THANKS FOR JOINING

RAISE CoE Training: LSTM & GRU Models

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2022-10-31, RAISE CoE Training LSTM & GRU Models, Online

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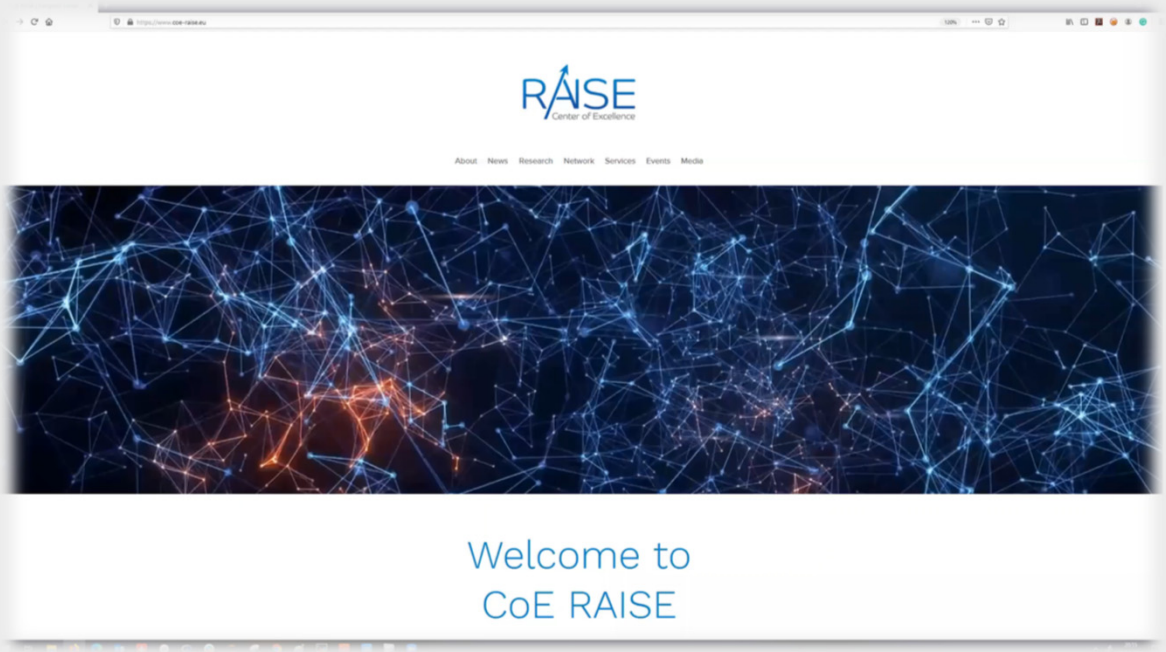
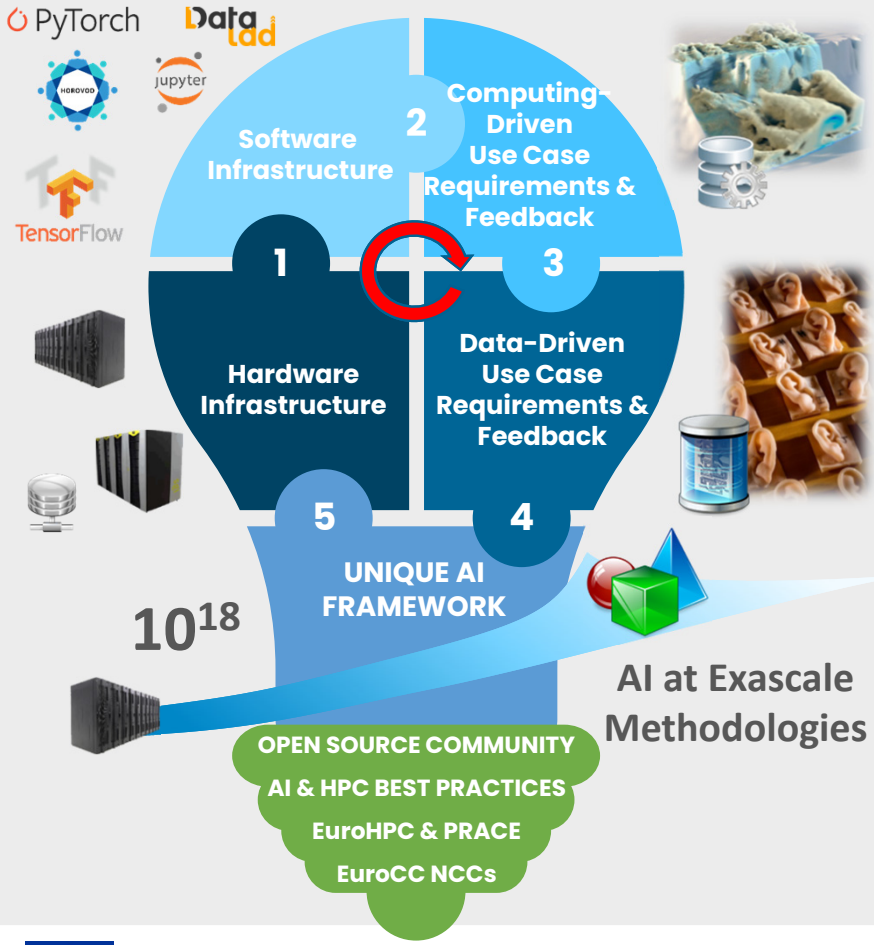
IHPC National Competence Center (NCC) for HPC & AI in Iceland

CoE RAISE Web Page & More Information



https://www.coe-raise.eu

Towards AI & HPC at Exascale with CoE RAISE Results



Hardware Infrastructure

Prepare & Document available production systems at partners' HPC centers

Examples: JUWELS (JUELICH), LUMI (UoICELAND), DEEP Modular Prototypes, JUNIQ (JUELICH), etc.

Software Infrastructure

Prepare & Document available open source tools & libraries for HPC & AI useful for implementing use cases

Examples: DeepSpeed and/or Horovod for interconnecting N GPUs for a scalable deep learning jobs

Computing-driven Use Cases Requirements & Feedback

Use cases with emphasize on computing bring in co-design information about AI framework & hardware

Examples: Use feedback that TensorFlow does not work nicely, so WP2 works with use cases on pyTorch

Data-driven Use Cases Requirements & Feedback

Use cases with emphasize on data bring in co-design information about AI framework & hardware

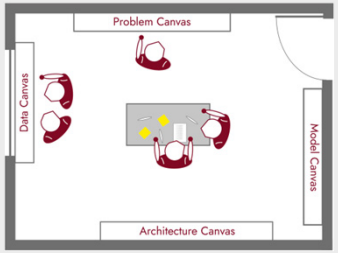
Examples: Deployment blueprint by using AI training on cluster module & inference/testing on booster

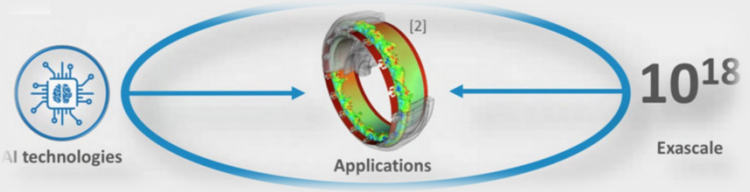
→ UNIQUE AI FRAMEWORK

Living design document & software framework blueprint for HPC & AI also with pretrained AI models

HPC Systems Engineering in the Interaction Room Seminar

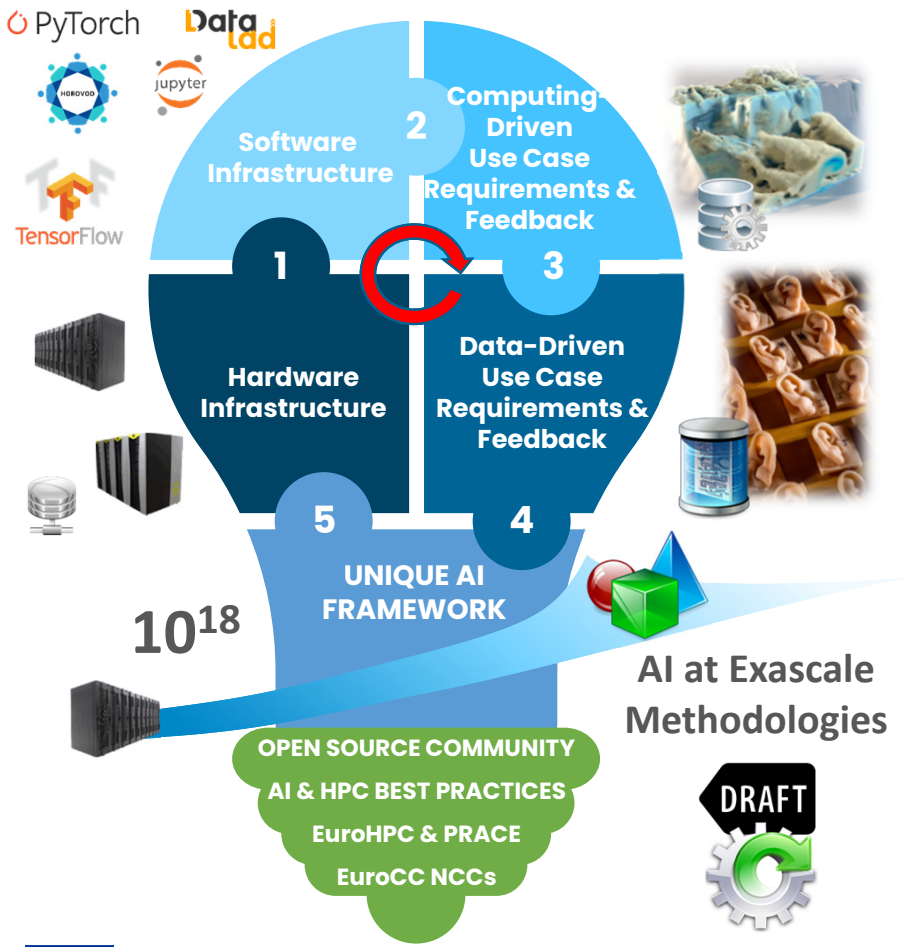
- CoR RAISE Interaction Room Process
  - Supports the proper software engineering design of the unique AI framework blueprint
  - Expecting to work with WP3 & WP4 experts in an open minded way
  - Process guided by Software Engineering Expert **Prof. Dr. Matthias Book** (University of Iceland)
  - Supported by Software Engineering & testing expert **Prof. Dr. Helmut Neukirchen** (University of Iceland)
  - CoE RAISE @ YouTube: https://www.youtube.com/channel/UCAdIZ-v6cWwGdapwYxdN7dg
  - Methology as one CoE RAISE outcome





Book, M., **Riedel, M.**, **Neukirchen, H.,** Goetz, M.: Facilitating Collaboration in High-Performance Computing Projects with an Interaction Room, in conference proceedings of the 4th ACM SIGPLAN International Workshop on Software Engineering for Parallel Systems (SEPS 2017), October 22-27, 2017, Vancouver, Canada

Summary – Training soon on CoE RAISE Channel



LSTM & GRU Models

Use Case	AE	PINN	ANNs		CNN		NO	GNN		RNN		GAN	TF				SVM	RF
Details	*CAE*		*ANN*	*RBF-ANN*	*U-Net*	*RES NET*	*FNO*	*MLPF*	*GAT*	*LSTM*	*GRU*	*WGAN*	*MViT*	*ViViT*	*Swin*			
AI for turbulent boundary layers	X	X	X									X						
AI for wind farm layout optimization				X												X		
AI for data-driven models in reacting flows					X				X									
Smart models for next generation aircraft engine design					X				X									
AI for wetting hydrodynamics	X	X					X			X								
Event reconstruction and classification at the CERN HL-LHC use case								X										
Seismic imaging with remote sensing for energy applications	X	X				X	X			X	X					X	X	X
Detect-free metal additive manufacturing	X		X									X	X	X	X			
Sound Engineering	X		X															

drive. enable. innovate.

RAISE Center of Excellence

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