ML Workflow & Interop Committee Update

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MLWorkflow & Interop Committee - Addressing Interop

› With recent development of the Pyro project, an incubation project of LF AI Foundation, Julia and MindSpore, it has become evident that AI native programming is the next trend in deep learning framework development. Gone with the old days that mathematical libraries were added to existing engineering toolsets, data scientists will more and more likely to use their familiar toolset with more engineering capability added. AI developers should be able to write the models as the mathematical format without a steep learning curve of software engineering

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MLWorkflow & Interop Committee - Problem Scope

1 Northbound Interoperability when the AI Native programming framework is adopted for applications in different areas.

2 Southbound Interoperability when the AI Native programming framework is used on various compute and storage backends
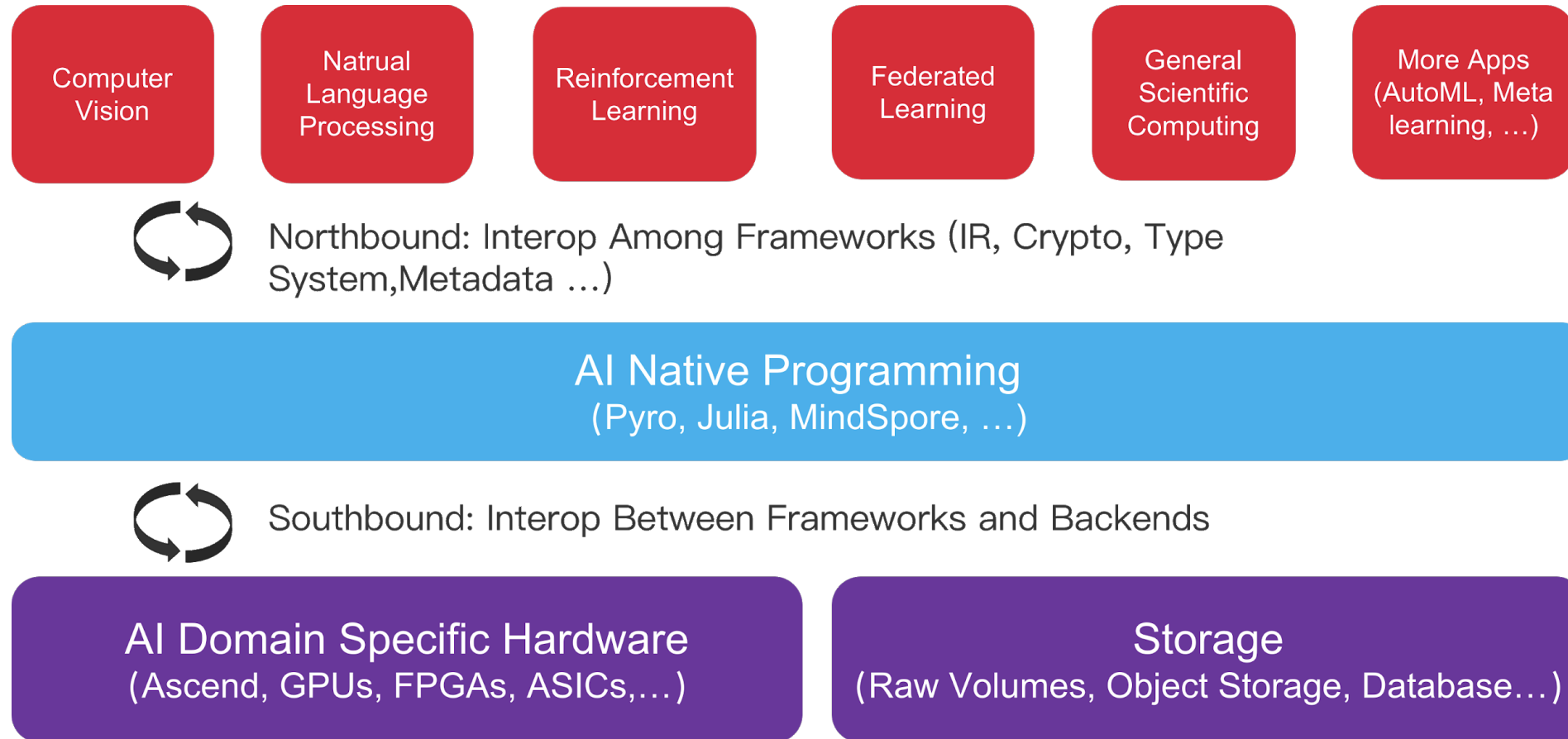
3 Framework Interoperability when traditional deep learning frameworks need to be supported or transformed. (**ONNX**)

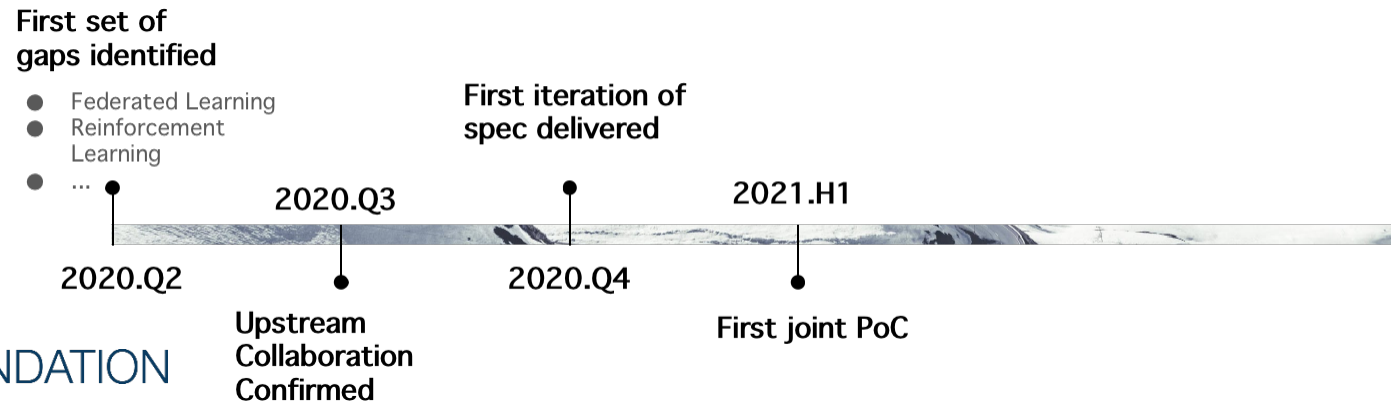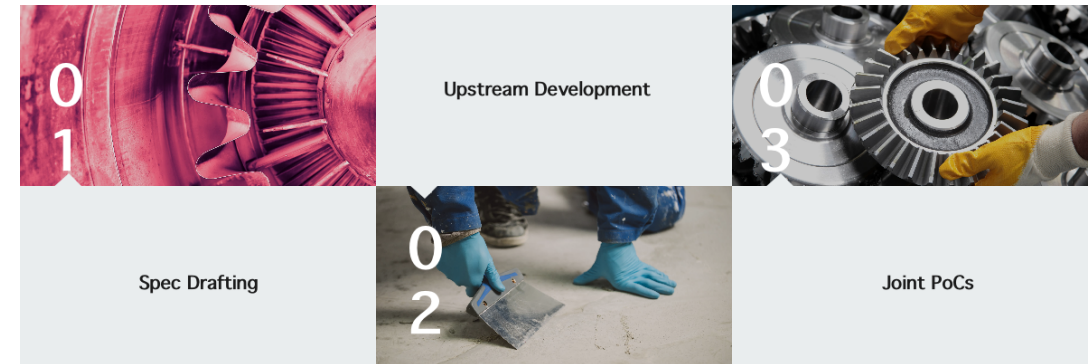**4** Build Interoperability when various types of deployment could be reproducible on different pipelines. (**Kubeflow**)

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MLWorkflow & Interop Committee - Interop Landscape

Computer Vision	Natrual Language Processing	Reinforcement Learning	Federated Learning	General Scientific Computing	More Apps (AutoML, Meta learning, …)

Northbound: Interop Among Frameworks (IR, Crypto, Type System, Metadata …)

AI Native Programming
(Pyro, Julia, MindSpore, …)

Southbound: Interop Between Frameworks and Backends

AI Domain Specific Hardware (Ascend, GPUs, FPGAs, ASICs,…)	Storage (Raw Volumes, Object Storage, Database…)

MLWorkflow & Interop Committee - Interop Work Items

› Address the northbound and southbound interoperability problem and work with LFAI community at large to solve framework and build interoperability issue

01	|	Identify the gaps
02	|	cross community discussion
03	|	upstream gap-fulfilling development
04	|	interop specification
05	|	joint proof of concept

First set of
gaps identified

- Federated Learning
- Reinforcement Learning
- ...

First iteration of
spec delivered

2020.Q3   2021.H1

2020.Q2   2020.Q4

Upstream
Collaboration
Confirmed

First joint PoC

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MLWorkflow & Interop Committee Update

› Key Development

  › The interop proposal was reviewed and approved

  › The interop use case document has been prepared, in which Transfer Learning and Federated Learning are selected as the top two areas to study the gaps for interoperability.

› Key Stats

  › Mailing list interactions have improved a lot in May

Message History

	Jan	Feb	Mar	Apr	May
2020	2	2	5	7	16

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MLWorkflow & Interop Committee Update

› Discussion Arrangment

  › Starting in June meeting to invite LFAI project members to join for conversation on interoperability. The current proposed pipeline is:

    › Adlik

    › Seldon/Kubeflow

    › ONNX

    › …

MLWorkflow & Interop Committee Update

› Adlik Discussion

  › (1) What other open source projects have you successfully integrated your project with in an ML Workflow? What made that work?

  › A: Tensorflow, Keras, PyTorch. XGboost/ScikitLearn for v1.0. Static graph first.

  › (2) What other open source projects have you unsuccessfully integrated your project with? What made it fail?

  › A:

  › (3) What other open source projects would you like to be integrated with in the future? Why? What will be the challenges?

  › A: Acumos for O-RAN use case

  › (4) What are the top use cases of your project today/tomorrow (northbound)?

  › A: How to define or standardize the interference metadata structure/format. https://github.com/SeldonIO/seldon-core/#send-api-requests-to-your-deployed-model (Seldon Swagger Example)

  › https://github.com/kubeflow/kfserving/blob/master/docs/predict-api/v2/required_api.md#model-metadata (KFServing)

  › (5) What hardware and storage requirements does your project have today/tomorrow (southbound)?

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