

HIGH PERFORMANCE COMPUTING IN ŠKODA AUTO

(EXPERIENCE, CROSSROADS AND CHALLENGES)



ŠKODA
SIMPLY CLEVER



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ŠKODA AUTO a.s. - Systémová integrace, vznik výrobku

Examples of HPC usage I

- <https://www.skoda-storyboard.com/en/innovation/supercomputer-equal-60000-pcs-whats-capable/>



Examples of HPC usage III - Aerodynamics

Škoda Auto

15% Wind tunnel 200 Hrs. / Project

85% Simulation 3000+ Computations



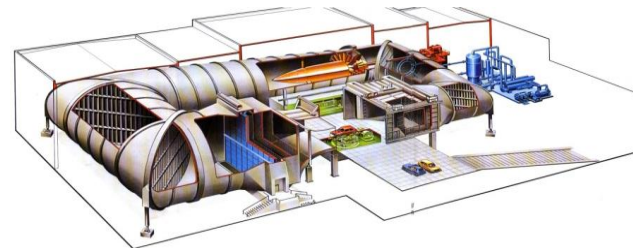
ŠKODA has no wind tunnel
Simulation is basic tool
No aero-specific prototypes

Focused on IT performance

Industrial Standard

70% Wind tunnel 1000 Hrs. / Project

30% Simulation 200 Computations



Standard in: Audi, VW ...
Simulation only as support.

Investment in wind tunnel: **≈ 70 Mio. €**

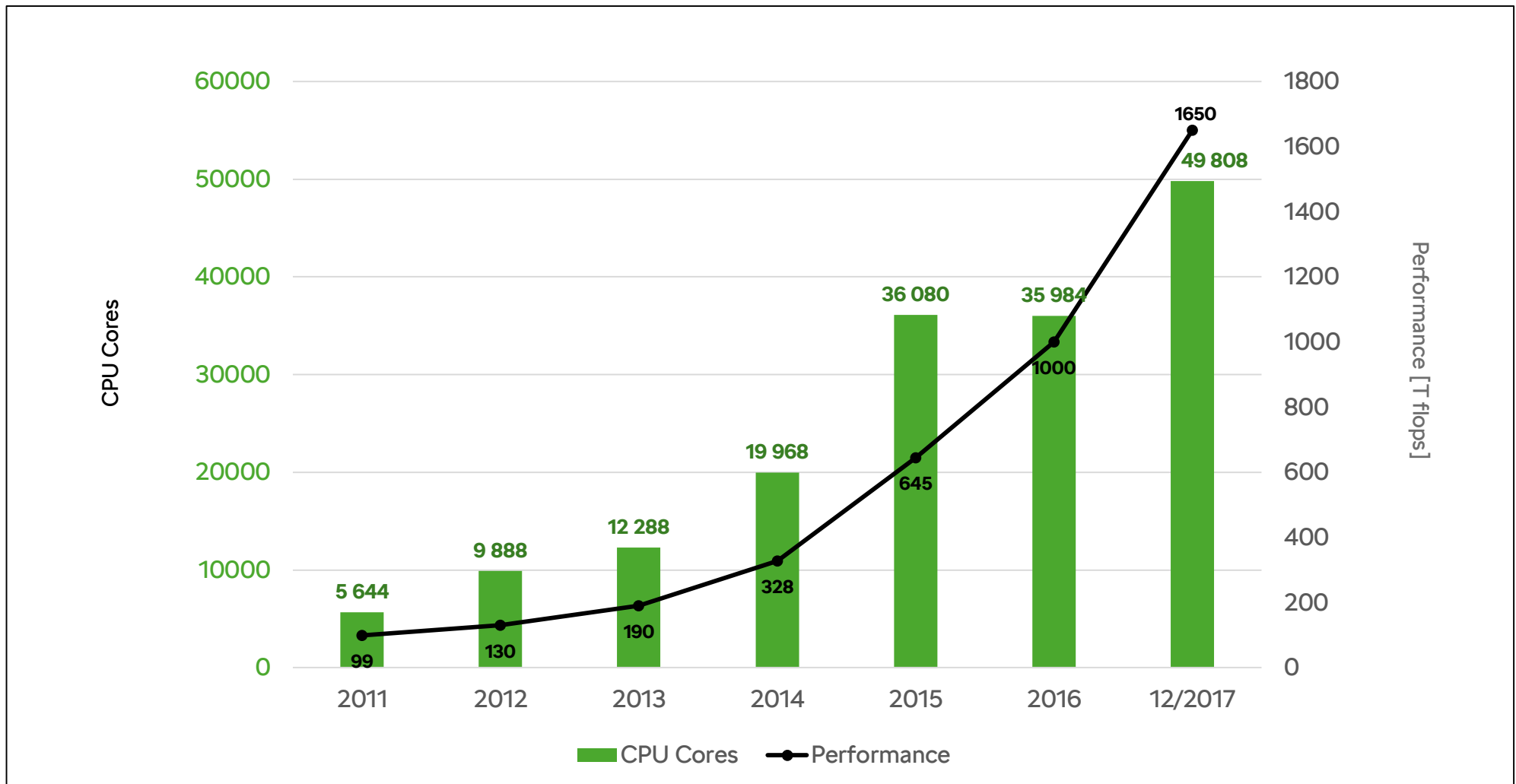
Examples of HPC usage II - Rendering

▪ Z-Buffer Method (OpenGL) = **GPU**

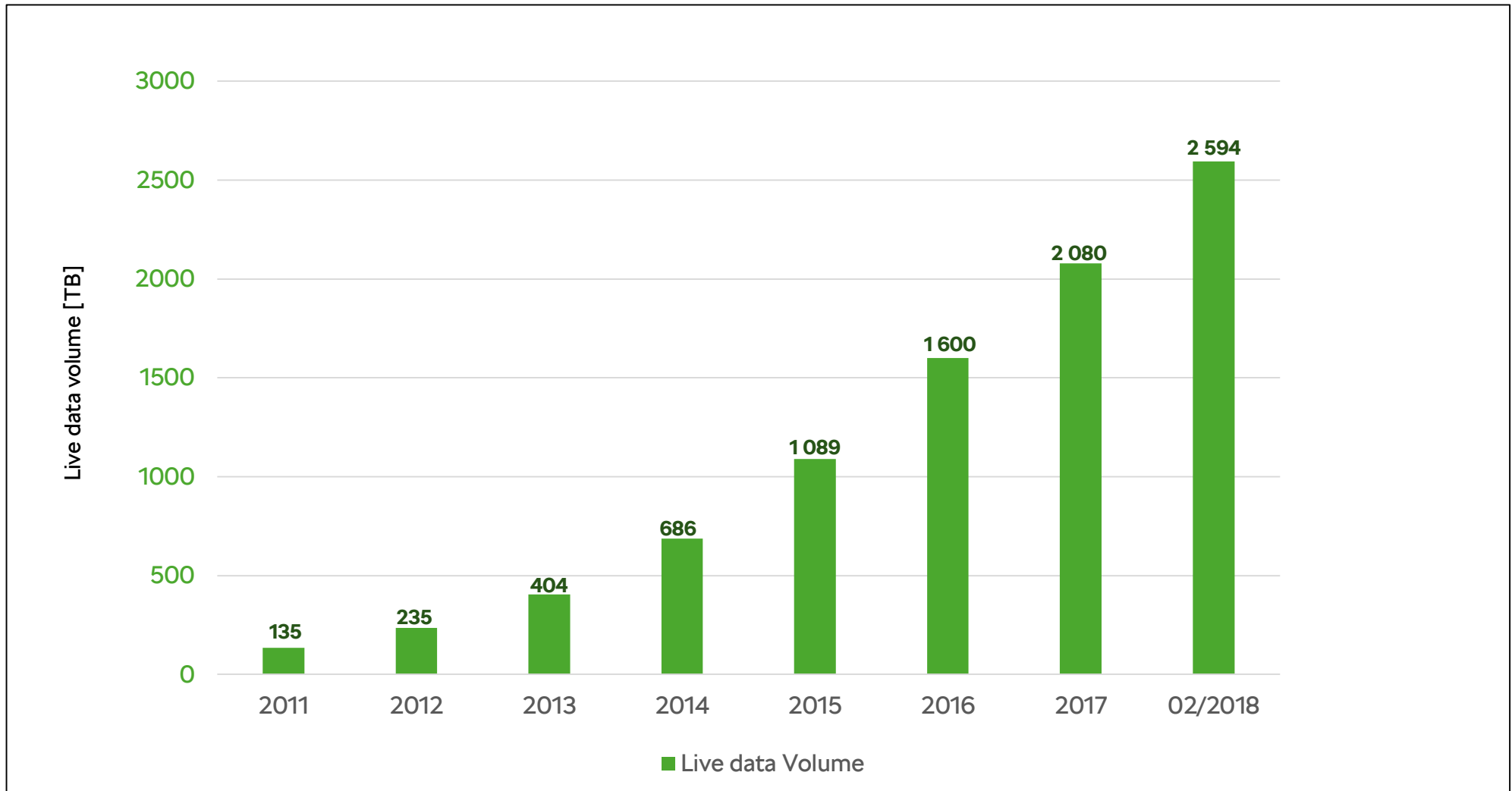
RayTracing Method (OpenRT) = **CPU**



HPC indicators : Performance / CPU Cores



HPC indicators : Volume of live data



Crossroads

- Role splitting – 2004 (IT staff and CAE engineers)
- First cluster – 2007 (Itanium SMP -> Xeon clusters)
- Leaving user quotas – 2012 (crash and CFD share the whole cluster without guaranteed partial capacities)
- Change from investment to leasing – 2016 (CAPEX -> OPEX)
- Migration to the North – 2016 (in the manner of VW , business case for Skoda failed)
- Change of cooling medium - 2018 (air -> water) in the newly built part of DC will be room with water cooling



Challenges

- First cluster with water cooling– running tender, 09/2018
- New legislation (WLTP), new propulsion systems
- VW group project – sharing free capacities among brands
- External access - security issues
- Sharing of capacities with another use cases (rendering in virtual reality, artificial intelligence)

