Open Programmable Infrastructure (OPI) project aka Project Diamond Bluff

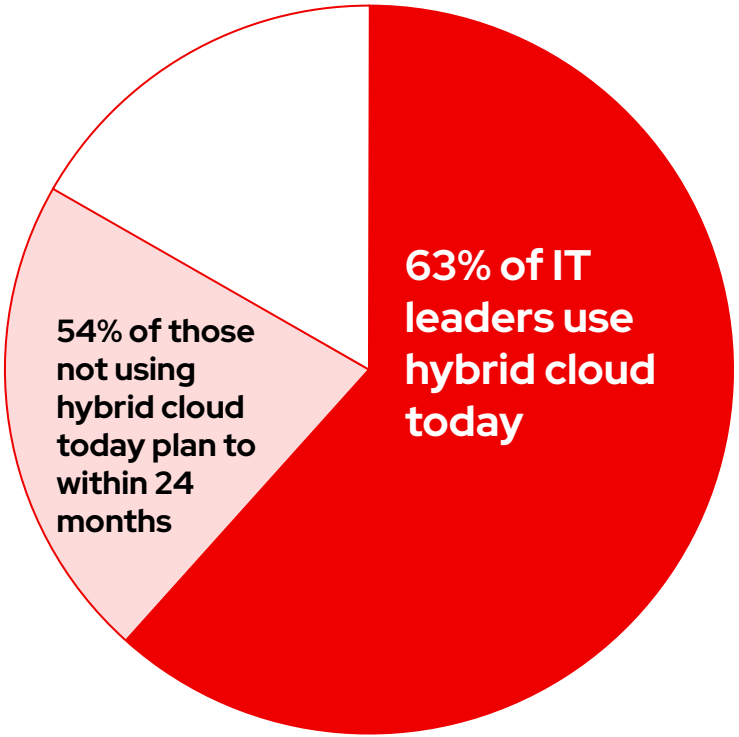
Building an open ecosystem for architectures, APIs, and frameworks based on DPU/IPU technologies

Hybrid Cloud is the Predominant Operational Paradigm

Public cloud

Private cloud

Edge



Virtual

Bare metal

Source: Red Hat, 2020 State of Enterprise Open Source Report.

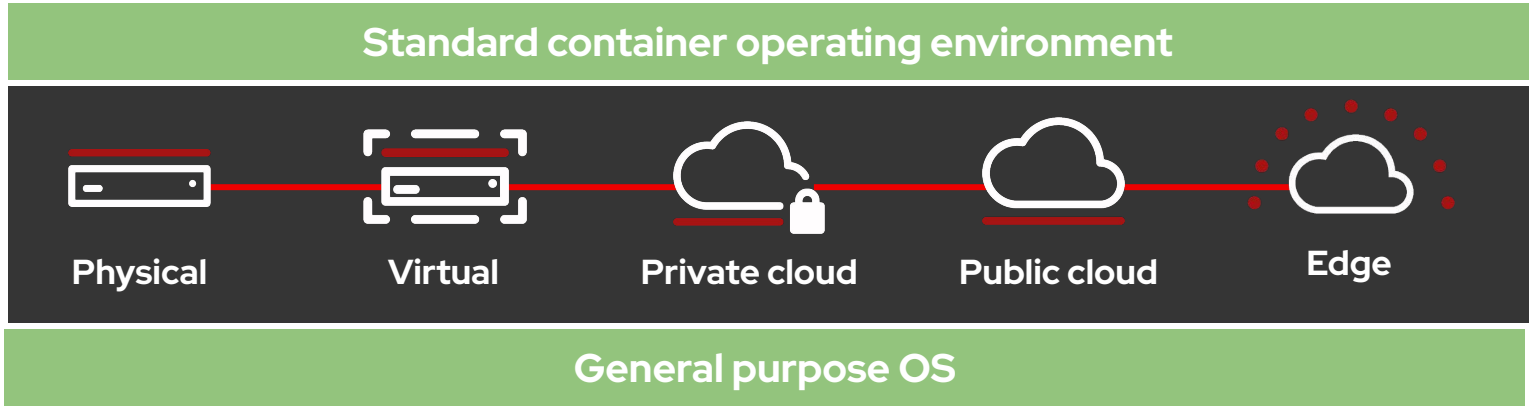
The Hybrid Cloud Data Center

Everything-as-a-Service

Modern apps

Containers and microservices

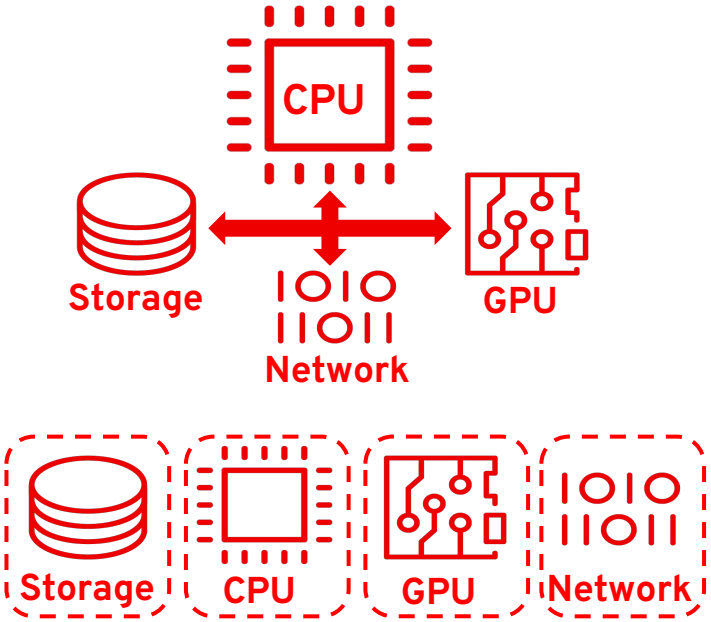
ISVs



Architectural Compartmentalization and Domain-Specific Hardware

- Mismatch of software to hardware abstractions and trust boundaries
- Hypervisors are unable to effectively abstract domain-specific hardware

Disaggregated and Composable System Architecture



Move from CPU-centric architecture to collection of independent devices and SW-defined device functions

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New chapter in modern system architecture

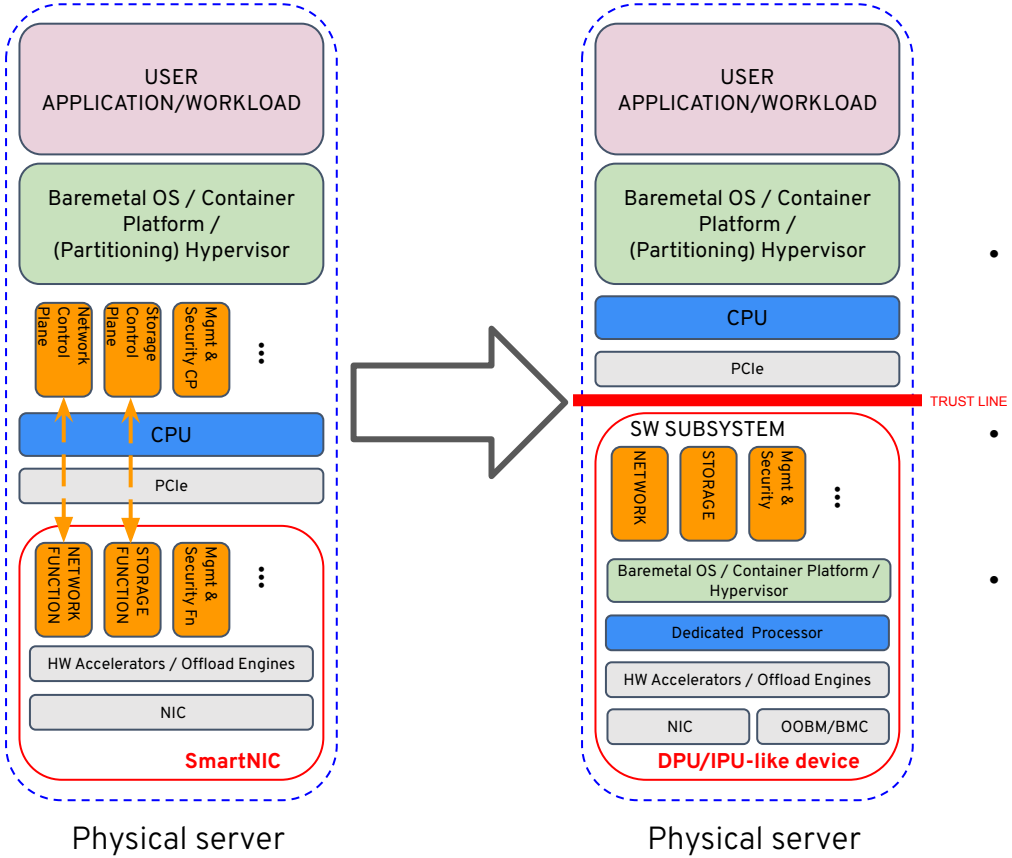
Key characteristics of this new architecture include:

- Presence of their own general purpose processor
- The ability to boot a general purpose OS
- Domain-specific HW acceleration capabilities
- Software-defined device functions that allow the software components deployed to them to define the device's functions that are presented to the host
- Offloading of whole software subsystems, such as the Networking or Storage stack, including their control planes
- Strict security isolation from the host on the hardware-level
- Unique network identity
- Out-of-band management where the Data/Infrastructure Processing Unit (DPU/IPU)-like device is managed separately from the server where it resides or the DPU/IPU-like device can be used to manage the server

Generalized example of a new system architecture

Traditional SmartNIC model

- Computer is CPU + SmartNIC as peripheral that is fully controlled by the CPU
- CPU + domain-specific HW acceleration
- Static device function



DPU/IPU-like model

- NIC & HW accelerators move to DPU/IPU-like device with its own CPU
- Software defined device function
- Computer is an aggregation of independently intelligent subsystems

Project Diamond Bluff - Vision Statement

*The objective of the **Diamond Bluff** project is to foster a **community-driven standards-based open ecosystem** for next generation architectures, APIs, and frameworks **based on DPU/IPU-like technologies**.*

https://github.com/Diamond-Bluff/Diamond-Bluff/blob/main/README.md

Project Goals

- Create community-driven standards-based open ecosystem for DPU/IPU-like technologies
- Create vendor agnostic framework and architecture for DPU/IPU-based software stacks
- Reuse existing or define a set of new common APIs for DPU/IPU-like technologies when required
- Provide implementation examples to validate the architectures/APIs

Structure and Governance

- Current working groups in the project
  - Organizational/Administration
  - Vision Statement/Goals
  - Developer Platform/Proof of Concept/Reference Architectures
  - Minimum Requirements
  - Legal/Governance
  - OPI API and Behavioral Model
  - Events and Outreach
  - Orientation
- Not yet associated with a foundation
- Looking for more contributors that share our goals and vision to join us

Join the Project

Anyone can join and contribute to Project Diamond Bluff

1. **Fill out this form**
   a. You will be invited to our Google Group, invited to the main meeting, and granted access to the shared documents
2. Once you have access, **join the subgroups** you would like to contribute to **here**
3. **Follow the steps** to contribute on GitHub **here**
4. Review the Introduction Materials:
   a. Orientation links
   b. Introduction deck

THANK YOU!