OOI – CyberInfrastructure
Architecture & Design

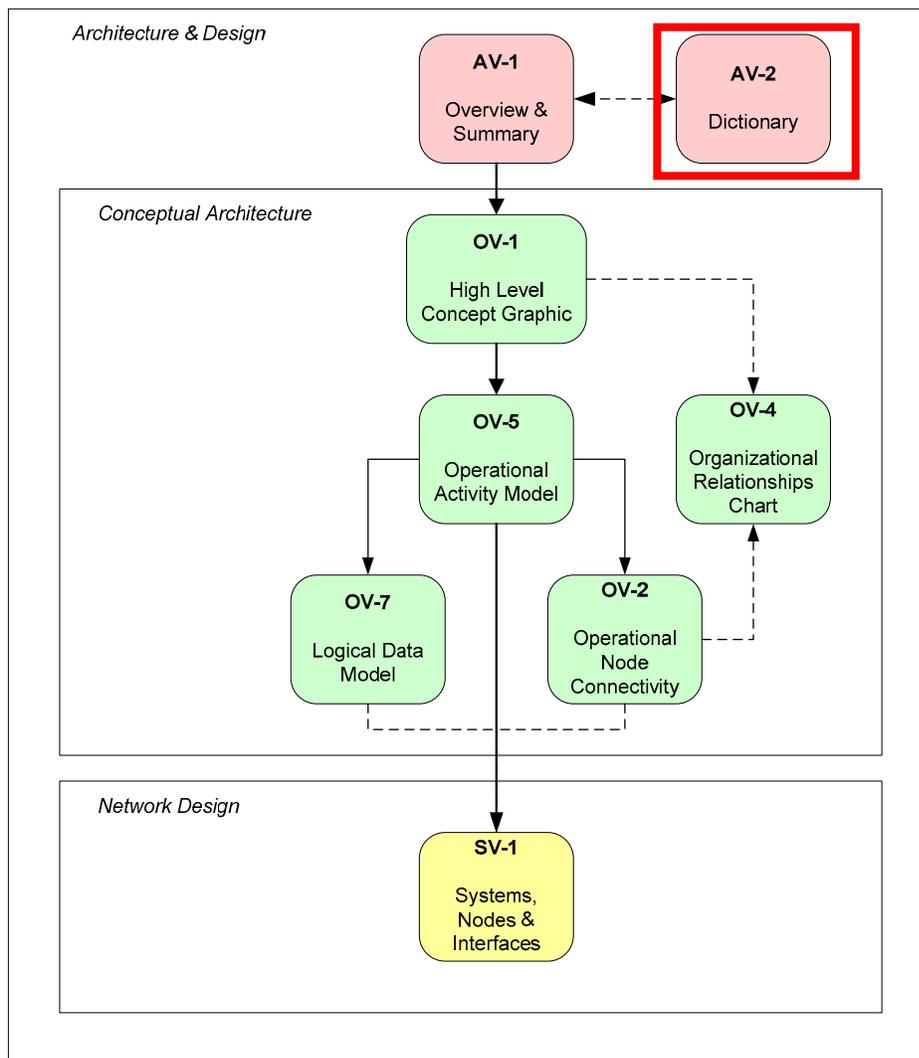## Integrated Dictionary

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Document History

Date	Version	By	Description of Changes
2006.05.30	1.0	Benoît Pirenne John Graybeal	First public release
2007-08-03	2.0	CI ADT	Conceptual Architecture Update Initial Draft. Reframed, added acronym tables, replaced ORION with OOI
2007-08-15	2.1	CI ADT	Addressed review comments
2007-09-20	2.2	CI ADT	Style changes, content update
2007-10-04	2.3	CI ADT	Added the context for some terms

Preamble

The set of documents named AV*, OV*, SV*, TV* are all part of the OOI CyberInfrastructure Architecture & Design (CIAD), in the structure prescribed by the DoDAF (Department of Defense Architecture Framework). Each document has a designated title, an identifier (such as AV-1) and covers a specific topic in a self-contained way. Document AV-1 provides further explanations and a summary. A glossary of the terms used in these documents and their context can be found in AV-2.

The figure below suggests an intuitive reading flow through the provided documents. Other documents will be added to the figure as they emerge during the design of the CI (for the complete set of documents see AV-1). The thick arrow suggests a reading order through the core documents (AV-1, OV-1, OV-5 and SV-1). The red rectangle highlights the current document.

Table of Contents

OOI - CyberInfrastructure
Architecture & Design
Integrated Dictionary (AV-2)

1   Introduction

1.1   Product Overview

The Integrated Dictionary contains definitions of terms used in the given architecture. It consists of textual definitions in the form of a glossary, a repository of architecture data, their taxonomies, and their metadata (i.e., data about architecture data), including metadata for tailored products, associated with the architecture products developed effort (adapted from [DoDAF-vII 2007]).

1.2   Product Purpose and Description

AV-2 enables the set of architecture products to stand alone, allowing them to be read and understood with minimal reference to outside resources. AV-2 is an accompanying reference to other products, and its value lies in unambiguous definitions. The key to long-term interoperability can reside in the accuracy and clarity of these definitions.

AV-2 defines terms used in an architecture, but it is more than a simple glossary. Many architectural products have implicit or explicit information in the form of a glossary, a repository of architecture data, their taxonomies, and their metadata. Each labeled item (e.g., icon, box, or connecting line) in the graphical representation should have a corresponding entry in AV-2. Each item from a textual representation of an architectural product also has a corresponding entry in AV-2 effort (adapted from [DoDAF-vII 2007]).

2   Dictionary

2.1   Entities

This table contains the entity terms, or nouns, used in the architecture.

Noun (Entity)	Context	Description
Action		Something done (a task or activity); used in OV-5 to denote the smaller tasks shown on each Activity Diagrams.
Activity		A task or grouping of tasks that provides a specialized capability, service, or product; OV-5 diagrams the most significant task groupings that are in the resources lifecycle.
Actor	OV4-2.3,2.4,2.5	An entity external to a system that plays a role in (interacts with) that system; can be a human, device, or system component, but is often represented as a stick figure on diagrams. See also the definition of "User".
Actuator		The counterpart of sensor. It responds to commands to carry out some action (e.g., a pump).
Administration		the process of addressing details associated with completing a task or project
Agent		An agent is a program acting on behalf of a person or organiza-

Noun (Entity)	Context	Description
		tion.
Agreement	OV4-2.3	A negotiated, possibly legally binding understanding between parties as to a course of action
Application Program Interface (API)		In computer science, a library of well documented, externally accessible functions, methods or routines to be used by a *software application*.
Architecture		A specification that identifies components and their associated functionality, describes connectivity of components, and describes the mapping of functionality onto components. Architectures can be of different types, e.g., hardware, software, or system, and can be domain-specific.
Architecture Document		a document that describes the scope of the architecture, the characteristics to be captured, and the views and products to be built. The document addresses the build-up requirements for the requisite products.
AV		All Views – a perspective from the DoDAF Methodology Architecture Standard that incorporates all the other views (but at a higher level)
Bandwidth		The transmission capacity of a computer network or other tele-communication system
Calibration		The correlation of the readings of an instrument (sensor) with those of a standard in order to check the sensor's accuracy. Also: the adjustment of experimental results to take external factors into account or to allow comparison with other data. (For this variant, please see: Instrumental signature removal.
Collaboration	OV4-2.4	The action of working with someone to produce or create something.
Community		a set of people who participate in activities leading to a unique goal.
Configuration		The set of parameters that determine how a computer or system operates
Configuration Control		An element of configuration management consisting of the evaluation, coordination, approval or disapproval, and implementation of changes to configuration items after formal establishment of their configuration baseline.
Configuration Management		The technical and administrative direction and actions taken to identify and document the functional and physical characteristics of a configuration item; to control changes to a configuration item and its characteristics; and to record and report change processing and implementation status.
Concept Of Operation		A description of the way a system is used or operates. Addresses the support for the operation of a system and its use by the stake-

Noun (Entity)	Context	Description
		holders
Conceptual Architecture		Decomposition of a system into components and responsibilities, without delving into details of interface specification; should include the architectural style, concepts, mechanisms and principles that will guide the architecture team during the next steps of structuring.
Credential		A piece of information that provides authentication for a claim (typically, asserts the users' identity or *privilege*)
Cyberinfrastructure		the coordinated aggregate of software, hardware and other technologies, as well as human expertise, required to support a project.
Database		A collection of data arranged for ease and speed of search and retrieval.
Data Centre		a site where part or all of the observatory long-term data storage is located, offering retrieval and optionally data processing services.
Data Dictionary		a set of metadata that contains definitions and representations of data elements
Data Discovery Service		A system providing users with information on the location of particular data sets or data products, using a registry of information
Data Flow		Defines the stream of data structures and related characterizations exchanged within the system during a sequence of data processing; the path of data within a data process
Data Management		Principles, processes, and systems for sharing and controlling information resources
Data Product	OV4-2.4	A collection of (1 or more) parameters packaged with associated ancillary and labeling data. Uniformly processed and formatted. Typically uniform temporal and spatial resolution. (Often the collection of data distributed by a data center or subsetted by a data center for distribution.)
Data Sharing		Allows computer users to share and exchange data / reports with other users.
Data Sources		entity that produces data, possible including all antecedent data products and data sources.
Decision Support System		A management and/or analysis system that can assess a given situation and help in making better decisions.
Device		An electronic apparatus that can be connected through peer-to-peer communication and can provide information and data about itself and/or its environment. Device can encompass both sensor and actuator. See also instrument.
Documentation		The list of artifacts used to describe the entities identified and the operations performed on them. Documentation can be embedded or external, static or dynamic, automatically generated or manu-

Noun (Entity)	Context	Description
		ally composed. It can be more or less structured, and can encompass comments and other auxiliary information.
Element		A conceptual component of the cyberinfrastructure.
Encryption		The translation of data into a secret code, unreadable without special knowledge.
Entity		A physical or virtual component of relevance to the *system*; the representation of physical entities in the cyberinfrastructure is called a *resource*
Environmental Consumable		Natural resources or properties such as sound, light, terrain, chemicals, etc. represent those consumables that the observatory sensors will attempt to use. Those consumables may or may not be renewable.
Experiment		The combination of one or more users, tools, and instruments used in concert to (in)validate a scientific hypothesis. An experiment will produce data products and metadata describing it. An experiment can be interactive (requiring the presence of a user to drive it and make decisions to alter its course) or autonomous (pre-programmed).
Extensible Markup Language (Xml)		Is a cross-platform, extensible, and text-based standard for representing data. It is also a key technology in the development of web services.
External Stake-holder	OV4-2.3	An interested party that is not normally a member of the observing system or cyberinfrastructure; often refers to governmental or organizational entities that will benefit from or be affected by outputs of the system
Facility		A collection of functions, capabilities, and/or resources that are provided to users (through allocation or access) through a coherent framework. Typically a facility is run by a single organization, and/or has a single theme.
Firewall		A network security system used to monitor and restrict traffic between two networks.
Format		The structure of something, e.g., a data product or data stream.
Functional Requirements Document		A formal statement of system requirements and capabilities.
Infrastructure		The core components and services of a *system* that make it possible for the system to work; the infrastructure includes both the *physical infrastructure* and the *cyberinfrastructure*
Instrumental Signature Removal		The act of removing artifacts in a data set that are caused by the nature of the measuring instrument, rather than the underlying properties being measured (can include removing non-linearities, read-out and other noises; going from instrumental to physical units); typically produces a higher-level data product.

Noun (Entity)	Context	Description
Instrument Life Cycle		The suite of events that define the life of an instrument from the expression of its mandate (via the requirements); its purchase or fabrication; its test, integration and deployment; its operational life, including maintenance activities; through to its decommissioning and removal.
Junction Box		A device allowing the distribution of power and bandwidth to one or more instruments or other junction boxes. On NEPTUNE junction boxes include nodes, primary and secondary junction boxes.
Implementing Organization	OV4-2.1,2.2	In the framework of the OOI program, the Implementing Organization is the consortium that will be in charge of designing and implementing one of the components (or possibly a subcomponent of one of the components) of the Ocean Observatory initiative: regional scale orbservatory, coastal-global scale observatory, or the common cyberinfrastructure.
Identity Credential		A document or certificate proving somebody's identify or qualification.
Instrument	OV4-2.4,2.5	An electronic device that can, through the use of embedded sensors and/or actuators, acquire physical information about its environment.
Message		A unit of communication between agents.
Metadata		The set of attributes and their value that characterize a particular system, device or data product.
Model	OV4-2.4	A simplified description, especially a mathematical one, of a system or process, to assist calculations or predictions
Network		A physical or virtual link allowing the instantiation of peer-to-peer communication between computing entities in the system.
Node	OV4-2.5	Main junction box where other junction boxes and instruments can be connected; a node is installed alongside a backbone cable at a location of scientific interest.
Party		The broader term for either a person an organization or an agent.
Observatory	OV4-2.4	A collection of resources, processes, activities, and actors associated to perform a common function; OOI will include both *physical observatories* and *virtual observatories*,
Physical Observatory	OV4-2.5	A system composed of a cabled or independent underwater infrastructure; zero, one or more shore stations; and one or more data centres; on OOI, instances of Physical Observatories include the Regional Cabled Observatory, the Global Observatory, and one or more Coastal Observatories.
OOI Cyberinfrastructure (CI)	OV4-2.4,2.5	The ensemble of software that provides capabilities to OOI components to support current and future discoveries in science and engineering; the computing system and components that link the OOI observatories with each other and with external activities and actors. The OOI Cyberinfrastructure must integrate relevant and

Noun (Entity)	Context	Description
		often disparate resources to provide a useful, usable, and enabling framework for research and discovery characterized by broad access and end-to-end coordination; it is one of the three components of OOI (the others being the two physical observatory types) to be created by Implementing Organizations.
OOI System	OV4-2.3	The entire collection of assets, products, and capabilities created and used as part of the OOI project (see http://www.orionproject.org for additional information)
Owner		The party who has rights (consistent with observatory policies) to use, or allow others to use, an entity or resource such as an instrument, product, or service
Peer-To-Peer Communication		the exchange of information between two entities using a communication network following a well-defined protocol that can include authentication, authorization, and privacy
Performance Parameter		A measure of behavior or effectiveness of a system; can be used to guide and control progressive development.
Policy	OV4-2.4	A guiding principle designed to influence decisions, actions, etc. Typically, a policy designates a required process or procedure, or constraint on behavior within an organization; within the cyberinfrastructure, a policy contains the terms of an agreement between a resource provider and a resource user, and is described in a language that makes it computationally enforceable. Any OOI policy that is implemented by the cyberinfrastructure must meet that last criteria.
Power		The electrical voltage and electrical current necessary for a particular device to operate in its environment
Privilege		The necessary authorization requirements that give a user a right to perform a particular role
Process		Designed sequence of operations or events, possibly taking up time, computation power, or other resources, which produces some outcome; may be identified by the changes it creates in the properties of one or more objects under its influence.
Processing Level		A rating given to a data product indicating the level of sophistication of the data set.[1]

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[1] DATA PRODUCT LEVEL. Data levels 1 through 4 as designated in the Product Type and Processing Level Definitions document. Source: SPSO.

Raw Data - Data in their original packets, as received from the observer, unprocessed by EDOS.

Level 0. Raw instrument data at original resolution, time ordered, with duplicate packets removed.

Level 1A. Reconstructed unprocessed instrument data at full resolution, time referenced, and annotated with ancillary information, including radiometric and geometric calibration coefficients and georeferencing parameters (i.e., platform ephemeris) computed and appended, but not applied to Level 0 data.

Level 1B. Radiometrically corrected and geolocated Level 1A data that have been processed to sensor units.

Level 2. Derived geophysical parameters at the same resolution and location as the Level 1 data.

Noun (Entity)	Context	Description
Program Baseline		A document that contains the major cost, schedule, and performance parameters (both objectives and thresholds) for the program.
Program Plan		A program planning document that describes the activities, plans, schedules, and resources necessary to perform the program's strategies, and identifies relevant issues and describes the acquisition, technical and management approach to achieve the program's objectives and goals.
Proprietary Period		The period during which access to data from a particular data source may be restricted by the owner;will not be publicly accessible but rather limited to a given data owner. This exclusive right will have to be relinquished after the said period.
Provisional Credential		Arranged *credential* that is effective only for a period of time, to serve until a permanent version can be obtained
Quality Control		The operational steps performed to enforce quality of a particular product
Quality Assurance		A planned and systematic means for assuring management that defined standards, practices, procedures, and methods of the process have been followed in the performance of a job.
Protocol		A well-defined exchange of tokens (words, packets, ...) allowing two or more peers to communicate.
Recipient		The receiver of information.
Registrar		Operational entity responsible for ingesting and organizing information about *resources*.
Registry	OV4-2.4	An official list, catalog, or register of information, typically about *resources*.
Reliability		The level of performance of a *system* under stated conditions for a stated period of time; also, the ability to maintain that level of performance.
Reporting		Tools and communication mechanisms needed to inform the correct external stakeholder of some event or information
Repository	OV4-2.4	A facility providing indefinitely long storage, preservation, disposition, and distribution of information about *resources*, particularly including data sets and associated metadata.
Requirement		A capability needed by a user to solve a problem or achieve an objective.
Requirement Analysis		The determination of product-specific performance and functional characteristics based on analysis of stakeholder needs, expectations, and constraints; operational concept; projected utilization environments for people, products, and processes; and measures

Level 3. Geophysical parameters that have been spatially and/or temporally re-sampled (i.e., derived from Level 1 or Level 2 data).
Level 4. Model output and/or results of lower level data that are not directly derived by the instruments.

Noun (Entity)	Context	Description
		of effectiveness.
Requirement Document		A *specification* that identifies and defines the system, communications, and other network needs of a program.
Resources	OV4-2.4	A resource is defined by [RFC 2396] to be anything that can have an identifier. Although resources in general can be anything, this architecture is only concerned with those resources that are relevant to services and therefore have some additional characteristics. In particular, they incorporate the concepts of ownership and control: a resource that appears in this architecture is a thing that has a name, may have reasonable representations and which can be said to be owned and used. The ownership of a resource is critically connected with the right to set policy on the resource. Resources are OOI entities that can be used via the cyberinfrastructure; possibly non-renewable consumables to be acquired, such as network, systems, registries, repositories, or services. Resources can be considered in multiple frameworks, and have to be managed. In OOI, any function associated with a resource is presented as a *service*.
Resource Reference		A link, pointer or bookmark that will indicate the location of a resource of interest, without having to copy it.
Role		Function to be fulfilled by a particular user. Roles allow granting specific functionality to a certain user or group of users.
Scientific Instrument		A device used to acquire data for scientific applications; see also *instrument*
Semantic Metadata		Information characterizing the meaning of a computational entity (often a data set)
Sensor		Is a device that will convert a physical phenomenon in an electrical signal, which can in turn be digitized through the use of an analog to digital converter. A sensor is normally housed in an instrument. Data coming from sensors is normally raw and needs to be calibrated. (Note: In some uses, *sensor* is used interchangeably with *instrument*, or includes the functionality described under *instrument.*)
Service	OV4-2.4	An application that provides computational or informational resources on request. A service may be provided by several physical servers operating as a unit.
Service Agreement	OV4-2.3	A service agreement is the legally binding document that describes the service offering to the service user.
Shore Station	OV4-2.5	For cabled observatories, is the system that will provide power to the underwater infrastructure and serve as focal point for the transmission of data and commands. It can also offer processing and data buffering capabilities.
Software Applica-		A computer program that performs the transformation of an input

Noun (Entity)	Context	Description
tion		into an output
Specification		A document that prescribes, in a complete, precise, verifiable manner, the requirements, design, behavior, or characteristics of a system or system component.
Subscription To-ken		Simultaneously a confirmation of a subscription as well as a handle to access the resource subscribed to
Syntactic Meta-data		Information about the data types and structures of an entity, usually a data set or data stream; includes parameters such as data type(s), data item size(s), and number of data items.
System		A collection of interacting components designed to satisfy a set of requirements.
System Administrator		The person who administers / maintains a running computer system, including the contributing computers, networks, and other components.
System Architecture		A representation of a system in which there is a mapping of functionality onto hardware and software components, a mapping of the software architecture onto the hardware architecture, and a description of human interaction with these components.
Systems Engineering		The interdisciplinary approach governing the total technical and managerial effort required to transform a set of stakeholder needs, expectations, and constraints into a product solution and the support for that solution throughout the product's life.
System Policy Definitions		The collection of *policies* that govern the operation of a *system*
Test Procedure		The detailed instructions for the setup, execution, and evaluation of results for a given verification procedure.
Tools		The set of *software applications* available to users for acting on data or on the infrastructure of a *system*
Underwater Infrastructure		Is the set of interconnect scientific instruments including the data and power transport system
User		A user is an agent (human or software) that will consume and optionally act upon the infrastructure. A user belongs to a user class. See also the definition of "Actor".
User Class		Defines the *role* of a user, from which *privileges* of the user can be derived.
User Identity		The collective set of user *credentials* by which a user can be identified or authorized.
Validation		Confirms that the product, as defined, will fulfill its intended use. See also *verification*.
Verification		Confirms that work products properly reflect the requirements specified for them. In other words, verification ensures that "you

Noun (Entity)	Context	Description
		built it right." See also *validation*.
Verification Period		See *proprietary period*
Visualization	OV4-2.4	The depiction of information in a graphical form to aid in its understanding. May include multiple sources or types of information, geographic (2-D), geospatial (3-D), temporal, or geospatio-temporal (4-D) representations of information.
Virtual Observatory		The network of inter-operable Observatories
Web Client		An application which can use HTTP (and related protocols) to receive documents written in HTML (and potentially extended languages) from a web server and present those documens to a user.
Web Server		A networked computer and software that can receive HTTP (and related protocol) requests and return HTML documents.
Work Breakdown Structure (WBS)		A guide of program and acquisition activities for a project.
Work Flow		Sequence of work steps in a complex structure. Work flows can be pre-programmed or static, can have dynamic decision points, or can be composed dynamically.
XML		See Extended Markup Language

2.2 Verbs

The following table contains the verbs used in the various activity diagrams.

Note that most of the activities in the OOI CyberInfrastructure can apply to any OOI *resource*, while a few can apply to physical *entities* as well. The definitions in this table attempt to use the correct term per the table above, but in general the reader should understand that the concept of resource exists within the cyber-infrastructure, and may or may not map to a physical entity.

(For example, when an instrument is deployed at sea, the physical entity is hooked up by a person (or ROV) to an OOI platform. Within the cyber-infrastructure, when we say the instrument has been deployed on the platform, we are considering the instrument and platform to be the OOI resources, which in this case are the virtual representations of the physical instruments. Keeping the virtual representations synchronized with the state of the physical entities is a critical requirement, and challenge, of the OOI system.)

If the definition uses the term 'entity' but not 'physical entity', this means either a physical entity or a resource.

Verbs	Context	Definition
Acquire		obtain the rights to use (an entity or resource); note that the entity itself is not acquired, only the rights to use it
Activate		enable for *use*; begin operating
Announce		notify interested parties of an occurrence, for example the com-

Verbs	Context	Definition
		missioning of a resource
Associate		establish a relationship or connection (or the lack thereof) between two or more entities, in particular OOI resources.
Calibrate		test and/or adjust the accuracy of a measuring instrument or process by comparing its output with a reference.
Clean		removing contaminants, typically sediment and organic matter, from an instrument in order to maintain its sensor accuracy characteristics and prevent it from aging or corroding too rapidly.
Commission		bring an instrument or software process, or other resource, into a state ready for operation; certify readiness for use. For an entity that merely interfaces to OOI, commissioning simply includes verifying the entity appears to meet the interface and documentation standards of the system. For an entity that is managed by OOI, commissioning consists in thoroughly verifying the entity's behavior, performance and and calibration, including its behavior after installation, in accordance with OOI policy. Commissioning is not to be confused with initial lab or integration testing., which does not imply OOI certification; or with activation and use, which may occur repeatedly, as on deployments or missions.
Configure		set up an entity, e.g., for use, testing, or operation. An entity can be configured for normal or specific operating modes; this may happen at any point in the life cycle of the entity, as long as it does not violate OOI policy...
Correlate		establish a relationship or connection (or the lack thereof) between two or more phenomena. For example, in the framework of sensor data, scientists attempt to correlate multiple, apparently unrelated, time series from sensors at the same or different locations.
Deactivate		disable to preclude further use; stop using
Decommission		process an instrument or software process, or other resource, when it is no longer ready for operation (for example, when it is at the end of its physical life or useful existence, or is defective); may result in notifications of the change of status, but will not necessarily preclude all access (since further testing or review of the resource may be necessary)
Deploy		put an entity into a given location, context, or configuration (typically, the final location where it is intended to operate—this is part of the OOI activity *commission*. Deployment may be hierarchical, with entities deployed on other entities (and so on)—this is part of the OOI activities *develop* (as instruments and platforms are built up) or *commission* (as an entity is put into its final operational environment). Deployment may also be repeated, with entities deployed over and over for operation, as a CTD rosette off a ship—this corresponds to the OOI activity called *activate*.
Detect (An Event)		deriving from a stream of information or data the knowledge that

Verbs	Context	Definition
		a condition has been met. Detection may be followed by other automated actions, including notification of interested parties, presentation of relevant information, and controlling the response.
Discover		find an entity, typically in the course of a search
Govern	OV4-2.4	establish use policies, negotiate access rights through the establishment of agreements, enforce policies and rights and finally audit utilization.
Maintain		keep an entity in an operational state; includes the following sub-activities: configure, calibrate, monitor, clean and refurbish.
Manage		administer, maintain, and regulate, as in resources under one's control.
Monitor		observe and check the progress or quality of something over a period of time.
Notify		see *announce*.
Persist		save (a resource) for a period of time for later re-use; (in software development, maintaining an object instance beyond the lifetime of the application that created it so as to be able to re-use it later)
Publish	OV4-2.3	make something generally known; to present something in a format for others to assimilate
React/respond (to an event)		perform a pre-planned action once an *event* has been detected. The response can be a simple warning message sent to the owner of the event detection or a more elaborate process that involves the intervention or mobilization of various actors who will further observe and confirm the detected phenomenon.
Refurbish		bring a device in its nominal state and confirm it as ready for re-deployment in operations.
Register		provide information (about an entity or resource) to a service that is responsible for logging and publishing it
Release		indicate that one is no longer wishes to use an entity or resource (the inverse of *acquire*)
Subscribe		arrange for access to an on-line service; to request direct provision of a particular type of information, for example a particular stream of data
Support		provide assistance to people or systems that require it.
Use	OV4-2.4	employ an entity or resource for some purpose

2.3 Acronyms

2.3.1 Scientific

Acronym	Context	Meaning
AUV		Autonomous Underwater Vehicle

CGSN	OV4-2.2	Coastal Global Scale Node
CLEANER	OV4-2.1	Collaborative Large-scale Engineering Analysis Network for Environmental Research
CODAR		Coastal Radar
DMAC	OV4-2.1	Data Management and Communications (of IOOS)
ECMWF		European Centre for Medium-Range Weather Forecasts
ESONET	AV1-4.3	European Seafloor Observatory Network - http://www.oceanlab.abdn.ac.uk/research/esonet.php
ESMF		Earth System Modeling Framework
GOOS	AV1-6.1, OV4-2.1	Global Ocean Observing System - http://www.ioc-goos.org
GEOSS	AV1-6.1, OV4-2.1	Global Earth Observing System of Systems – http://www.earthobservations.org
GTS		Global Telecommunications Network
GSN		Global Sensor Network
IOOS	AV1-4.3, OV4-2.1	Integrated and Sustained Ocean Observing System
LEAD	OV4-2.1	Linked Environments for Atmospheric Discovery
MARS		Monterey Accelerated Research System
MPI		Message Passing Interface (used in parallel computation)
MURI		Multidisciplinary University Research Initiative
NCAR		National Center for Atmospheric Research
NEON	OV4-2.1	National Ecological Observatory Network - http://www.neoninc.org/
NetCDF		Network Common Data Form
NOAA	OV4-2.1	National Oceanic & Atmospheric Administration
NORIA	AV1-3.1	Network for Ocean Research, Interaction and Application – official name of the UCSD proposal
ONR		Office of Naval Research
PCA		Principal Components Analysis
RCO	Replaced with RSN?	Regional Cabled Observatory
ROMS		Regional Ocean Modeling System
RSN	OV4-2.2	Regional Scale Node
SST		Sea Surface Temperature
THREDDS		Thematic Realtime Environmental Distributed Data Services
WATERS	AV1-2.4	WATer and Environmental Research Systems Network

2.3.2 Organizational

Acronym/ Abbreviation	Context	Meaning
BoG	OV4-2.2	Board of Governors
CA	AV1-3.1	Conceptual Architecture
CAD	AV1-2.1	Conceptual Architecture Design
CADT	AV1-2.1	OOI Conceptual Architecture Design Team - a subcommittee of the OOI CI Committee
CDR		Concept Design Review
CI	AV1-2.1	CyberInfrastructure
CIAD	AV1-2.1	CyberInfrastructure Architecture and Design

CIADT	AV1-2.2	CyberInfrastructure Architecture and Design Team - a subteam of the CI Implementing Organization (CIIO)
CIIO	AV1-2.3	CyberInfrastructure Implementing Organization
COLI	AV1-2.3	Consortium for Ocean Leadership
CONOPS	AV1-3.1	Concepts of Operations
DoD	AV1-9.1	Department of Defense
E&O		Education and Outreach
FDR		Final Design Review
INCOSE	AV1-2.4	International Council on System Engineering
JOI	AV1-2.3, OV4-2.1, 2.2	Joint Oceanographic Institutions - a subdivision of the Consortium for Ocean Leadership (COLI)
OOI	AV1-2.1	Ocean Observatories Initiative
OSC	OV4-2.2	Observatory Steering Committee
PD		Project Definition (Phase)
PDR		Preliminary Design Review
PM	AV1-2.5	Project Manager
QA, QC		Quality Assurance, Quality Control
SA	AV1-2.5	System Architect
SE	AV1-2.5	System Engineer
SoW		Statement of Work
SRD	AV1-3.1	System Requirements Document
SSEP		System and Software Engineering Plan
TRN		Transition (Phase)
UCSD	AV1-2.2	University of California, San Diego
URD	AV1-3.1	User Requirements Document
UW	AV1-4.3	University of Washington
WBS		Work Breakdown Structure
WHOI	AV1-4.3	Woods Hole Oceanographic Institute
Y1		Year 1

2.3.3 Architecture/DoDAF

Acronym/ Abbreviation	Context	Meaning
AV	AV1-9.1	All-View
CADM	AV1-4.1	Core Architecture Data Model
CoI		Community of Interest
DARS		DoD Architecture Registry System
DoDAF	AV1-4.1	Department of Defense Architecture Framework
FEA	AV1-9	Federal Enterprise Architecture
FoS		Families of Systems
GIG		Global Information Grid
NCE		Net-Centric Environment
NCO		Net-Centric Operations
NCW		Net-Centric Warfare
OV	AV1-9.1	Operational View
RUP	AV1-9	Rational Unified Process
SOA	AV1-6.2	Service-Oriented Architecture
SoS		Systems of Systems

SV	AV1-9.1	System and Services View
TV	AV1-9.1	Technical Standards View

3   Introduction to the Diagram Notation

3.1   Introduction to class diagrams

This section of the architecture document uses class diagrams to describe the logical data model of the OOI CI system. To increase clarity, we outline the semantics of the graphical notation that will be used here.

3.1.1   Class

A class picture (Figure 1) represents an entity type of the system; it can be a logical or a physical entity. A class has attributes that specify additional information available. A class does not represent the actual instantiation of the entity but captures the characteristics of all entities of a given type.
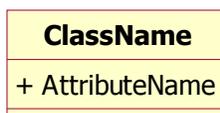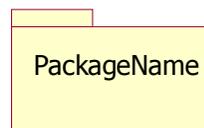

Figure 2 - Class

Figure 2 – Package

3.1.2   Package

A package is a container that organizes elements in the domain model. One package can contain other packages (sub-packages) or entities (Classes, Associations, and Generalizations).
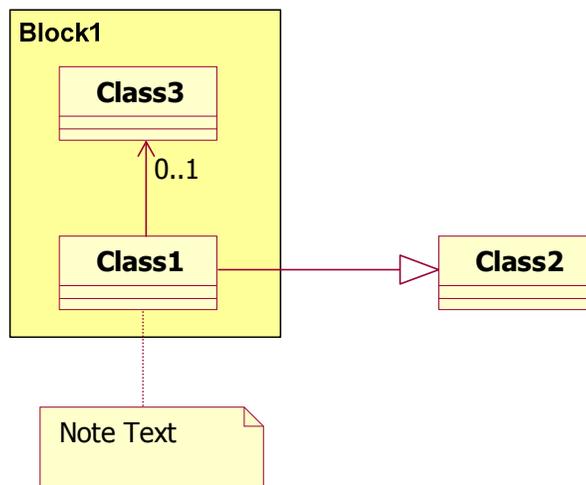
3.1.3   Block

Figure 3 – Block

Blocks (or colored boxes) group entities with similar characteristics. They include a textual description and stress a component view of the system. An entity can be part of various blocks in different views of the system, but an entity is part of only one package.
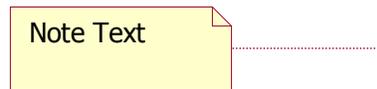
3.1.4 Note

Note Text

Figure 4 – Note

A note is textual information that connects via a dotted line to any element in the diagram. It is used for comments or to better specify relationships and properties not easy to describe otherwise.

3.1.5 Association

Class1   **Class2**   **Class1** ————▶ **Class2**

Figure 5 – Undirected association   **Figure 5 – Directed association**

An association is a solid line between 2 classes. It establishes a relationship between entities. It can be directed or undirected. Associations capture additional information of a data structure that cannot be captured by simple attributes.

In fact, associations can have names (much like attributes) and a multiplicity on both ends of the line (**Error! Reference source not found.**).

Class1 1 *Name* ▶ **Class2** *

Figure 7 – Named directed association with multiplicity

The multiplicity of an association describes the number of instances of the given entity at each end of the line. In Figure 7, for example, exactly one instance of Class1 refers to 0 or more instances of Class2. Possible values of multiplicity are:

- o 1 Exactly one instance is required.
- o 0..1   At most one instance is allowed.
- o 1..*   One or more instances are required.
- o *   An arbitrary number of instances are allowed.

Class1 ◇————▶ **Class2**

Figure 6 – Aggregation association

One particular type of association is the aggregation association (Figure 8). It is a directed association with a white diamond on one side and an arrow on the other. It denotes that the class next to the arrow is part of the class next to the diamond. A similar concept is that of *composition association* (**Error! Refer-**

Class1 ◆————▶ **Class2**

Figure 9 – Composition association

ence source not found.):
In the composition association, one instance of the class can be part of only one composition, while in the aggregation association the same instance can be part of different aggregations.

3.1.6   Generalization

Generalization is a graphical notation used to describe hierarchical types. The meaning of **Error! Reference source not found.**0 is that Class1 is a specialization of Class2. Therefore Class1 has inherited all the relationships and attributes of Class2 and an instance of Class1 can be used where one of Class2 is required.

Figure 7 – Generalization

4   References

[Arrott et al 2007]   M. Arrott, B. Demchak, V. Ermagan, C. Farcas, E. Farcas, I. H. Krüger, and M. Menarini, "Rich Services: The Integration Piece of the SOA Puzzle," in Proceedings of the IEEE International Conference on Web Services (ICWS), Salt Lake City, Utah, USA. Jul. 2007.

[DoDAF-vI 2007]   DoD Architecture Framework v1.5 Volume I: Definitions and Guidelines, Washington, D.C.: Department of Defense, April 2007
http://www.defenselink.mil/cio-nii/docs/DoDAF_Volume_II.pdf

[DoDAF-vII 2007]   DoD Architecture Framework v1.5 Volume II: Product Descriptions, Washington, D.C.: Department of Defense, April 2007
http://www.defenselink.mil/cio-nii/docs/DoDAF_Volume_II.pdf

[DoDAF-vIII 2007]   DoD Architecture Framework v1.5 Volume III: Architecture Data Description, Washington, D.C.: Department of Defense, April 2007
http://www.defenselink.mil/cio-nii/docs/DoDAF_Volume_II.pdf