DynaXtend - Flexible And Short-Term LS-DYNA Software and Hardware Lease

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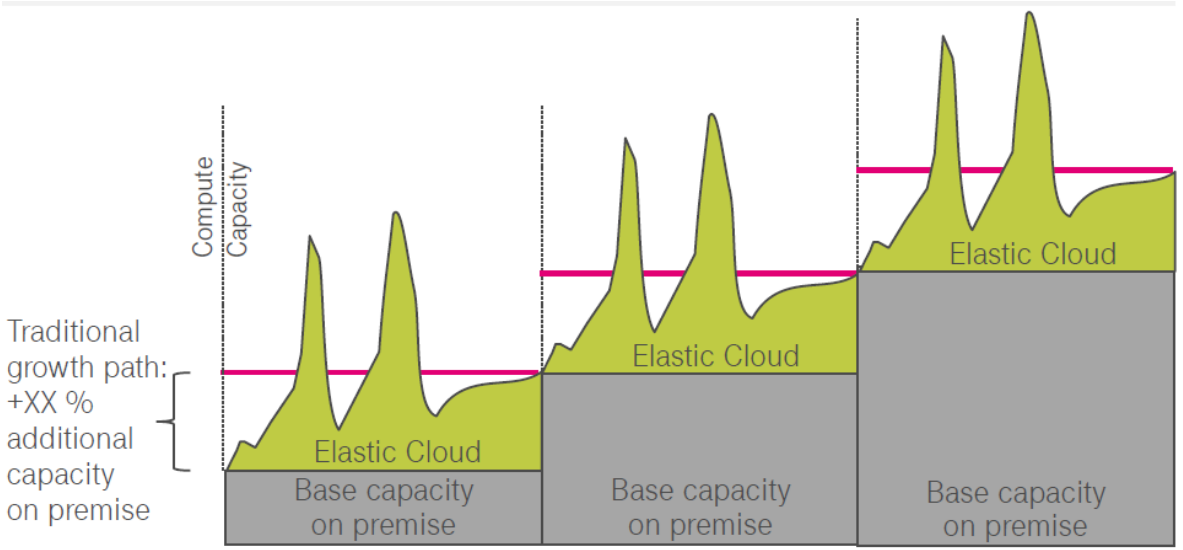
What is DynaXtend

- Special LS-DYNA Model from DYNAmore
  - Short-term LS-DYNA leasing
  - Booking at short-notice
  - Optional hardware lease

  → Boosting you simulation capacity at short-noticed
- Beneficial for e. g.
  - Peaks in simulation demands
  - Short-term projects
  - Hardware failures
- High-Performance Cloud Computing in cooperation with T-Systems and the High-Performance Computing Center (HPCC) Stuttgart

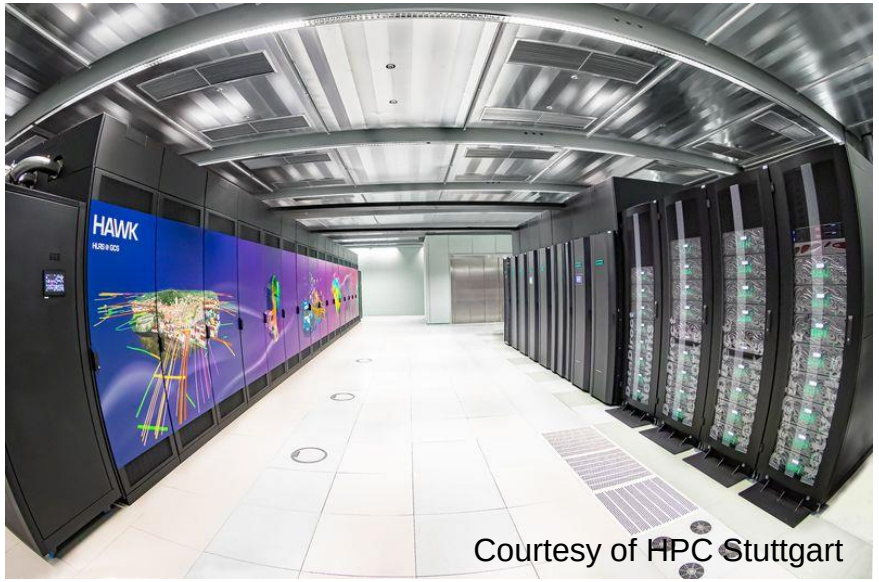


T-Systems

High-Performance Computing

- Hawk (HPE Apollo 6500 Gen10 Plus) (https://www.hlrs.de/systems/hpe-apollo-hawk/)
  - AMD EPYC™ 7742 CPU @ 2.25 GHz
  - 5632 nodes with 128 cores per node
  - 192 NVIDIA A100 GPU
  - ~ 1.44 PB of memory
  - ~ 25 PB of disk space
- Performance
  - Ranked 24 in world-wide top 500 list (https://www.top500.org/lists/top500/list/2021/11/)
- Very good parallel scaling with LS-DYNA

Courtesy of HPC Stuttgart

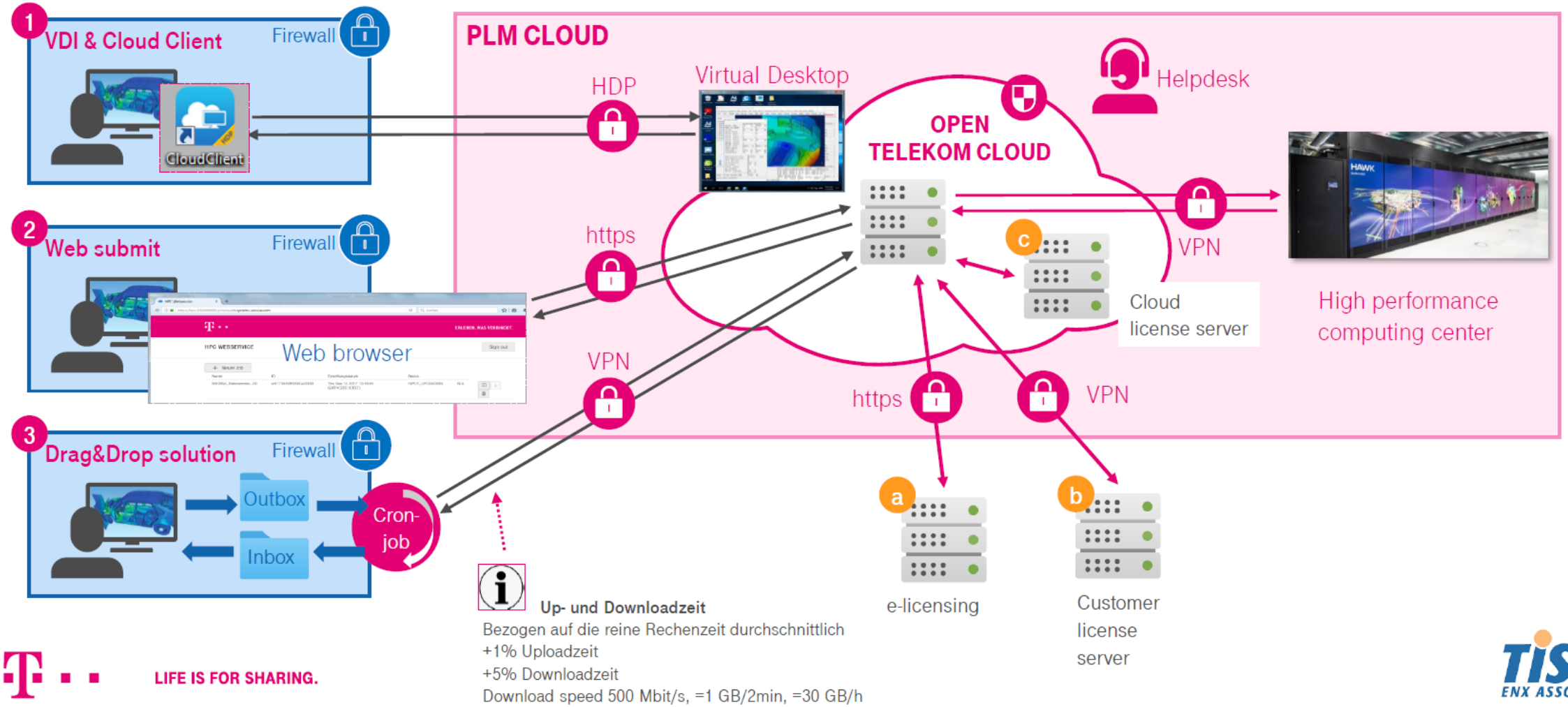


Courtesy of HPC Stuttgart

Access, booking, prices

- Currently, provides independent software and hardware lease
  - LS-DYNA license from DYNAmore
  - Machine lease via your hardware provider of choice, e. g.
    - Ansys Cloud Asure
    - T-Systems PLM Cloud
    - Gompute Cloud
- Tight cooperation with T-Systems PLM Cloud
  - Easy access via web interface or drag and drop folders on your local hardware
  - Different hardwares to choose from, e. g. 128-Core node at Hawk
- DynaXtend
  - Monthly lease
  - Daily booking
  - Prices and contact for **LS-DYNA licenses**, see https://www.dynamore.de/de/produkte/dynaxtend
  - Booking for **PLM Cloud contact** karl-heinz.hierholz@t-systems.com

HPC Access via T-Systems PLM Cloud



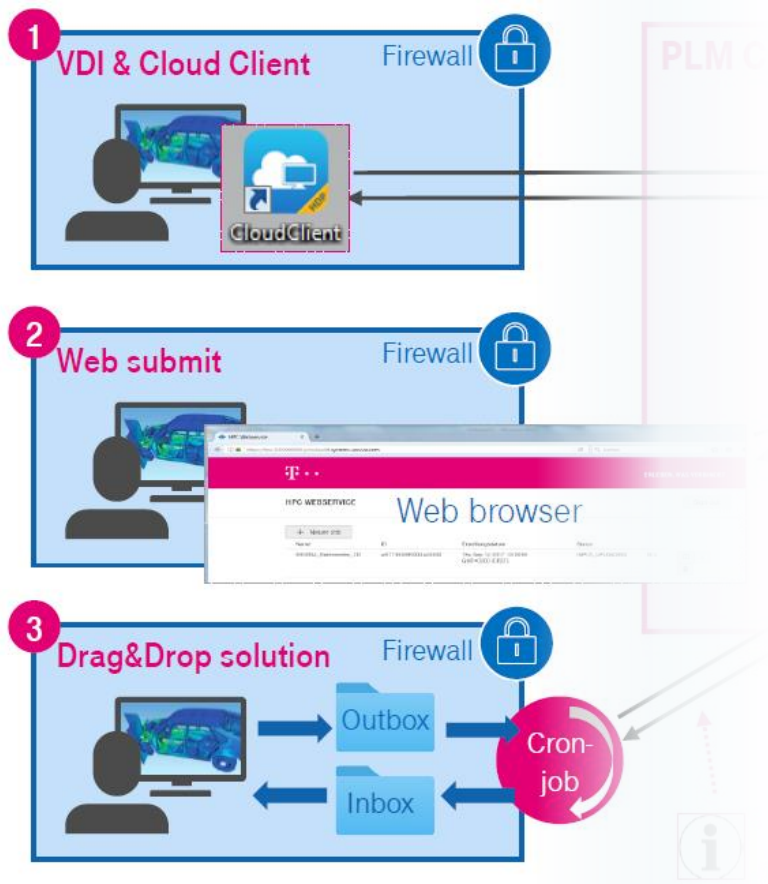
LIFE IS FOR SHARING.

[1]Product life-cycle managment: synonymous for engineering cloud

HPC Access via T-Systems PLM Cloud

- **TISAX**[1] approved
- Three options to submit a job

1. **Virtual Desktop Infrastructure (VDI)**
   Direct access compute hardware via a virtual desktop via **HDP**
2. **Web submit**
   Upload and download of input decks and result files, respectively, via web interface via **HTTPS**
3. **Drag and Drop**
   predefined folders on your local machine
   are kept in sync with compute hardware via **VPN**
   - All ***Outbox*** files will by send to compute hardware
   - All ***Inbox*** files will by retrieved from compute hardware



Regardless of the option, the compute-job progress can always be tracked via web interface

[1]**TISAX** (Trusted Information Security Assessment Exchange) is a standard for information security management system in the automobile industry

HPC Access via T-Systems PLM Cloud

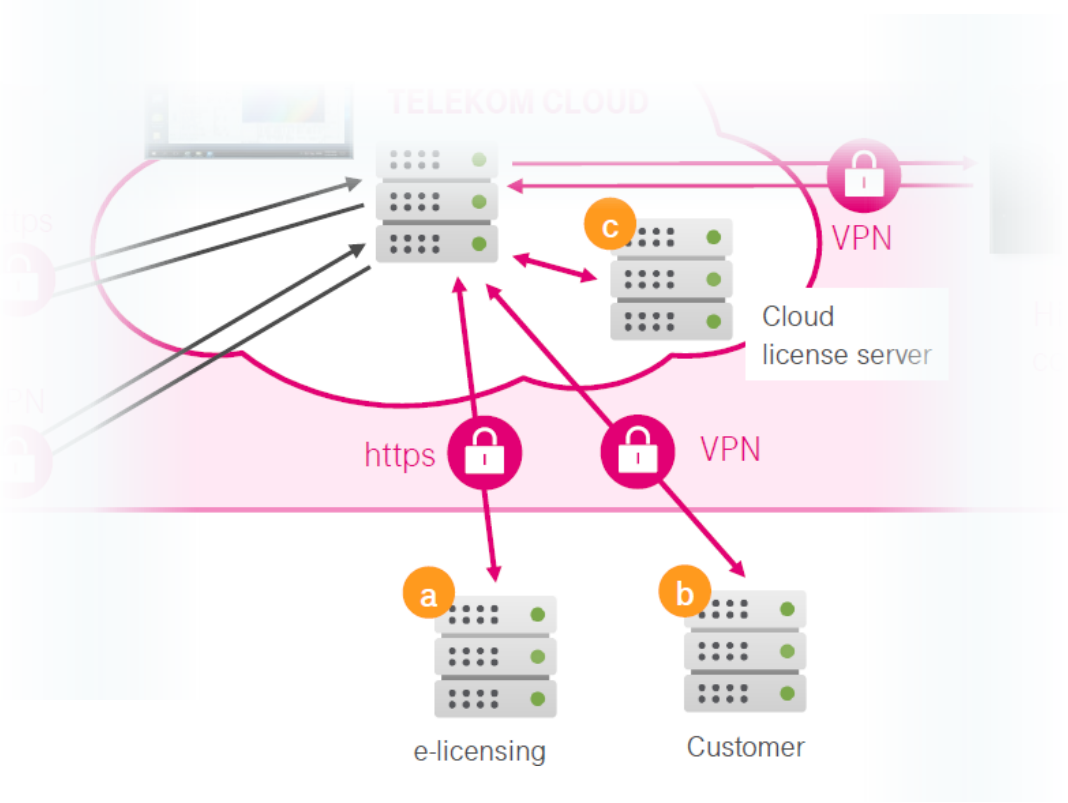
- Three possibilities for LS-DYNA licensing

a **e-licensing**
Open licensing server connected to computer hardware via URL

b **Customer**
License server at customers premise will be connected via VPN to compute hardware.
Requires LS-DYNA license to cover IP range of compute hardware.

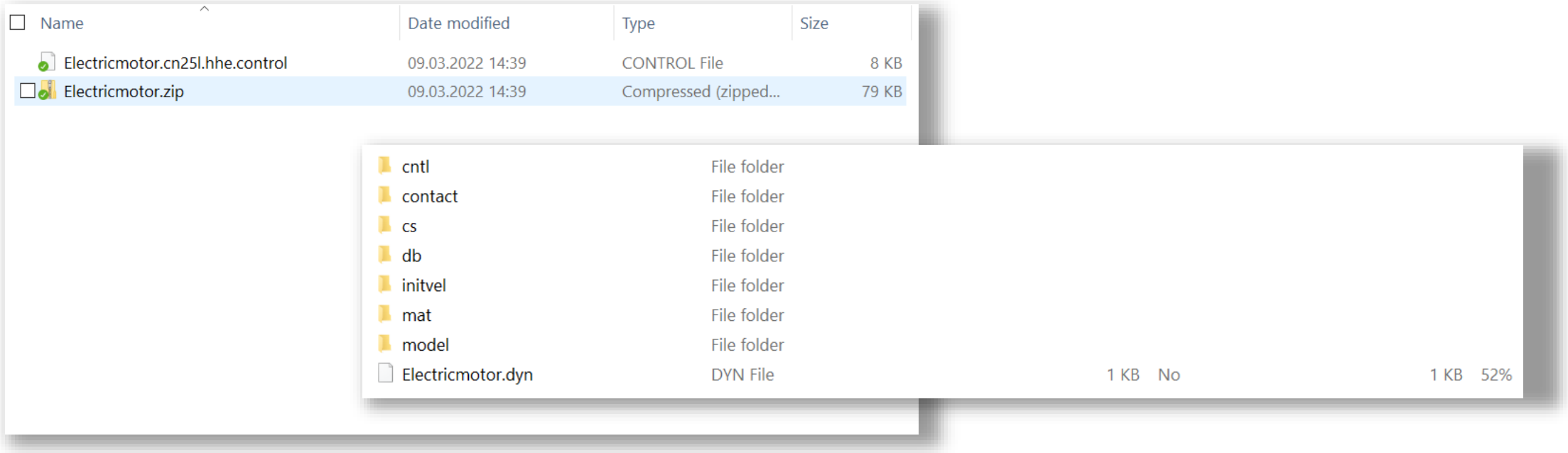
c **Cloud-license server**
Customer license server runs PLM Cloud

preferred for LS-DYNA licensing through **DynaXtend**



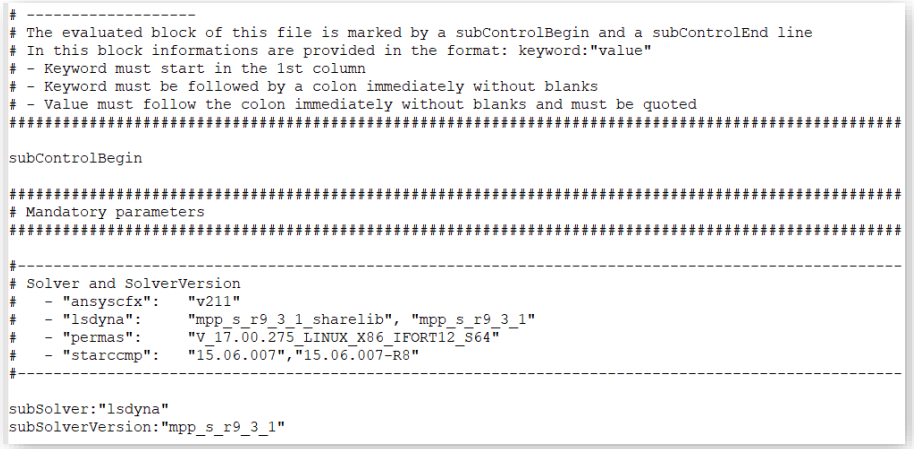
HPC Access via T-Systems PLM Cloud

- Submitting a job via **Web submit** comprises
  - LS-DYNA input deck (as archive)
  - Job control file (`.control`)
- LS-DYNA input deck
  - Conveniently as compressed as an archive



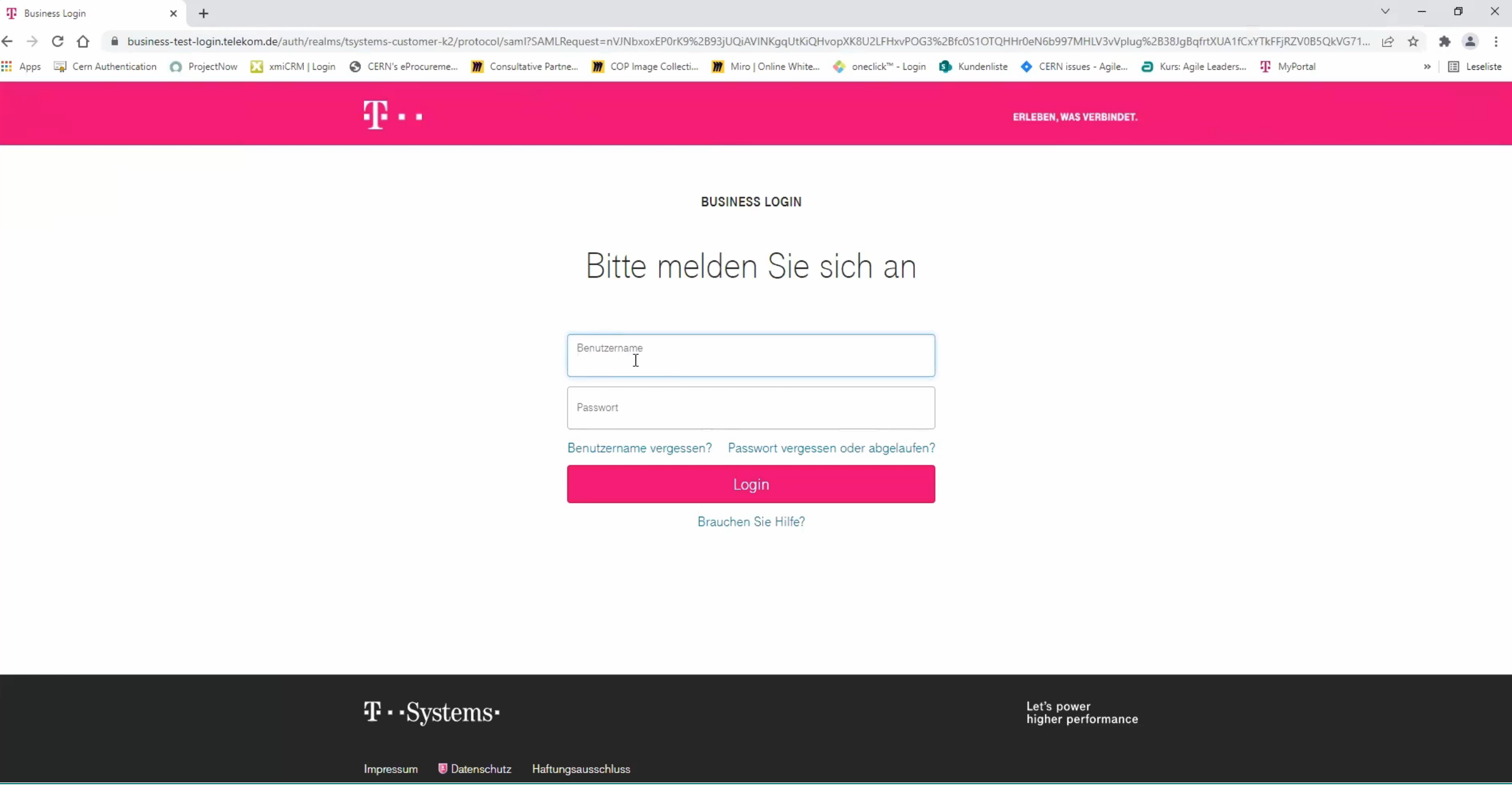
HPC Access via T-Systems PLM Cloud

- Job control file (`.control`) defining, e. g.,
  - `subSolver` defines solver, e. g. lsdyna
  - `subSolverVersion` defines solver version
  - `subInputFile` defines LS-DYNA master file
  - `subOutputFileList` defines list of result files to be compressed and send back
  - `subReqNodeFlavor` defines hardware which to use, e. g. `CN25` for Hawk. A complete list of available hardware can be found here (https://cloud.telekom.de/en/infrastructure/plm-cloud) under *Service description*
  - `subReqNodeNumber` defines number of nodes
  - `subReqMaxWallTime` defines hard limit of job runtime. Once limit is reached job will be terminated



```
# ------------------
# The evaluated block of this file is marked by a subControlBegin and a subControlEnd line
# In this block informations are provided in the format: keyword:"value"
# - Keyword must start in the 1st column
# - Keyword must be followed by a colon immediately without blanks
# - Value must follow the colon immediately without blanks and must be quoted
##########################################################################################################

subControlBegin

##########################################################################################################
# Mandatory parameters
##########################################################################################################

#---------------------------------------------------------------------------------------------------------
# Solver and SolverVersion
#   - "ansyscfx":   "v211"
#   - "lsdyna":     "mpp_s_r9_3_1_sharelib", "mpp_s_r9_3_1"
#   - "permas":     "V_17.00.275_LINUX_X86_IFORT12_S64"
#   - "starccmp":   "15.06.007","15.06.007-R8"
#---------------------------------------------------------------------------------------------------------

subSolver:"lsdyna"
subSolverVersion:"mpp_s_r9_3_1"
```

- `subJobName` defines a jobname
- `subProject` defines projectname, which is useful for tracking of resources and accounting
- `subResultCompress` defines the compression method of the result files before copied
- `subOutputWatchFileList` defines list of files to be watched while job is running


Business Login
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CERN's eProcureme...
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Kundenliste
CERN issues - Agile...
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PLM CLOUD HPC WEB SERVICE

Drop your job here | Browse

Filter ...

jobid	gstcsoid	l1status	l3status	lastregularl3sta...	userid	jobname	inputfile	project	flavor	nodenu...	corenu...	sol	Actions
w1f4add6590ba2c95900	8400000601		FINISHED	FINISHED	k50193689	Electricmotor01	Electricmotor.dyn	Projectname	cn25l.hhe	1	128	lsd	submit.log
w1f4add6590ba1aa3400	8400000601		FINISHED	FINISHED	k50193689	Electricmotor01	Electricmotor.dyn	Projectname	cn25l.hhe	1	128	lsd	submit.log
w1f4add6590b9c6a7d00	8400000601		FINISHED	FINISHED	k50193689	cavity__500x500__tmax-0.5__dt-0.00002_1n	cavity.sh	TSITestProject	cn25l.hhe	1	128	op	submit.log
w1f4add6590b9c69f600	8400000601		FINISHED	FINISHED	k50193689	Electricmotor01	Electricmotor.dyn	Projectname	cn25l.hhe	1	128	lsd	submit.log

03_Kalkul... | Antworte... | 02_Ange... | 03_Kalkul... | Webinar

Summary

- DynaXtend is flexible LS-DYNA licensing approach to cope with peaks in simulation demands
- Optionally, can be combined with hardware lease with your hardware provider of choice, e. g.
  - Ansys Cloud Asure
  - T-Systems PLM Cloud
  - Gompute Cloud
- Access to HPC, e. g. Hawk at HPC Stuttgart
- In case of PLM Cloud, access via
  - VDI
  - Web interface
  - Drag-and-drop folders on your local machine
- Pricing can be found at https://www.dynamore.de/en/products/dynaxtend
- Booking via kathleen.fritz@dynamore.de

More Information on our Product Suite

- **LS-DYNA**
  - Support / Tutorials / Examples / FAQ
    www.dynasupport.com
  - More Examples
    www.dynaexamples.com
  - Conference Papers
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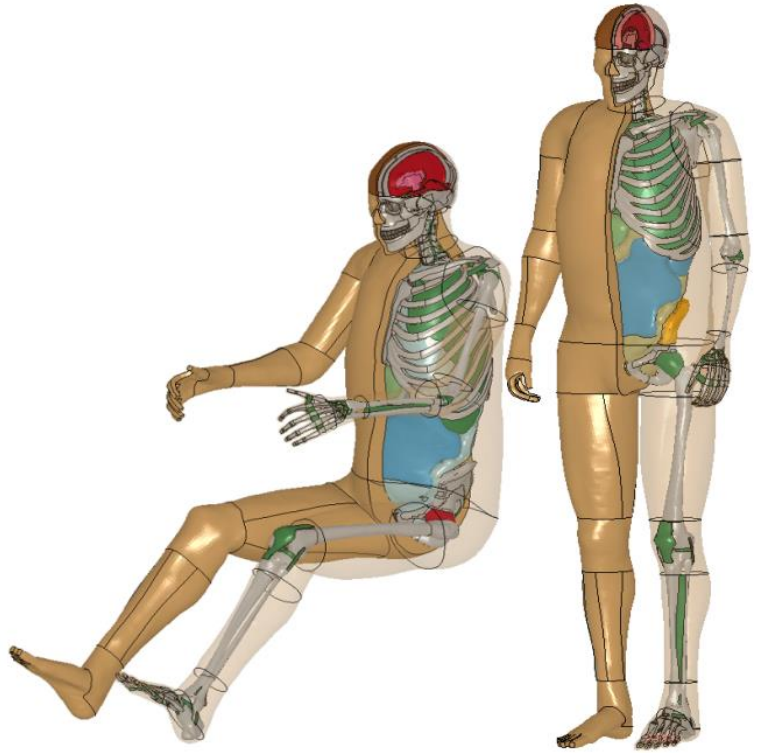

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Your questions, please