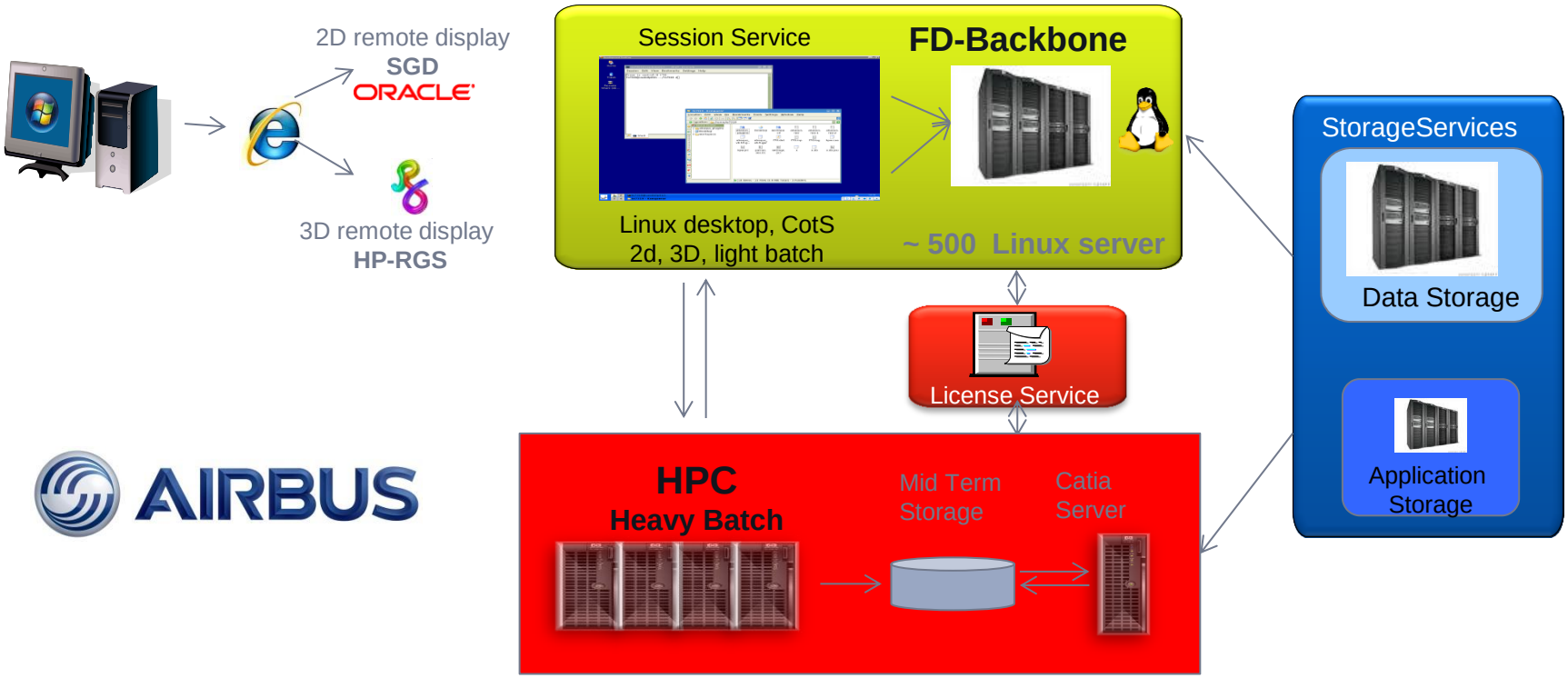
„Best“ is a well balanced System

AIRBUS

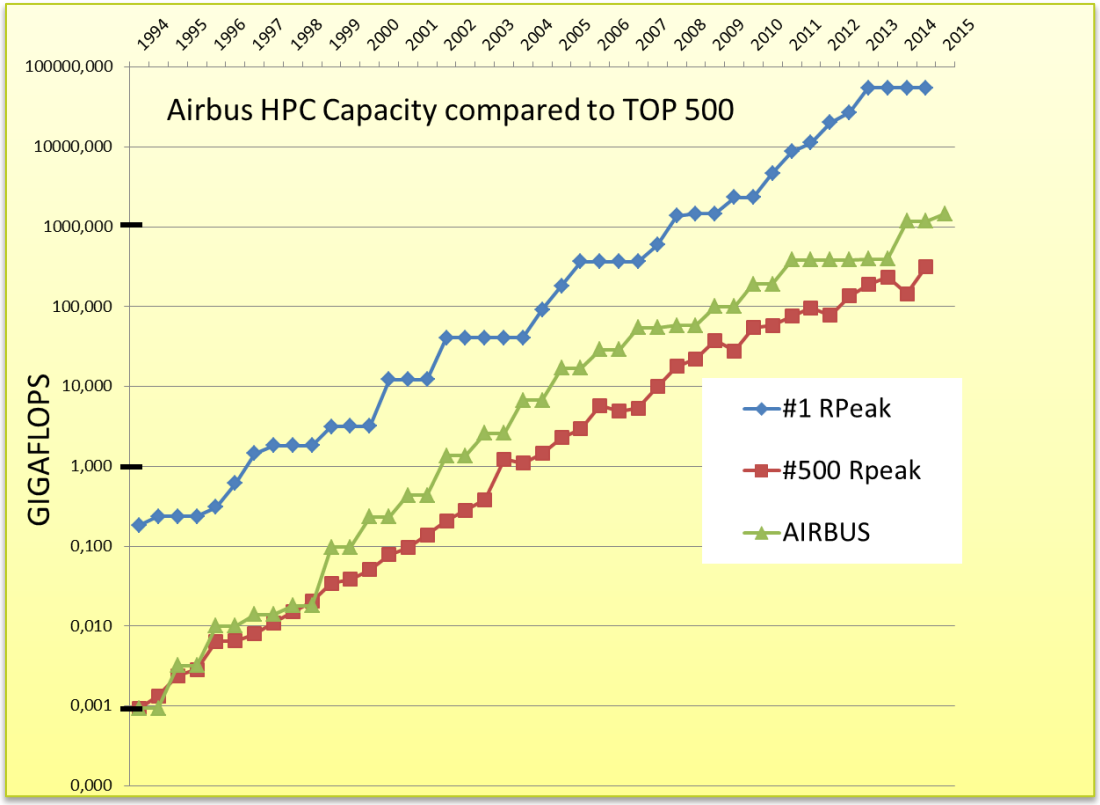
Scientific Computing Architecture

Is to build mathematical models, analyze them to simulate the reality.

This requires graphic capabilities, huge data flows and massive amounts of calculations on distributed computing platforms



HPC Capacity

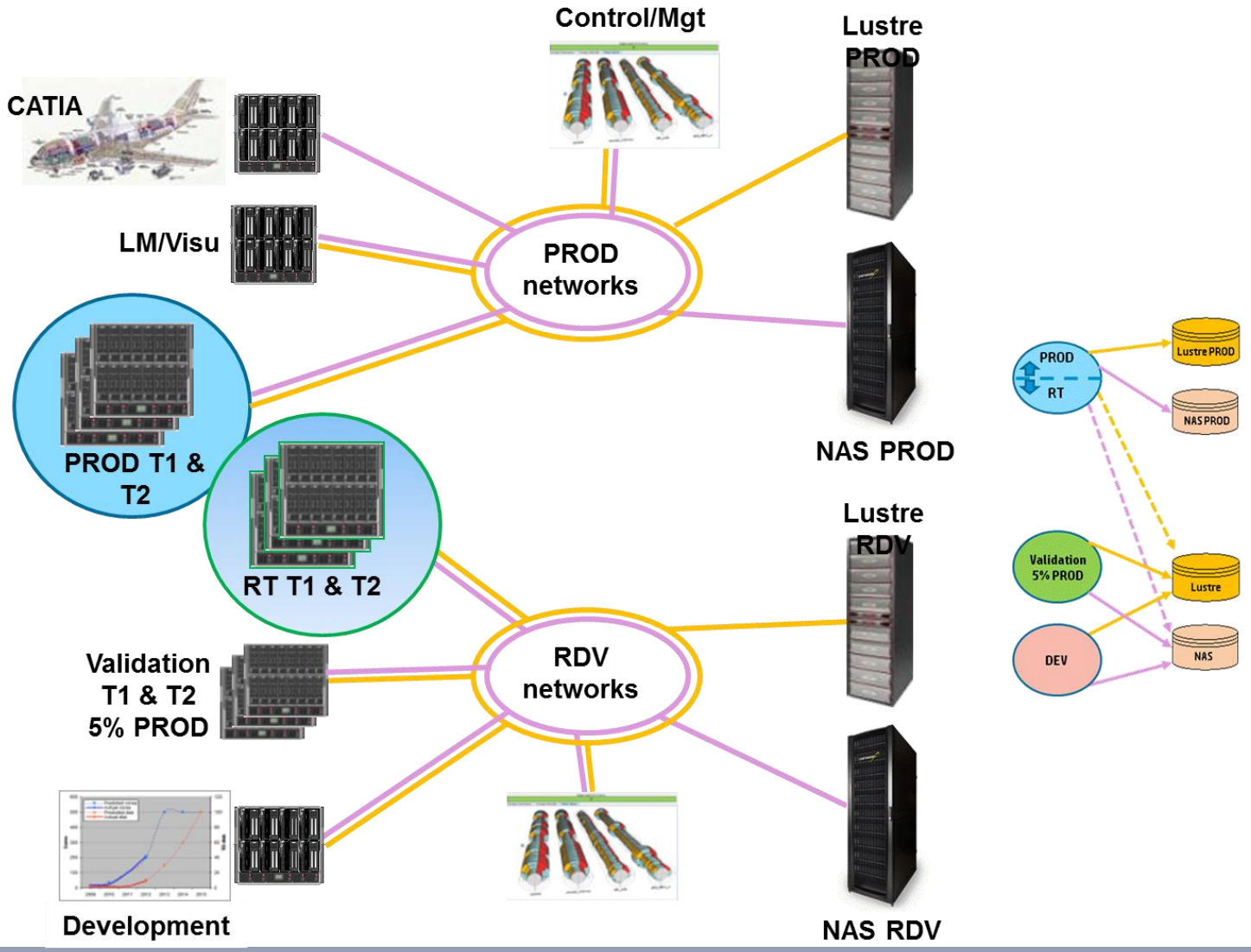


Airbus HPC capacity incrementing according to needs

			2015	2016	2017	2018
Code	Use Case	Cores	Number of run in 24h			
a	half	96	100	167	278	463
	full	192	30	50	83	139
b	standard	512	70	117	194	324
	opti	1024	45	75	125	208
c	scalable	4096	8	13	22	37

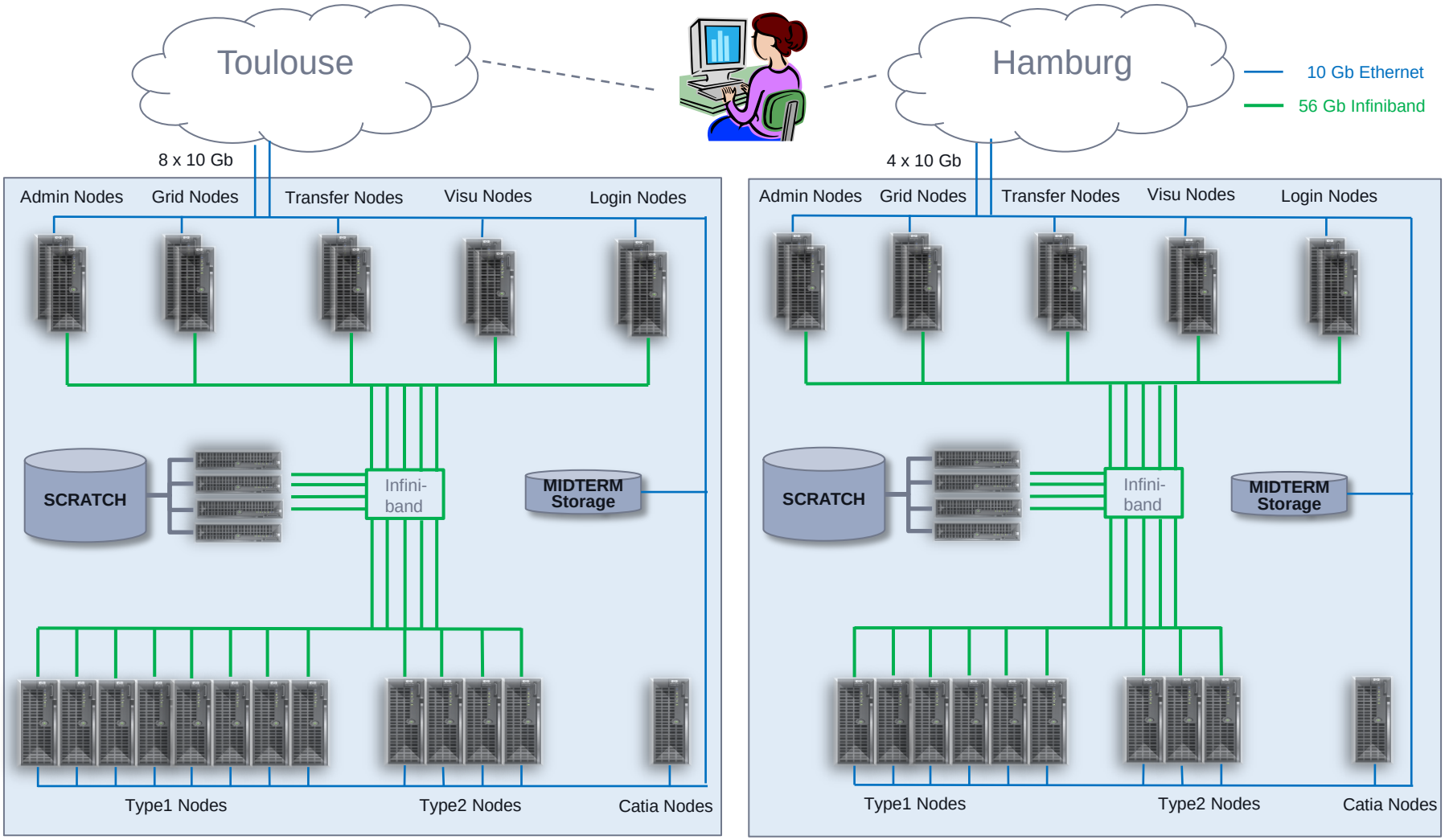
AIRBUS

HPC4 Global Architecture

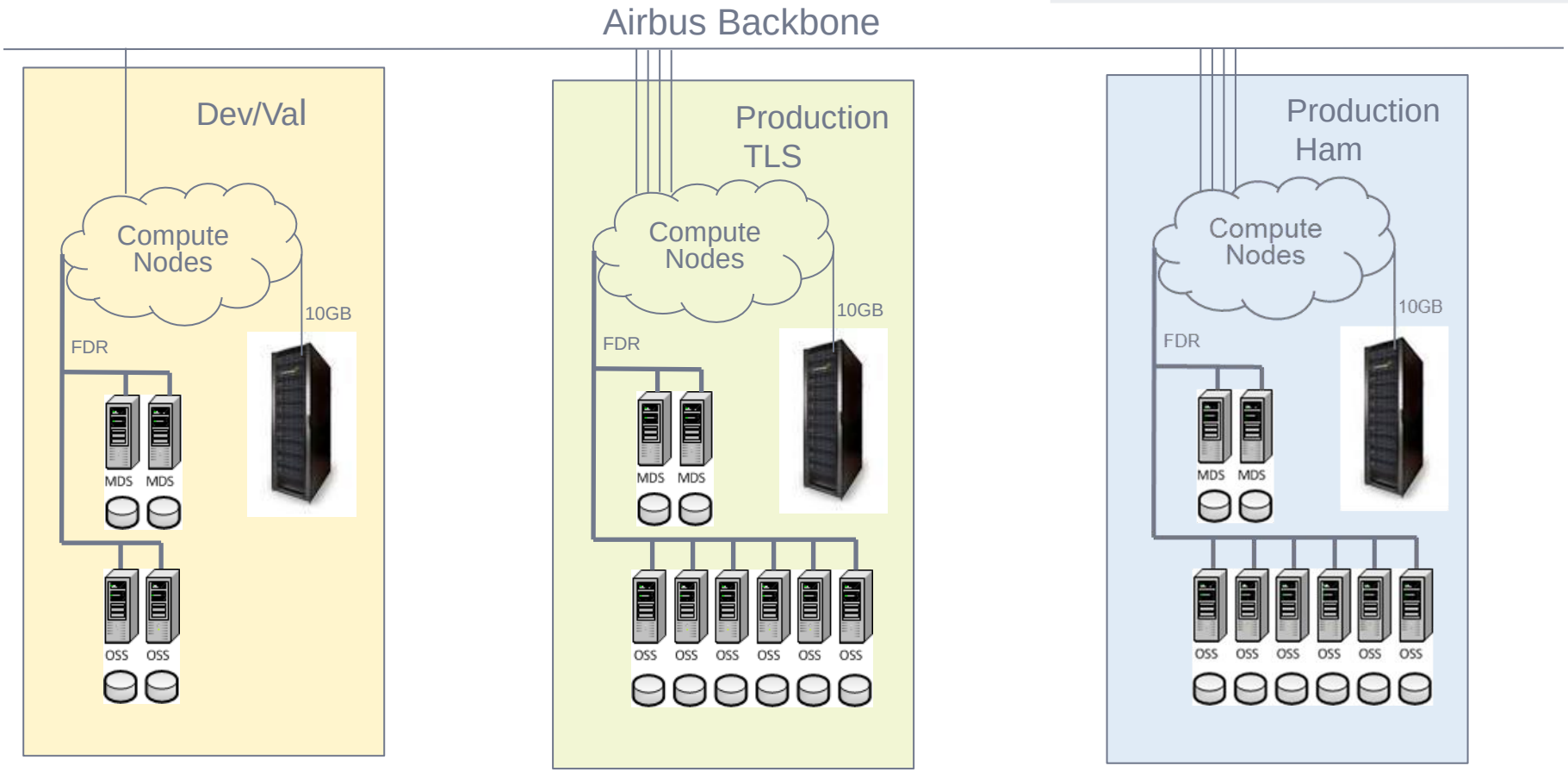


AIRBUS

HPC4 Functional Architecture View



Storage design in HPC4



Thoughts

- System reliability/stability
  - At least 2 Locations
    - Electricity
    - Network Load
      - Multiple Enduser locations
- Enable full service contract
  - Reduce number of interface points
    - Split between Batch (HPC) & Interactive Environment
- Large NFS Mount table slow down the system
  - No direct access to standard storage enviroment
- Sizing on given Application portefolio
  - Application inventory with the Customer
  - Agree on a load forecast

Conclusion

The right system has to be balanced based on requirements and constrains

- There no „Best“ System or optimal solution for every one
- I/O is one important perimeter of design
  - I/O is often forgotten in design
  - I/O can slow down /limit the whole system
- Check the design with your own application portefolio

Scientific Computing