# R2 CEI Task List

| WBS | Type | Iteration | Task | Description |
|---|---|---|---|---|
| 1.2.3.13 | S | | Common Execution Infrastructure | CEI is responsible for the services to manage the distributed, immediate mode execution of processes. |
| | | | CEI Overarching Inception Period Tasks | Subsystem focused tasks of strategic relevance, not related to designing the services and service components. This includes a vetting and refinement of the subsystem. |
| | IT | R2I1 | Develop workshop and site visit proposals | Provide the description of the meeting, the proposed OOI internal and external attendees, suggested observers, date, location, duration. Rationalize the importance of this meeting. Also, work with others on developing proposals and brainstorming ideas. |
| | IT | R2I1 | Develop prototype proposals (these are the system visible prototypes as well as internal prototypes) | For all prototypes of system level or user level visibility, or prototypes that span multiple subsystems, describe the prototype and steps to realize it, with developers involved, interfaces required, effort planned |
| | IT | R2I1 | Review product description use cases and comment | Read the existing product description use cases for all subsystems and vet them as the official set of R2 scenarios. Suggest changes or raise open issues. If needed suggest removal or addition of use cases in accordance to CI requirements |
| | IT | R2I1 | Refine product description use cases for subsystem. | Author refined use case steps. Vet in subsystem teams and with product team |
| | IT | R2I1 | Review subsystem architecture pages and list the number of issues and missing pages | Read all architecture pages of the subsystem and other general pages relevant to the subsystem. Provide comments wherever appropriate pointing to questions and open issues. Create a list of pages and content missing |
| | IT | R2I1 | Revise high-level service architecture with services for R2 | Author diagrams and revise existing diagrams to reflect R2 services in addition to R1 services. Author or revise textual descriptions for architecture pages. Make sure all existing material is in the architecture specification |
| | IT | R2I1 | Review technology list and add R2 candidates | Reevaluate the official list and add technology entries. Significant new technologies arose in the CEI field, and also we will need to explore new technologies covering the scope of R2. Prepare a list of technologies to be evaluated during R2I2. |
| | IT | R2I1 | Develop external objectives statement presentation | Prepare the deliverable of presenting the subsystem objectives for R2 to non-CI audience |
| | IT | R2I1 | Perform subsystem risk assessment. Review existing risks and add R2 technology risks | Review the existing risks in the risk register as relevant for a subsystem. Suggest new risks and an evaluation of their likelihood and consequence and possible mitigation actions |
| | IT | R2I1 | Preparation for face to face meeting in San Diego | Presentation authoring, material review, travel and attendance for face to face meeting. |
| | IT | R2I1 | Author draft integration description | Prepare the deliverable |
| | IT | R2I1 | Author risk mitigation plan | Prepare the deliverable |
| | IT | R2I1 | Author inception 2 task list | Estimate resources and define tasks. Rank tasks by priority and effort. Assign to resources if known. Get task lists approved by engineering management |
| 1.2.3.13.1.1 | SV | | Elastic Computing Services | Scheduling, provisioning, and monitoring services to maintain a balanced deployment of Operational Units (virtual compute nodes) to available computational resources (servers), considering node failures and changing demand. |

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| | CO | | Elastic computing planner service | Capability to plan elastic computing needs and trigger commands to provisioner and lower level planners. Plan (schedule) operational units based on available physical computation and storage resources and execution policy. Scheduling of resources should be independent of execution environments. In parts based on Nimbus-Condor integration.  in order to dynamically match damand while ensuring basic reliability and quality properties |
| 1.2.3.13.1.2 | SV | | Execution Engine Catalog & Repository Services | Maintains references to registered execution sites and Virtual Compute Node configuration packages. |
| | CO | | Deployable unit generation service | Generate a deployable unit that is adapted to a specific execution site. Capability for an automatic deployment pipeline. Retrieves packages and components required for the generation of a deployable unit from a package service. |
| | CO | | Execution engine resource model | The data model as resources and associations for execution engines and related resources |
| | CO | | Execution engine management service | Capability to register and manage execution engines. Define the service provider interface of execution engines in general. Examples of execution engines include the different capability containers, an SQL stream processing engine, Grails etc. |
| 1.2.3.13.1.3 | SV | | Resource Management Services | Establishes standard models for the operational management (monitor & control) of stateful and taskable resources. |
| | CO | | Taskable resource model | The data model as resources and associations for taskable resources: stateful resources with behavior. Define metadata model, life cycle model |
| | CO | | Taskable resource registry service | A resource registry for taskable resources resources, based on the generic resource registry framework. Special types of takable resources are EPUs, Operational Units, Agents, Processes, Services. Provide the common service framework to describe and manage them through agents. |
| | CO | | Taskable resource management services | Services accessible with a messaging interface for the management of generic taskable resource. This includes:<br>(1) Planner: Accept requests for need of generic taskable resources and plan (schedule) their provisioning according to policy. Planning leads to resource provisioning and control commands.<br>(2) Controller: Control and monitor taskable resources. Control is provided form of relaying commands to a resource via its agent. Commands originate from users or from another resource. Monitor the resource and react to abnormal conditions.<br>(3) Generic Provisioner: Provision new generic taskable resources on request. At the resource end, this includes some resource specific form of contextualization and configuration. Retire and remove taskable resources on request and when no longer needed. Provide a taskable resource factory. Define a flexible service that can support specific adapters for selected resource environments and execution sites.<br>(4) Fault Monitor/Compensator: Observes resource conditions coming directly from the resource (agent) and detects abnormal situations. Reacts by issuing commands to the resource controller for failure compentation. |

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| | CO | | Service level agreement management service | Manage SLAs for generic taskable resources. In the case of CEI taskable resources, this includes (IaaS, meta-level, etc.) – schema/contract/commitment. Dependent on COI Governance framework and negotiation between agents |
| | CO | | Resource agent | Develop template for resource agents based on COI agents. These agents manage taskable resources and should be able to control, monitor, represent and govern the resources in general, and for specific resources. Generalize work done by IPA team |
| | CO | | Taskable resource integration | Integrate with other subsystem teams on the management of specific subclasses of taskable resources. This includes initially:<br>(1) Marine observatory resources: Collaborate with the IPAA and S&A teams about instruments and platforms, which are special kinds of taskable resources, fronted by resource agents. These agents represent taskable resources in the marine observatories, which will be managed with CEI resource management services.<br>(2) Services: Collaboration with the COI team on the management of services and bringing them though their life cycle.<br>(3) Data management and storage resources: Collaborate with the DM and EOI teams about taskable resources around data management and their uniform management and their specializations. This does not include information resources, but other taskable resources, such as external data sources, storage sites, archive providers etc. |
| | CO | | System Operations and Monitoring | Provide the operator interfaces and capabilities to operate and monitor the system. This includes user interfaces, network monitoring and state of health monitoring integration, system statistics, troubleshooting. |
| 1.2.3.13.2.1 | SV | | Process Management Services | Provides the validation, scheduling, and management services for policy-based process execution at specified execution sites. The service supports the coupling of the dynamic data distribution service with the process and its triggering. Provenance and citation annotation are registered associating the input and output products with the execution process and its operating context. |
| | CO | | EPU as a service | Capability to request, instantiate, configure and control EPUs on demand, for instance for user processes such as instrument agents, data transformations, visualizations. This extends EPUs from supporting services to supporting processes |
| | CO | | Process scheduling services | Services to manage the scheduling of processes on virtual compute nodes. Includes the requirement to notify the initiating actor of estimated turnaround and incorporate initiating actor constraints on execution resource type into the scheduling process. |
| | CO | | Process I/O services | Services to manage the input and output of data from executing processes. Uses the DM distribution pubsub services. |

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| | CO | | Process contextualization services | Services to support the contextualization of deployable units in registered execution environments. Contextualization sets the basic parameters for an instantiated process, such as network and IP address, so that it can play its part in a network of processes. Includes the requirement to adapt the process instance to the available resources provided by the execution environment, such as memory, computing power, storage etc. |
| | CO | | Process execution services | Services to manage the execution of deployable units in registered execution environments. |
| | CO | | Process management UI components | Screens and plug-ins to the Web UI and application integration services related to process scheduling and execution. |
| 1.2.3.13.2.2 | SV | | Process Catalog & Repository Services | Maintains process itineraries and references to registered process engine configurations and execution sites. Processes include system processes (services, agents, data processing processes) and user provided processes (data transformations, visualizations, workflows). Processes can be scheduled either continuos, recurring or on demand. |
| | CO | | Process resource model | The data model as resources and associations for processes and related resources, such as process definitions, schedules, input/input connectors, configuration, parameterization. |
| | CO | | Process registry services | Processes to support the registration, cataloging, and discovery of process definitions and service component packages and virtual machine images. This includes their configuration and dependencies on other packages and the OOI network. |
| | CO | | Process definition repository | Processes to support the persistence and retrieval of process definitions and service component packages and virtual machine images |
| | CO | | Source code representation services | Services to manage source code representations of service component packages. Includes the requirement for source code versioning and the conversion of source code into service component packages. |
| | CO | | Deployable unit services | Services to manage the conversion of configurations of service component packages into execution environment-specific deployable units. |
| | CO | | Process catalog and repository UI components | Screens and plug-ins to the Web UI and application integration services related to process registration, definition. |
| 1.2.3.13.2.3 | SV | | Integration with the National Computing Infrastructure | Provide the capability to deploy OOI processing, both data stream and ocean models on to the nation computing infrastructure, in particular the focus is on the Open Science Grid and the Teragrid (and/or its logical successor) |
| | CO | | Integration with Amazon cloud | Provide the capability to deploy OOI processing, both data stream and ocean models, on Amazon's cloud services. |