Service Engineering Analytics in Hybrid Computing Systems of IoT, Big Data and Clouds

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Real applications and systems

Realtime sport analytics

Traffic monitoring & management

Enterprise services & digitalization

Geo Sports: Picture courtesy Future Position X, Sweden


Customers waiting for boarding trains in Hangzhou

Challenging to develop and operate them
Solving complex problems with hybrid and diverse capabilities

Big Data

Cloud

IoT

Human

Complex Software Systems

How to optimize the development and operation of such software systems?
Hybrid Computing Systems

- Abstract computing, sensing, data, network and analysis capabilities as services
- Utilize constrained-to-powerful machine and human capabilities
- Design and build software systems with hybrid computing service units
- Hide low-level details and enable dynamic software systems
Responsive, Elastic & Resilient
HCS
need
novel Service
Engineering Analytics

Application requirements

Services, systems & infrastructures

Engineering methodologies
Resource ensembles from hybrid capabilities

Ensemble = \{\text{Resource slice, Requirements, Metrics, Policies, ...}\}

Resource slice of services
Multi-dimensional elasticity brings many applications

- Quality of analytics
- Software-defined capabilities
- Application-specific resource ensembles
Understand uncertainty and incidents

- A W3H deep analytics model becomes crucial
- **What**, **When**, **Where** and **How** for uncertainty & incidents in big systems
- End-to-end integrated with software engineering processes
New engineering principles

End-to-end Engineering & Optimization

Elasticity Coherence

Development & Production Symbiosis
Service Engineering Analytics outlook on Hybrid Computing Systems

- Characterization & service models of hybrid software systems
- Instrumentation, monitoring, measurement & benchmarking
- Analytics models, techniques & algorithms
- Ensemble as a Service
Thanks for your attentions!

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