

Applications

MPICH, Open-MPI, etc.

OpenSHMEM, UPC, CAF, X10,
Chapel, etc.

Parsec, OCR, Legions, etc.

Burst buffer, ADIOS, etc.

UCX

UCP (Protocols) - High Level API
Transport selection, cross-transport multi-rail, fragmentation, software protocols for operations that are not supported by hardware

Message Passing API Domain:
tag-matching, rendezvous

PGAS API Domain:
RMAs, Atomics

Task Based API Domain:
Active Message

I/O API Domain:
Stream

UCT (Hardware Transports) - Low Level API
RMA, Atomic, Tag-matching, Send/Recv, Active Message

Transport for InfiniBand VERBs
driver

RC

UD

XRC

DCT

Transport for
Gemini/Aries
drivers

GNI

Transport intra-node host memory communication

SYSV

POSIX

KNEM

CMA

XPMM

Transport for
GPGPU

GPGPU

UCS (Services)
Common utilities

Utilities

Data
Structures

Memory
Management

OFA Verbs Driver

Cray Driver

OS Kernel

ROCm/CUDA

Hardware