Acronyms and Definitions

Version 1.3

Revision History

Revision	Description of Change	Date
v1.0	Initial creation for OpenCPI 1.0	2/2016
v1.1	Reorganized and updated for OpenCPI 1.1	3/2017
v1.2	Updated for OpenCPI Release 1.2	8/2017
v1.3	Updated for OpenCPI Release 1.3	2/2018

Document Conventions

This document uses *italic type* to indicate a keyword that is defined elsewhere, and possibly later, within.

1 Acronyms

ACI *Application* Control Interface

ARM Advanced RISC Machine

AV ANGRYVIPER Team: sometimes used as prefix on ticket numbers within code

AXI Advanced eXtensible Interface

CDK *Component Development Kit*

CPU Central Processing Unit

DSP Digital Signal Processing or Digital Signal Processor

FPGA Field Programmable Gate Array

GPP General Purpose Processor

GPU Graphics Processing Unit

HDL *Hardware Description Language*

OAS OpenCPI *Application Specification*

OCL OpenCL

OCS OpenCPI *Component Specification*

OHAD OpenCPI HDL *Assembly Description*

OpenCL Open Computing Language

OpenCPI Open Component Portability Infrastructure

OPS OpenCPI *Protocol Specification*

OSS Open Source Software

OWD OpenCPI *Worker Description*

PCI Peripheral Component Interconnect

PCIe *PCI*-Express

RCC Resource Constrained C-Language: see *RCC Authoring Model*

RPM RPM Package Manager

VHDL VHSIC Hardware Description Language

VM Virtual Machine

XML eXtensible Markup Language

ZLM *Zero Length Message*

2 Definitions

Adapter Worker
Worker used when two connected workers are not connectable in some way due to different interface choices in the OWD. Adapter workers are normally inserted automatically as needed, *e.g.* between a *worker* that has a 16-bit bus and one with a 32-bit one.

Application
In this context of Component-Based Development, an *application* is a composition or assembly of *components* that, as a whole, perform some useful function. The term "application" can also be an adjective to distinguish functions or code from infrastructure to support the execution of a component-based application, *e.g.* a *device worker* vs. an *application worker*.

Application Specification (OAS)
An XML document that describes the collection of *components* along with their interconnections and configuration properties in an OpenCPI *application*.

Application Worker
Implementation of a function used in an *application*, generally portable and hardware independent.

Argument
See *operation argument*.

Artifact
A file containing executable code for one or more *workers* for a specific *platform*.

Authoring Model
One of several ways of creating *component* implementations in a specific language using a specific API between the component and its execution environment. Existing models include RCC and HDL.

AXI (Advanced eXtensible Interface)
Industry-standard bus used by ARM processors.

Component
Interface "contract" that is specified by a *component specification* and implemented by an *application worker*.

Component Development Kit
Set of tools, scripts, documents, and libraries used for developing *components* and *workers* in *projects*.

Component Library
Collection of *component specifications* and *workers* that can be built, exported, and installed to support *applications*.

Component Specification (OCS)
An XML document that describes both *configuration properties* and zero or more data interfaces (*protocol specifications*) of a *component*, establishing interface requirements for multiple implementations (*workers*) in **any** authoring model.

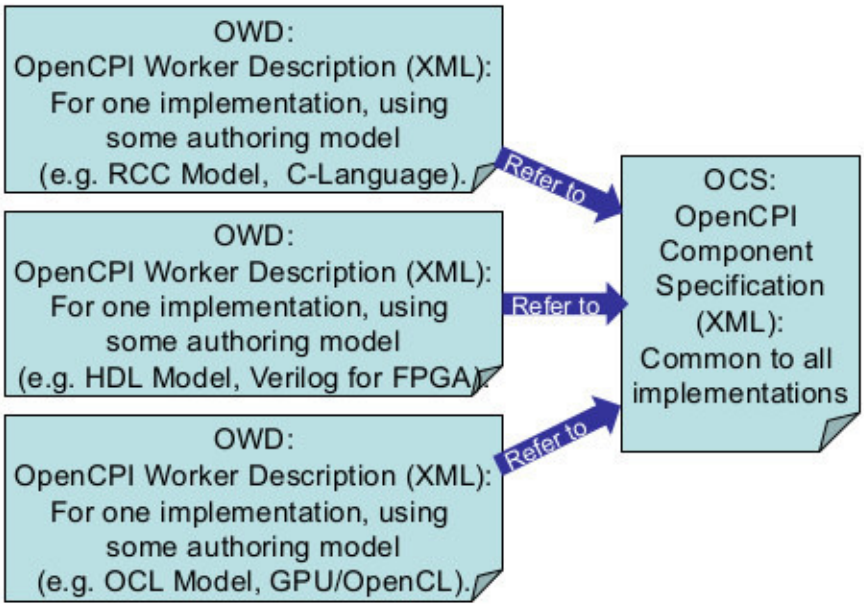

Figure 1: Relationship between *OCS* and *OWD*s

Configuration Properties
Named values of a *worker* that may be read or written by *control software*. Their values indicate or control aspects of the *worker*'s operation. Reading and writing these property values may or may not have side effects on the operation of the *worker*. Configuration properties with side effects can be used for custom worker control. Each *worker* may have its own, possibly unique, set of configuration properties. They may include hardware resources such registers, memory, and state.

Containers
OpenCPI infrastructure element that "contains," manages, and executes a set of application *workers*. Logically, the container "surrounds" the workers, mediating all interactions between the *workers* and the rest of the system.

Control Operations
A fixed set of control operations that every *worker* has. The control aspect is a common control model that allows all workers to be managed without having to customize the management infrastructure software for each worker, while *configuration properties* are used to specialize components.

Control Plane
Control and configuration interfaces for runtime *lifecycle* control and configuration of *worker* instances at runtime.

Control Software (AKA Control Application AKA Control Agent)
The entity that is exercising control using the ACI. Encompasses the various aspects of how *control software*, usually running in a centralized host processing environment, can control *worker* instances at runtime via the *control plane*.

Core
The *project* containing the default *workers* and infrastructure VHDL for the framework to operate.

Data Plane
Data passing interfaces used for *workers* to consume/produce data from/to other workers in the *application* (of whatever *authoring model* in whatever *container*).

Device Proxy
A device proxy is a software *worker* (RCC/C++) that is specifically paired with a *device worker* in order to translate a higher level control interface for a class of devices into the lower level actions required on a specific device.

Device Worker
Special *worker* used for controlling hardware physically attached to an FPGA, *e.g.* a status LED.

Hardware Description Language
Refers to a specialized language used to program the structure design and operation of digital logic circuits. In OpenCPI, it is an *authoring model* using the VHDL language and is targeted at FPGAs. HDL *workers* should be developed according to the *HDL authoring model* and which is described in the "OpenCPI HDL Development Guide."

HDL Assembly
A fixed composition of HDL *workers* that can act as subset of a heterogeneous OpenCPI *application*.

HDL Assembly Description (OHAD)
The XML file that describes an *HDL assembly*.

HDL Authoring Model
The *authoring model* used by the HDL (VHDL-language) *workers*.

Infrastructure
Software/gateware is either *application* or infrastructure.

isim
The HDL simulator that Xilinx provides with their ISE software.

Lifecycle Model
The control states each *worker* may be in and *control operations* which generally change the state a worker is in, effecting a state transition:

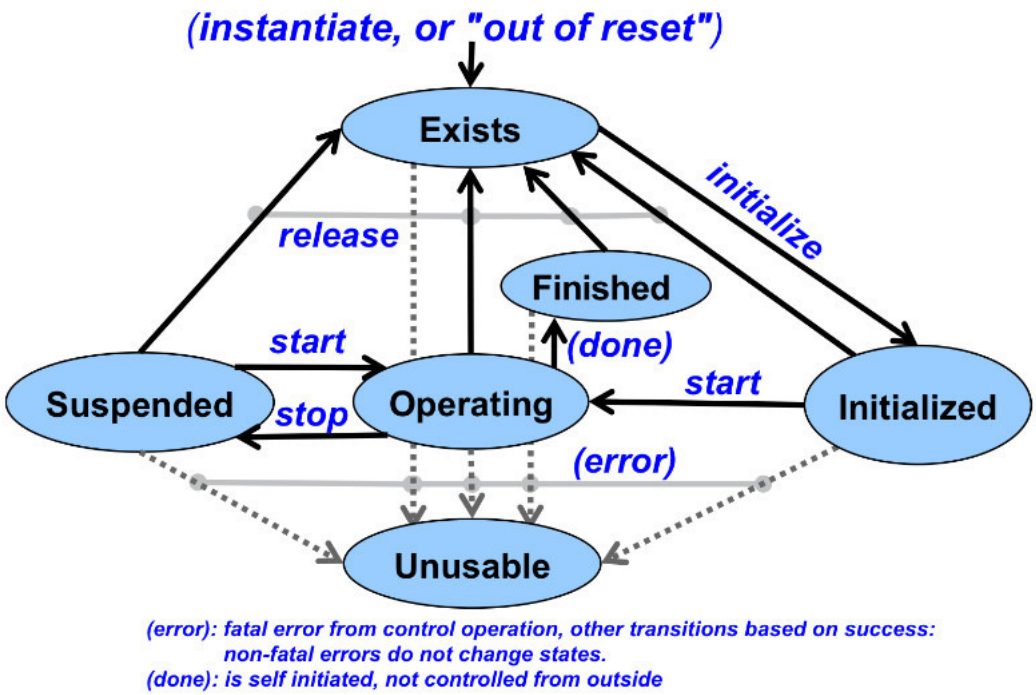

Figure 2: The OpenCPI *lifecycle model* of **all** *workers*

Library
A conceptually-related set of *components* within a single location (often a *project*).

OpCode
See *operation code*.

Operation Argument
Payload data within a *protocol specification* whose type information is determined by the *operation code*.

Operation Code
Message type encapsulating zero or more *operation arguments* within a *protocol specification*.

Parameter
An immutable *configuration property* that is set at build time, allowing software compilers and hardware compilers to optimize accordingly.

PCI (Peripheral Component Interconnect)
Industry-standard local computer bus for attaching hardware devices.

Port Readiness
Indicates a *worker* has data available, input or output, that the *container* needs to act on. Input ports have available buffers when there is message data present that has not yet been consumed by the *worker*. Output ports are ready when buffers are available into which they may place new data.

Platform
A particular type of processing hardware and/or software that can host a *container* for executing OpenCPI *workers*.

Platform Configuration
The XML file that describes a unique configuration of a *platform*.

Platform Worker
A singleton *worker* that bootstraps the *platform* and *container*.

Primitive
HDL assets that are lower level than *workers* and may be used (and reused) as building blocks for HDL *workers*.

Project
Work area in which to develop OpenCPI *components*, *libraries*, *applications*, and other platform- and device-oriented assets.

Project Registry
A directory that contains references to *projects* in a development environment so they can be referenced by any *project* using that same *project registry*.

Property
See *Configuration Properties*.

Protocol Specification (OPS)
One or more XML files that describe the allowable data messages (*operation codes)* and payloads (*operation arguments*) that may flow between the ports of *components*.

Protocol Summary
The set of all summary attributes, whether inferred from the messages specified for the *protocol*, or specified directly as attributes of the protocol. Indicates the basic behavior of a port using a protocol. Can also be present when messages are specified, and can override the attributes inferred from the message specifications.

RCC Authoring Model
Authoring model used by the C or C++ language *workers* that execute on general purposes processors (GPPs). The "Resource Constrained" prefix indicates the limited set of library calls a worker should use; see the "OpenCPI RCC Development Guide" for more information.

Run Condition
When a *worker* has a combination of *port readiness* and/or some amount of time has passed. Determined by the worker's *container*.

Run Method
Non-blocking software method that is executed when a *worker*'s *run condition* is satisfied.

Spec file
Shorthand notation for *component specification* file.

SpecProperty
XML elements that add *worker*-specific attributes to the *configuration properties* already defined in the *component spec*.

Worker
Specific implementation of a *component specification* with the source code written according to an *authoring model*.

Worker Description (OWD)
The XML file describing the *worker* and references the *component spec* it is implementing. See Figure 1.

XML
Standardized markup language that defines a set of rules for encoding documents in a format which is both human- and machine-readable.

XSIM
The HDL simulator that Xilinx provides with their Vivado software.

Zero Length Message
Data payload with no *operation arguments* present when a *protocol specification* allows such an *operation code* with no data fields.