OPI (Open Programing Infrastructure) for DPU Keynote

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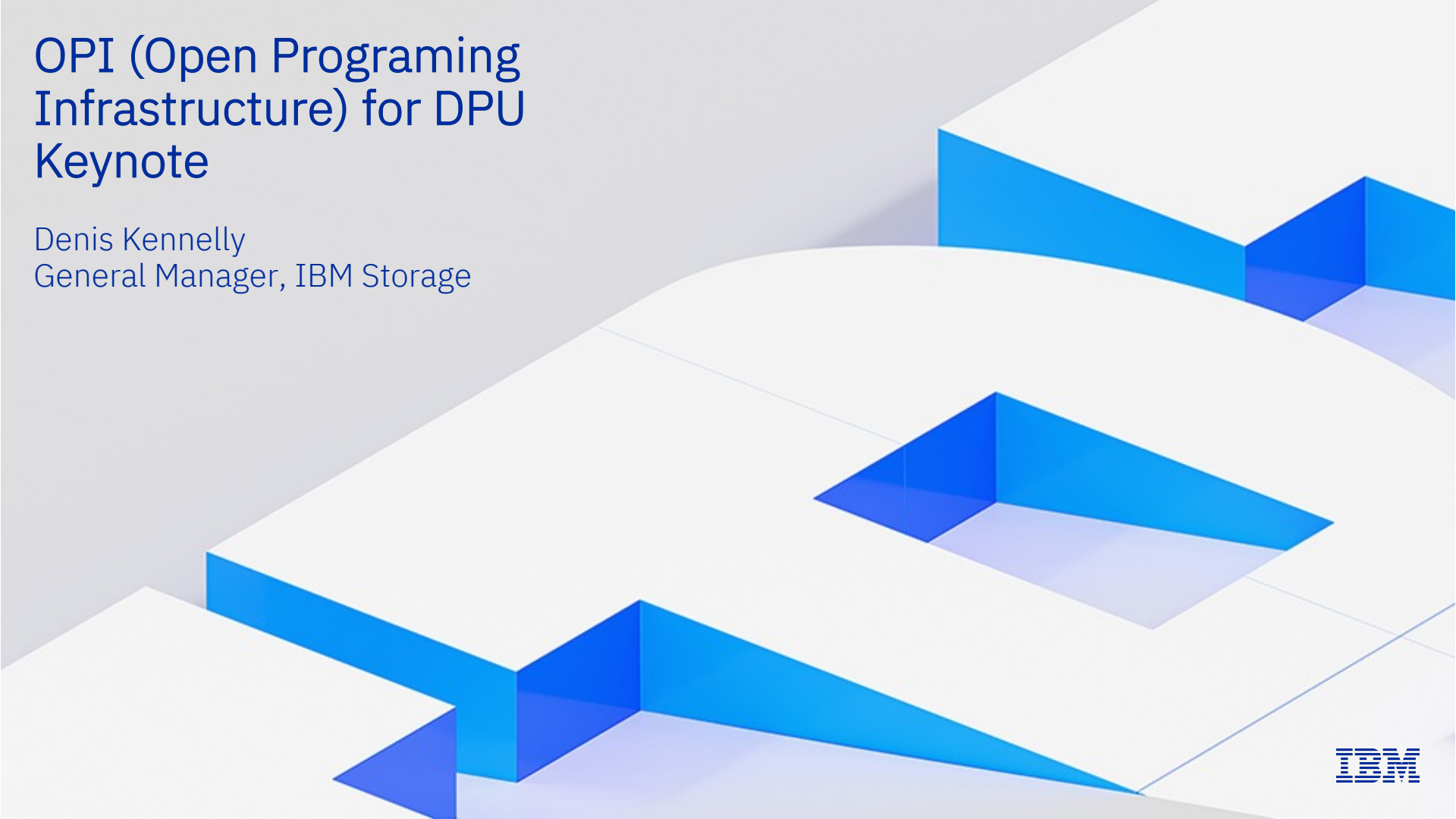


Agenda

Abstract

The evolution of hybrid cloud infrastructure

Why accelerator technology (DPU/IPU/SmartNIC)?

Open Eco system

IBM adoption of DPU/IPU/SmartNIC technology today

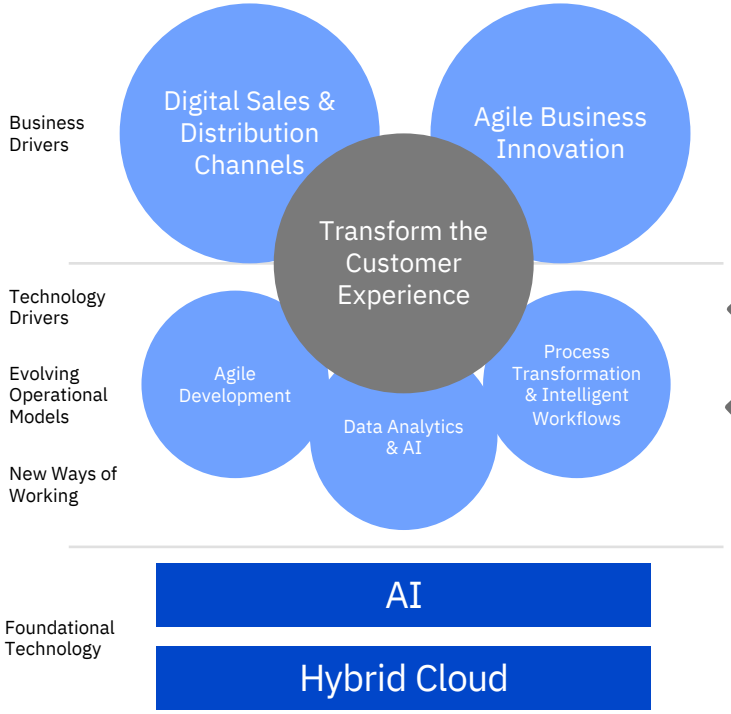
Potential storage use case

Infrastructure modernization with accelerator technology

Abstract:

The perfect storm of infrastructure modernization is here. Organizations need to gain the immediate insights of the ever-growing data estates, protect its assets from cyberattack and enable developers to develop solutions more efficiently in hybrid cloud environment. The traditional infrastructure can no longer satisfy the new requirements. We need a new intelligent hybrid cloud infrastructure that is portable, elastic, and secure. Developers can now leverage DPU/IPU/SmartNic technology to modernize its infrastructure – compute, network and storage. In this session, IBM will present its vision of infrastructure evolution and the possible applications and services that can take advantage of this technology.

Drivers and Implications of Cloud & Digital Transformation

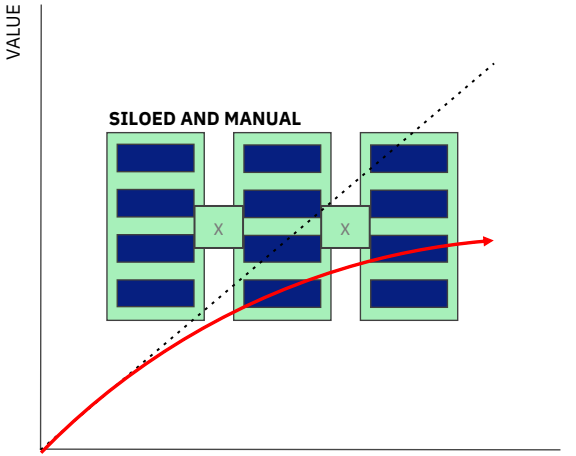


Infra	On-Premise	→	Hybrid Multi-Cloud
	VMs	→	Containers/Serverless
Dev	Full-Stack Custom Development	→	Composition and Integration of Enterprise & Provider Services
	Waterfall Development	→	Blended Agile & Traditional
	Monolithic	→	Service-Oriented (Microservices + Monolithic)
	Transactional Data	→	Transactional + Eventually Consistent Data
Sec	Perimeter	→	Application/Data/API
	Manual Reg Compliance	→	Automated/AI-Driven/Shift-Left
Ops	Traditional ITSM	→	Site Reliability Engineering (SRE/AIOps)

Consistent platforms are becoming necessary to address the increasing scale and complexity of hybrid (multi) cloud adoption

Separate environments with traditional op. model

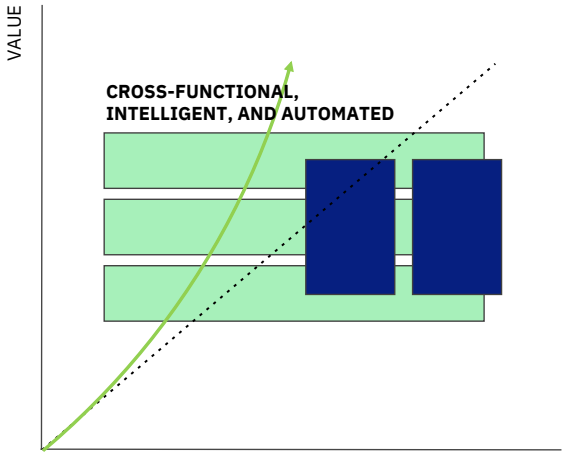
Traditional “vertical” operating models
Require resources to scale with load increasing cost and decelerating value capture



DRAGS
Manual processes
Ineffective communication
Lack of adequate tooling
Lack of visibility
Siloed teams
Skill deficiencies

Single hybrid platform and operating model

Hybrid Multi-cloud operating models
Reduce complexity through automation to scale with load without adding cost



ACCELERATORS
Developer productivity
Integrated collaboration
Cloud-native capabilities
Automated E2E software development lifecycle
Declarative automation
Engineering/SRE practices
Observability – single pane of glass, AI in operations

Hybrid platform approach offers:

2.5x

more value than a traditional cloud strategy...
...across five sources of value...

1. Business acceleration
2. Developer productivity
3. Infrastructure cost efficiency
4. Regulatory, Compliance & Security
5. Strategic optionality

Core characteristics of modern hybrid cloud

Applications and data portability

Build ONCE, deploy ANYWHERE, manage CONSISTANTLY

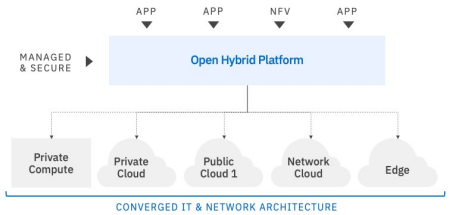
Applications and data are placed at the most optimal locations.

Selectively leverage differentiated native cloud provider services

Same operational cloud model enabled everywhere

Compliance and policy automated as code

Standardised and centralised configuration management



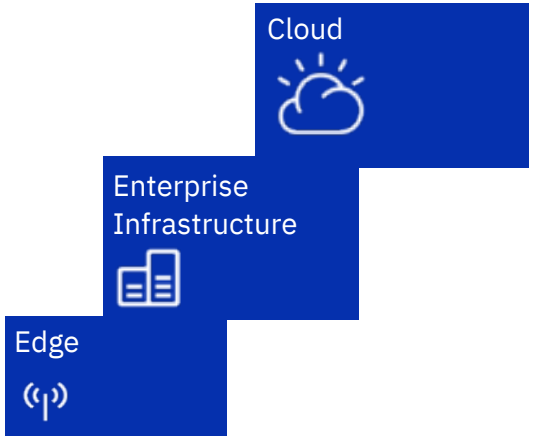
Elasticity

Resource allocation on demand

Adaptive resource allocation responding to business and environmental changes

From EDGE to Cloud

Seamless business model



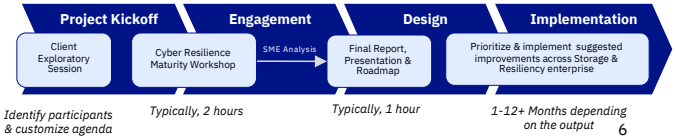
Security

Enable the right identity to have the right access to the right data under the right conditions

Protect against ransomware attack

Fast recovery of cyber attack

Consistent security and risk framework



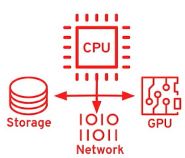
Two architecture problems – the opportunity for DPU/IPU

1. Rich infrastructure services compete with business applications on system resources (CPU/memory/storage)

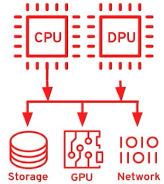
- Infrastructure services such as Hypervisor, Kubernette, SDS, SDN, Security,...etc could take up to 30% + of the overall system resources.
- Composable system need to have the more flexible resource scaling between infrastructure services and business applications

2. There is no HW isolation between infrastructure services and applications.

- Disaggregate computer architecture offer HW security isolation between infrastructure services and applications



Traditional : CPU Centric Architecture

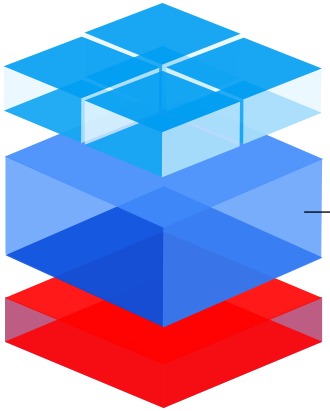


Emerging : Disaggregation of CPU Centric Architecture

We need an open Innovation with an open ecosystem

Example of a successful open eco system

Red Hat Marketplace



Cloud Paks

Red Hat OpenShift

Hybrid cloud platform

aws

Example of IBM adoption of SmartNIC/DPU

IBM Cloud leverages SmartNIC/DPU for IBM cloud to provide secure isolation in multi-tenant environment

IBM Research AI HW partner with Nureality on real time inference accelerator

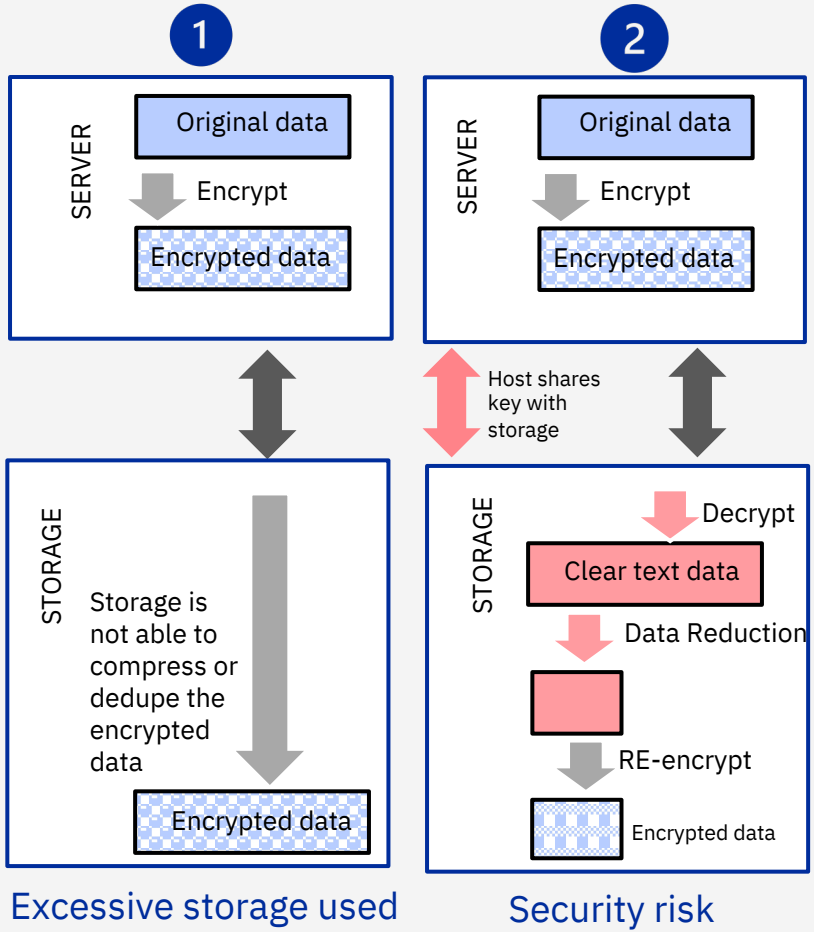
Potential storage use case with DPU/IPU

Data security is one of the top concerns in hybrid clouds and EDGE architecture. Storage-side encryption-of-data-at-rest alone is no longer sufficient.

1. Standard host-side encryption eliminates any possibility of storage-side data reduction

2. Competitors try to get around this problem by sharing the host-side encryption key with the storage which is an unacceptable security exposure.

With DPU/IPU technology, can we create a smart host base encryption also accommodate storage level data reduction?



Thank you

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