



Hewlett Packard
Labs

Heterogeneous Server-less Computing and FuncX

Parsl & FuncX Fest 2022

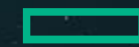
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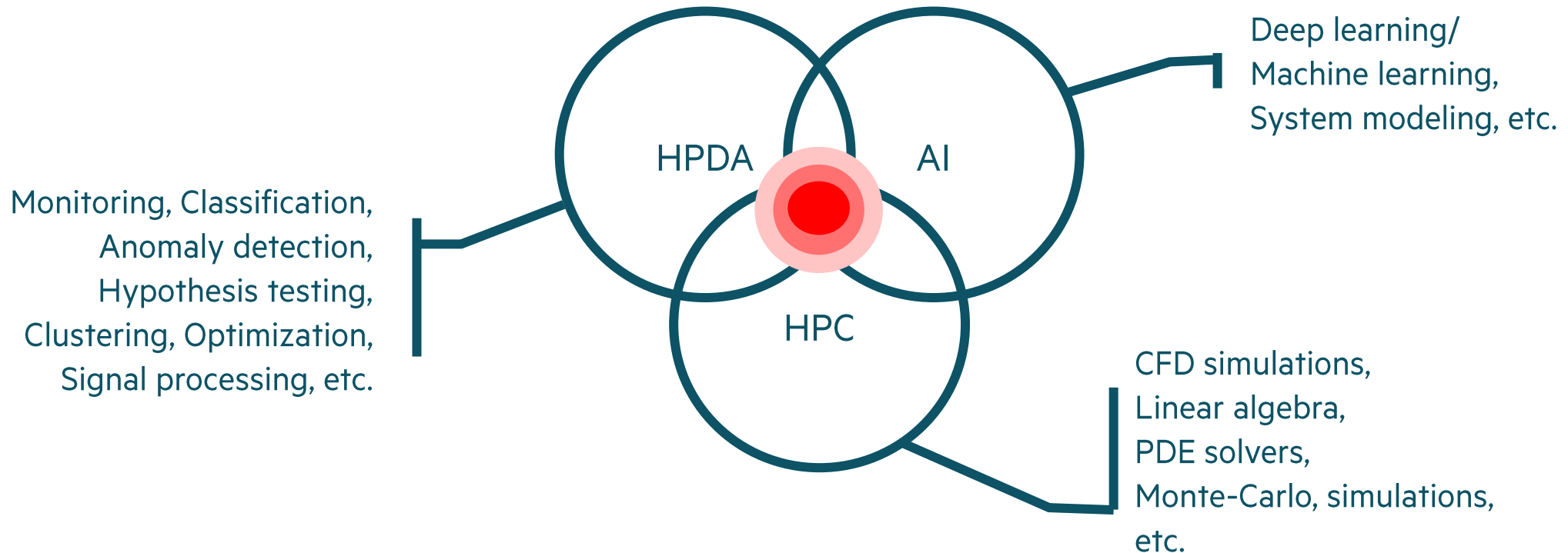
Presentation Overview

- Background and Motivation
- Heterogeneous Serverless Computing (HSC) Project Overview
- Why FuncX?
- FuncX – Future work?/Discussion

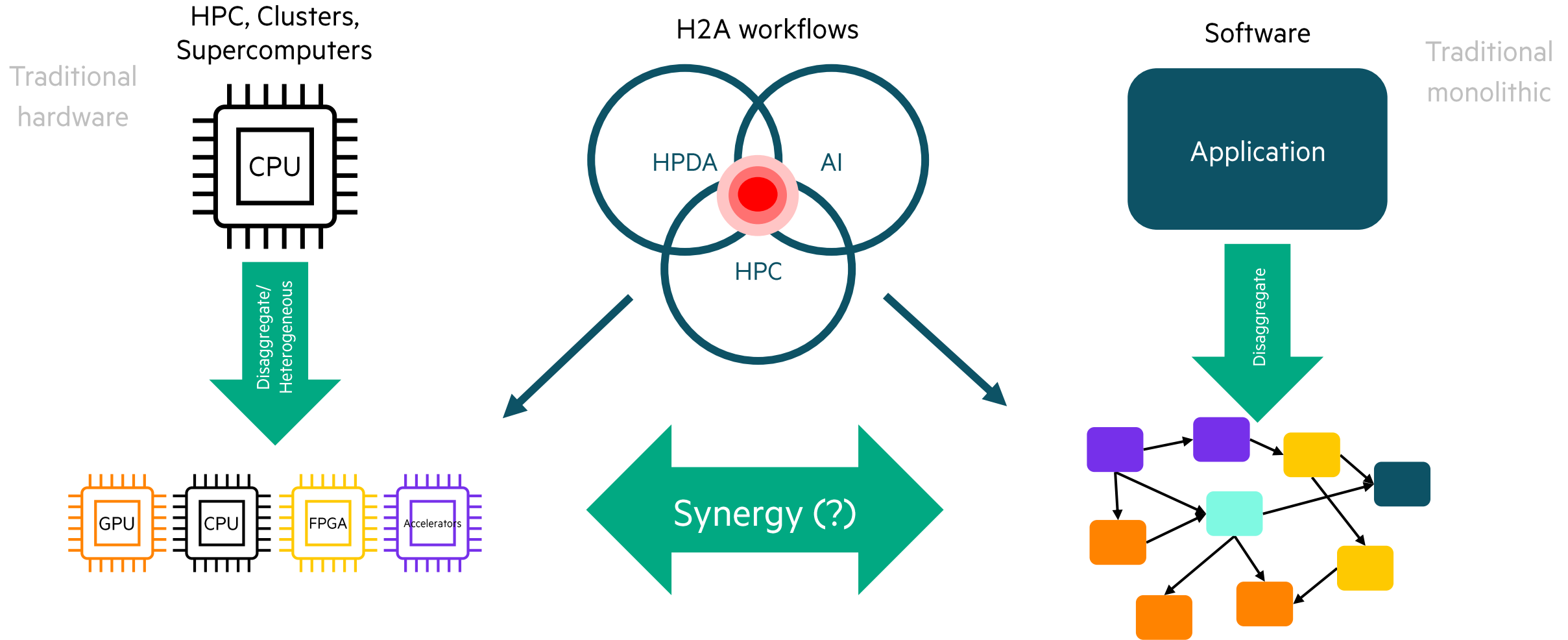


Background and Motivation

- **H2A** workflows –
 - High Performance Computing (**HPC**)
 - High Performance Data Analytics (**HPDA**)
 - Artificial intelligence (**AI**)



Heterogeneous Serverless Computing (HSC) Project Overview



HSC - Enable higher scale/fluidity of supercomputers and ease/efficiency of Cloud

Why FuncX?

Framework	Heterogeneity Support				Autoscaling	Multiple Container technologies	HPC Support	Open Source	Maturity	Responsiveness
	CPU	GPU	FPGA	NIC						
funcX	●	●	●	●	●	●	●	●	●	●
Apache Airavata	●	●	●	●	●	●	●	●	●	●
Kubernetes	●	●	●	●	●	●	●	●	●	●
OSS Serverless Frameworks	●	●	●	●	●	●	●	●	●	●
Fission	●	●	●	●	●	●	●	●	●	●
rFaaS	●	●	●	●	●	●	●	●	●	●

●	Fully Supported	No Effort
●	Supported with external components	Little to No Effort
●	Further investigation needed	Effort required in research and maybe implementation
●	Not supported	Major effort required, research and implementation

FuncX – Future Work? (Discussion)

- High scalability and low latency
 - e.g., satellite imagery processing
- Synchronous invocations (event based)
 - e.g., sensor data processing
- Inter-function communication
 - e.g., sorting data stored at various memory/disk locations
- Runtime scheduling and autoscaling
 - Custom scheduling/resource management logic
- Disaggregated hardware support for near data processing
 - e.g., GPUs, FPGAs, Accelerators, SmartNICs
- Able to host it on a private cluster/hardware





Thank You!

Questions?

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