



OGSA® Basic Execution Service Version 1.0

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Outline

- Basic Execution Service
- Activity Lifetime/States
- Attributes
- Extensions
- Implementations

Basic Execution Service

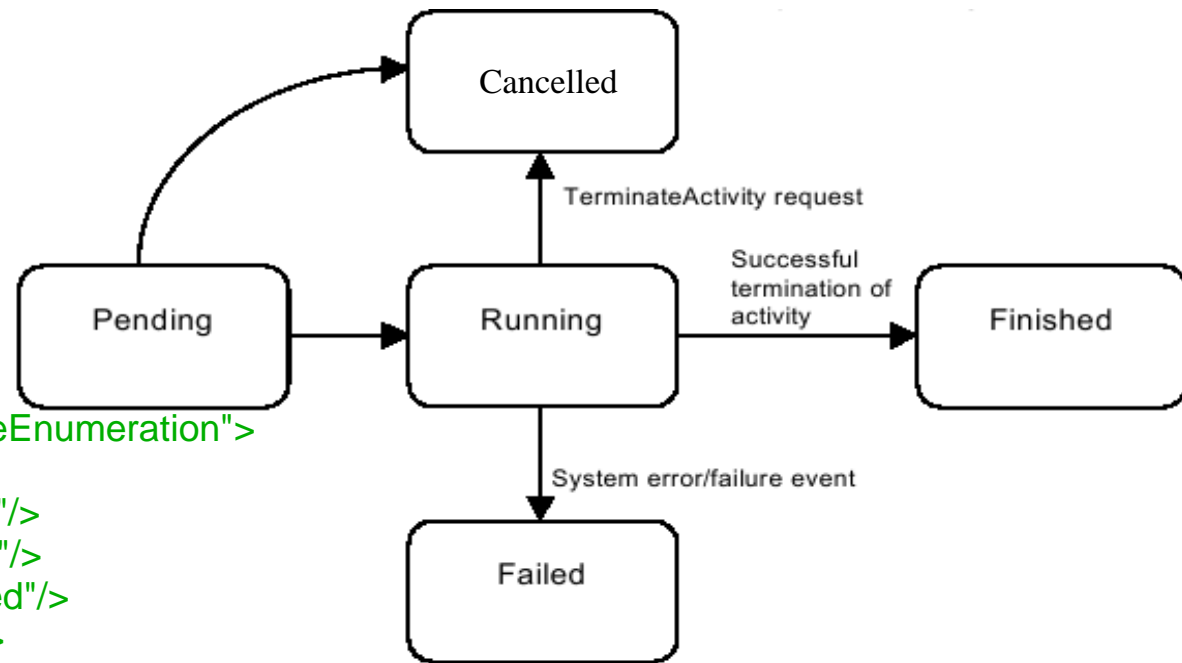
- Defined in GFD.108 OGF document
- Current status - Recommendation
- *“Basic Execution Service (BES) specification defines Web Services interfaces for creating, monitoring, and controlling computational entities such as UNIX or Windows processes, Web Services, or parallel programs - what we call activities - within a defined environment.”*
 - Activity is abstract entity described in XML document using Job Submission Description Language (JSDL)

BES Operations

- All operations are split into two groups
 - *BES-Management Port-type* – manages service itself
 - *StopAcceptingNewActivities* - stop accepting new activities
 - *StartAcceptingNewActivities* - start accepting new activities
 - *BES-Factory Port-type* – manages activities
 - *CreateActivity* - create a new activity
 - *GetActivityStatuses* - request the status of the activities
 - *TerminateActivities* - stop the activities
 - *GetActivityDocuments* - request JSDL documents of activities
 - *GetFactoryAttributesDocument* - request XML document describing BES service properties

Activity Lifetime/States

- Each Activity is created with Create Activity operation and goes through set of predefined States
- The BES defines basic States and Transitions

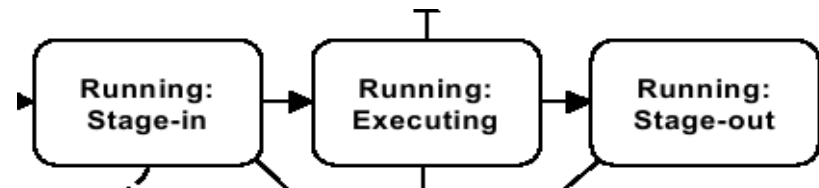
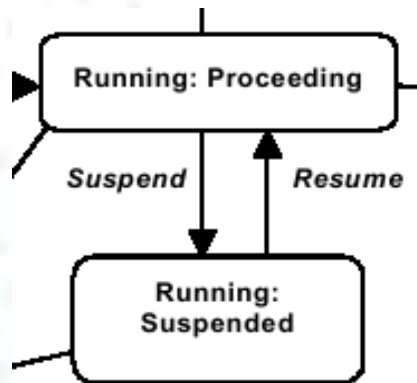


```

<xsd:simpleType name="ActivityStateEnumeration">
  <xsd:restriction base="xsd:string">
    <xsd:enumeration value="Pending"/>
    <xsd:enumeration value="Running"/>
    <xsd:enumeration value="Cancelled"/>
    <xsd:enumeration value="Failed"/>
    <xsd:enumeration value="Finished"/>
  </xsd:restriction>
</xsd:simpleType>
  
```

Activity Lifetime/States (cont.)

- The BES defines only basic States
 - Each State can be specialized by splitting it into implementation specific sub-states
 - New Transitions between basic States are not allowed for compatibility between different implementations



```
<bes:ActivityStatus state="Running">
  <n00:Stage-In/>
</bes:ActivityStatus>
```

Attributes

- The BES defines set of Attributes describing Service
- The Attributes are obtainable through *GetFactoryAttributesDocument* operation
- Attributes provide simplistic description of Resource exposed through BES
 - `IsAcceptingNewActivities` - if BES is accepting new activities
 - `CommonName` - Short human-readable name
 - `LongDescription` - Longer human-readable description
 - `TotalNumberOfActivities` - Number of activities currently managed
 - `ActivityReference` - Identifiers of activities currently active

Attributes (cont.)

- TotalNumberOfContainedResources - Number of contained resources
- ContainedResource - Description of contained resources
- NamingProfile - URIs of Naming profiles
- BESExtension - URIs of supported extensions
- LocalResourceManagerType - Resource manager type
- ResourceName - Resource name
- OperatingSystem - Resource operating system
- CPUArchitecture - Resource CPU type
- CPUCount - Resource CPU count
- CPUSpeed - Resource CPU speed, in Hertz
- PhysicalMemory - Resource physical memory, in bytes
- VirtualMemory - Resource virtual memory, in bytes

Extensions

- The BES is extensible
 - Communication schemas allow for additional elements to be inserted almost anywhere
 - Additional elements are defined through extensions supported by particular implementations
 - Supported extensions are announced in *BESExtension* attribute of service
- The BES specifications define 3 optional extensions
 - *Idempotent Execution Semantics* – uniquely identifies Activity
 - *Subscription to Notification Events* for Activity state changes
 - *Lifetime Management* defines termination time of Activity

Extensions (cont.)

- Third party extensions
 - HPC Basic Profile
 - Basic Filter – to limit amount of information provided by *GetFactoryAttributesDocument* operation
 - Implementation specific extensions
 - Every project/middleware adopting BES has own notion about what Execution Service is
 - Differences are implemented through extensions

Implementations

- ***Unicore***
- ***KnowARC*** – A-Rex
- ***gLite*** – CREAM BES
- ***GridSAM/OMII-UK***
- ***Globus Toolkit*** – GRAM4
- ***Platform Computing*** – BES++
- *Probably some other implementations*

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