June 22, 2004

Agenda
GGF11 Report
Document Status
XML XML XML
Next Meeting Schedule (1300 GMT, Tuesday)

Attendees
Fred B
Darren P
Ali A
Andreas Savva
Steve M
Donal F

Action List-
o GGF11 Meeting Notes (Ali)
o Steve to get the new XSD and XML to Fred to be put up on gridforge.
o HostType to HostGroup needs to be changed in the XML and the document (Andreas, Steve)
o Team to come up with XML examples that will match the XSD and how it would map to the underlying Scheduler.
o Chris to come up with Use Cases and idea for process topology.
o Preference Mechanism needs to be defined. (Look at the WS-Agreement mechanisms)
o OWL needs to be looked at for ideas. (Ali to present to the group in 1 week)

Document Status
o Andreas owns the document right now. 6/24
o Fred then gets it. 6/29
o Darren to have tech writer clean it up. 7/13
o Posted on the list for review. 7/13

[Text Slide A]

A Sharing Slide

[Share B]

XML Example

```
<?xml version="1.0" encoding="UTF-8"?>
<jsdl:job xmlns:jsdl="http://www.gridforum.org/JSDL"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      xsi:schemaLocation=
            "http://www.gridforum.org/JSDL
            jsdl.xsd">
  <jsdl:JobIdentification>
    <jsdl:JobName>MyFirstJob</jsdl:JobName>
    <jsdl:JobAnnotation>This is the first job ever submitted through JSDL</jsdl:JobAnnotation>
    <jsdl:JobAnnotation>This job won't really do anything</jsdl:JobAnnotation>
    <jsdl:ExecutionUserID>
      <jsdl:User name="steve" group="myGroup" />
    </jsdl:ExecutionUserID>
    <jsdl:JobProjectName>WritingTheSpecProject</jsdl:JobProjectName>
    <jsdl:JobCategory>writingJob</jsdl:JobCategory>
    <jsdl:Extend name="PBSQueueName">myQueue</jsdl:Extend>
  </jsdl:JobIdentification>

  <jsdl:Resource>
    <!-- The following describes the general architecture that should be used -->
    <!-- for all resources in the job. Ie all boxes will fall within these    -->
    <!-- requirements.                                                        -->
    <!-- Unless the job is complex (eg MPI) then this is all that is needed   -->
    <jsdl:Architecture>
      <!-- Only use intel and spark processors for this job                  -->
      <jsdl:CPUDescription>itel8086</jsdl:CPUDescription>
      <jsdl:CPUDescription>spark</jsdl:CPUDescription>
      <!-- Each box used must have at least 1 processor                      -->
      <jsdl:CPUCount>1</jsdl:CPUCount>
      <!-- All boxes must run at at least 8Mhz                               -->
      <jsdl:CPUSpeed>8Mhz</jsdl:CPUSpeed>
      <!-- Each box must have at least 1024 Mb of memory                     -->
     <jsdl:PhysicalMemory>1024Mb</jsdl:PhysicalMemory>
     <!-- See usage record for units                                        -->
    </jsdl:Architecture>
```

```
   <!-- Describing a hosttype we can refer to later                    -->
   <jsdl:HostType name="foo" description="This host type can be used for our job">

     <!-- Some examples of the resources that match this host type. We do not-->
     <!-- limit the system to only use these resources - but they are       -->
     <!-- probably a good starting point.                                   -->
     <jsdl:HostName>mybox.ggf.org</jsdl:HostName>
     <jsdl:HostName>secondbox.ggf.org</jsdl:HostName>
     <jsdl:HostName>resourcePool1</jsdl:HostName>
    <jsdl:Architecture>
       <!-- Hosts in this type are more narrowly specified                -->
      <jsdl:CPUDescription>intel8486</jsdl:CPUDescription>
      <jsdl:CPUCount>2</jsdl:CPUCount>
      <jsdl:CPUSpeed>1024Mhz</jsdl:CPUSpeed>
      <jsdl:PhysicalMemory>1024Mb</jsdl:PhysicalMemory>
    </jsdl:Architecture>
    <jsdl:Network>
       <!-- Boxes of this type must have fast ethernet cards              -->
      <jsdl:NetworkDescription>FastEthernet</jsdl:NetworkDescription>
       <!-- and at least two cards per box                                -->
      <jsdl:NetworkCount>2</jsdl:NetworkCount>
       <!-- Capable of supporting 100MB transfers                         -->
      <jsdl:NetworkBandwidth>100MB</jsdl:NetworkBandwidth>
    </jsdl:Network>

     <!-- Provide a file space called scratch which can store at least     -->
     <!-- 4096Mb of data                                                   -->
    <jsdl:FileSystem name="scratch" size="4096Mb"/>
     <!-- Have (or be able to have" the following filesystem mounted       -->
    <jsdl:FileSystem name="myBrainDump"
size="10GB">nfs:hostname:/export/vol01</jsdl:FileSystem>
     <!-- Have temp space of 200KB of data                                 -->
    <jsdl:TempSpace>200KB</jsdl:TempSpace>
     <!-- Have 100GB of swap space                                         -->
    <jsdl:SwapSpace>100GB</jsdl:SwapSpace>
     <!-- Our job requires exclusive use of these nodes?                   -->
```

```
    <jsdl:ExclusiveExecution>true</jsdl:ExclusiveExecution>
   </jsdl:HostType>

   <!-- Process topology - we need to define this some people may like to   -->
   <!-- try writing some examples based on their needs here.               -->
   <jsdl:ProcessTopology>?????</jsdl:ProcessTopology>
  </jsdl:Resource>

  <!-- Set up environmental variables                                      -->
 <jsdl:Environment>
   <!-- These variables apply to all boxes used                            -->
  <jsdl:EnvironmentVariable name="TASKID">Some Value</jsdl:EnvironmentVariable>
  <jsdl:EnvironmentVariable name="PROBLEMSIZE">1000</jsdl:EnvironmentVariable>

   <!-- These variables only apply to boxes used from the hostype foo       -->
   <!-- they override all box environment variables                         -->
  <jsdl:HostSpecificEnvironment name="foo">
  <jsdl:EnvironmentVariable name="PROBLEMSIZE">1001</jsdl:EnvironmentVariable>
  <jsdl:EnvironmentVariable name="CORRECTION">-1</jsdl:EnvironmentVariable>
  </jsdl:HostSpecificEnvironment>
 </jsdl:Environment>

  <jsdl:SoftwareRequirements>
   <jsdl:OperatingSystem>
    <jsdl:OperatingSystemDescription>Windows2000</jsdl:OperatingSystemDescription>
    <jsdl:OperatingSystemVersion>2000</jsdl:OperatingSystemVersion>
   </jsdl:OperatingSystem>
   <jsdl:OperatingSystem>
    <jsdl:OperatingSystemDescription>Linux</jsdl:OperatingSystemDescription>
    <jsdl:OperatingSystemVersion>RedHat7.2</jsdl:OperatingSystemVersion>
   </jsdl:OperatingSystem>
   <jsdl:Limits>
    <jsdl:ProcessVirtualMemoryLimit>1Gb</jsdl:ProcessVirtualMemoryLimit>
    <jsdl:VirtualMemoryLimit>1Gb</jsdl:VirtualMemoryLimit>
    <jsdl:DataSegmentSizeLimit>10Gb</jsdl:DataSegmentSizeLimit>
    <jsdl:CoreDumpSizeLimit>0</jsdl:CoreDumpSizeLimit>
    <jsdl:CPUTimeLimit>10Hours</jsdl:CPUTimeLimit>
```

```
    <jsdl:WallTimeLimit>24Hours</jsdl:WallTimeLimit>
   </jsdl:Limits>
   <jsdl:Queue>myQueue</jsdl:Queue>
   <jsdl:Queue>anotherQueue</jsdl:Queue>
  </jsdl:SoftwareRequirements>

  <jsdl:Application>
   <jsdl:ExecutableDescription>Run the vi command</jsdl:ExecutableDescription>
   <jsdl:ExecutableName type="bash">vi</jsdl:ExecutableName>
   <jsdl:Argument>-noX</jsdl:Argument>
   <jsdl:Argument>myFile.txt</jsdl:Argument>
   <jsdl:StdIn>myin.txt</jsdl:StdIn>
   <jsdl:StdOut>myOut.txt</jsdl:StdOut>
   <jsdl:StdErr>myErr.txt</jsdl:StdErr>
   <jsdl:WorkingDirectory>myBrainDump</jsdl:WorkingDirectory>
   <jsdl:Log>processLog.txt</jsdl:Log>
  </jsdl:Application>

 <jsdl:DataAttributes>
   <jsdl:File>
    <jsdl:FileName>myFirstFile.txt</jsdl:FileName>
    <jsdl:FileSystemName>myBrainDump</jsdl:FileSystemName>
     <jsdl:Source>http://www.ggf.org/myFirstFile.txt</jsdl:Source>
     <jsdl:CreationFlag>overwrite</jsdl:CreationFlag>
   </jsdl:File>
   <jsdl:File>
     <jsdl:FileName>mySecondFile.data</jsdl:FileName>
    <jsdl:FileSystemName>myBrainDump</jsdl:FileSystemName>
     <jsdl:Target>gsiftp::box.ggf.org/homes/ggf/mySecondFile.data</jsdl:Target>
     <jsdl:CreationFlag>append</jsdl:CreationFlag>
   </jsdl:File>
   <jsdl:File>
     <jsdl:FileName>StageThrough.data</jsdl:FileName>
    <jsdl:FileSystemName>scratch</jsdl:FileSystemName>
     <jsdl:Source>ftp://ftp.ggf.org/largeData/input.dat</jsdl:Source>
     <jsdl:Source>ftp://ftp.slowbox.org/largeDataBackup/record.data</jsdl:Source>
     <jsdl:Target>gsiftp::box.ggf.org/homes/ggf/result.data</jsdl:Target>
```

```
      <jsdl:CreationFlag>overwrite</jsdl:CreationFlag>
    </jsdl:File>
 </jsdl:DataAttributes>
</jsdl:job>
```

[Text Slide B]

XSD Example

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema"
      targetNamespace="http://www.gridforum.org/JSDL"
              xmlns="http://www.gridforum.org/JSDL"
   elementFormDefault="qualified">

<!--================================================================-->
<!-- The Extends mechanism - rough copy                             -->
<!--================================================================-->

  <xsd:element name="Extend">
    <xsd:complexType>
      <xsd:simpleContent>
        <xsd:extension base="xsd:string">
          <xsd:attribute name="name" type="xsd:string" />
        </xsd:extension>
      </xsd:simpleContent>
    </xsd:complexType>
  </xsd:element>

<!--================================================================-->
<!-- The core document -->
<!-- In this section we define the main Sections and the way to extend   -->
<!-- this. -->
<!--================================================================-->

  <xsd:element name="job">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element ref="JobIdentification"
            minOccurs="0" maxOccurs="1" />
        <xsd:element ref="Resource"
            minOccurs="0" maxOccurs="1" />
        <xsd:element ref="Environment"
            minOccurs="0" maxOccurs="1" />
```

```
      <xsd:element ref="SoftwareRequirements"
          minOccurs="0" maxOccurs="1" />
      <xsd:element ref="Application"
          minOccurs="0" maxOccurs="1" />
      <xsd:element ref="DataAttributes"
          minOccurs="0" maxOccurs="1" />
    </xsd:sequence>
  </xsd:complexType>
 </xsd:element>

<!--================================================================================-->

 <xsd:element name="Application">
  <xsd:complexType>
   <xsd:sequence>
    <xsd:element name="ExecutableDescription" type="xsd:string"
     minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="ExecutableName"
     minOccurs="0" maxOccurs="1"/>
    <xsd:element name="Argument" type="xsd:string"
     minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element name="StdIn" type="xsd:string"
     minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element name="StdOut" type="xsd:string"
     minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element name="StdErr" type="xsd:string"
     minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element name="WorkingDirectory" type="xsd:string"
     minOccurs="0" maxOccurs="1"/>
    <xsd:element name="Log" type="xsd:string"
     minOccurs="0" maxOccurs="unbounded"/>
   </xsd:sequence>
  </xsd:complexType>
 </xsd:element>

 <xsd:element name="ExecutableName">
  <xsd:complexType>
```

```
    <xsd:simpleContent>
      <xsd:extension base="xsd:string">
        <xsd:attribute name="type" type="xsd:string" />
      </xsd:extension>
    </xsd:simpleContent>
  </xsd:complexType>
 </xsd:element>

 <xsd:element name="Executable">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="ExecutableType" type="xsd:string"
        minOccurs="0" maxOccurs="1"/>
      <xsd:element name="ExecutableDescription" type="xsd:string"
        minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element name="ExecutableName" type="xsd:string"
        minOccurs="1" maxOccurs="1"/>
    </xsd:sequence>
  </xsd:complexType>
 </xsd:element>

<!--=========================================================================-->

 <xsd:element name="JobIdentification">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="JobName" type="xsd:string"
        minOccurs="0" maxOccurs="1"/>
      <xsd:element name="JobAnnotation" type="xsd:string"
        minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element ref="ExecutionUserID"
        minOccurs="0" maxOccurs="1"/>
      <xsd:element name="JobProjectName" type="xsd:string"
        minOccurs="0" maxOccurs="1"/>
      <xsd:element name="JobCategory" type="xsd:string"
        minOccurs="0" maxOccurs="1"/>
      <xsd:element ref="Extend"
```

```
        minOccurs="0" maxOccurs="unbounded" />
    </xsd:sequence>
  </xsd:complexType>
 </xsd:element>


 <xsd:element name="ExecutionUserID">
  <xsd:complexType>
   <xsd:sequence>
    <xsd:element ref="User"
     minOccurs="1" maxOccurs="unbounded" />
   </xsd:sequence>
  </xsd:complexType>
 </xsd:element>

 <xsd:element name="User">
  <xsd:complexType>
   <xsd:attribute name="name" type="xsd:string"/>
   <xsd:attribute name="group" type="xsd:string"/>
  </xsd:complexType>
 </xsd:element>

<!--=========================================================================-->

 <xsd:element name="SecurityAttributes">
  <xsd:complexType>
   <xsd:simpleContent>
    <xsd:extension base="xsd:string">
    </xsd:extension>
   </xsd:simpleContent>
  </xsd:complexType>
 </xsd:element>

<!--=========================================================================-->

 <xsd:element name="SchedulingAttributes">
  <xsd:complexType>
```

```
    <xsd:simpleContent>
      <xsd:extension base="xsd:string">
      </xsd:extension>
    </xsd:simpleContent>
  </xsd:complexType>
 </xsd:element>

<!--=========================================================================-->

 <xsd:element name="Environment">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element ref="EnvironmentVariable"
        minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element ref="HostSpecificEnvironment"
        minOccurs="0" maxOccurs="unbounded" />
    </xsd:sequence>
  </xsd:complexType>
 </xsd:element>

 <xsd:element name="HostSpecificEnvironment">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element ref="EnvironmentVariable"
        minOccurs="1" maxOccurs="unbounded" />
    </xsd:sequence>
    <xsd:attribute name="name" type="xsd:string" />
  </xsd:complexType>
 </xsd:element>

 <xsd:element name="EnvironmentVariable">
  <xsd:complexType>
    <xsd:simpleContent>
      <xsd:extension base="xsd:string">
        <xsd:attribute name="name" type="xsd:string" />
      </xsd:extension>
    </xsd:simpleContent>
```

```
   </xsd:complexType>
  </xsd:element>

<!--=========================================================================-->

  <xsd:element name="SoftwareRequirements">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element ref="OperatingSystem"
          minOccurs="0" maxOccurs="unbounded"/>
        <xsd:element ref="Limits"
          minOccurs="0" maxOccurs="unbounded"/>
        <xsd:element name="Queue" type="xsd:string"
          minOccurs="0" maxOccurs="unbounded"/>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>

  <xsd:element name="OperatingSystem">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="OperatingSystemDescription" type="xsd:string"
          minOccurs="0" maxOccurs="unbounded"/>
        <xsd:element name="OperatingSystemVersion" type="xsd:string"
          minOccurs="0" maxOccurs="unbounded"/>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>

  <xsd:element name="Limits">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="ProcessVirtualMemoryLimit" type="xsd:string"
          minOccurs="0" maxOccurs="unbounded"/>
        <xsd:element name="VirtualMemoryLimit" type="xsd:string"
          minOccurs="0" maxOccurs="unbounded"/>
        <xsd:element name="DataSegmentSizeLimit" type="xsd:string"
```

```
        minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element name="CoreDumpSizeLimit" type="xsd:string"
        minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element name="CPUTimeLimit" type="xsd:string"
        minOccurs="0" maxOccurs="unbounded"/>
      <xsd:element name="WallTimeLimit" type="xsd:string"
        minOccurs="0" maxOccurs="unbounded"/>
    </xsd:sequence>
  </xsd:complexType>
 </xsd:element>
<!--=========================================================================-->

 <xsd:element name="Resource">
  <xsd:complexType>
   <xsd:sequence>
    <xsd:element ref="Architecture"
      minOccurs="0" maxOccurs="1" />
    <xsd:element ref="HostType"
      minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element ref="Network"
      minOccurs="0" maxOccurs="1"/>
    <xsd:element ref="FileSystem"
      minOccurs="0" maxOccurs="unbounded"/>
    <xsd:element name="SwapSpace" type="xsd:string"
      minOccurs="0" maxOccurs="1"/>
    <xsd:element name="TemporarySpace" type="xsd:string"
      minOccurs="0" maxOccurs="1"/>
    <xsd:element name="ExclusiveExecution" type="xsd:boolean"
      minOccurs="0" maxOccurs="1"/>
    <xsd:element name="ProcessTopology" type="xsd:string"
      minOccurs="0" maxOccurs="unbounded" />
   </xsd:sequence>
  </xsd:complexType>
 </xsd:element>

 <xsd:element name="FileSystem">
  <xsd:complexType>
```

```
    <xsd:simpleContent>
      <xsd:extension base="xsd:string">
        <xsd:attribute name="name" type="xsd:string" />
        <xsd:attribute name="size" type="xsd:string" />
      </xsd:extension>
    </xsd:simpleContent>
  </xsd:complexType>
</xsd:element>

<xsd:element name="HostType">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="HostName" type="xsd:string"
        minOccurs="0" maxOccurs="unbounded" />
      <xsd:element ref="Architecture"
        minOccurs="0" maxOccurs="1" />
      <xsd:element ref="Network"
        minOccurs="0" maxOccurs="unbounded" />
      <xsd:element ref="FileSystem"
        minOccurs="0" maxOccurs="unbounded" />
      <xsd:element name="TempSpace" type="xsd:string"
        minOccurs="0" maxOccurs="unbounded" />
      <xsd:element name="SwapSpace" type="xsd:string"
        minOccurs="0" maxOccurs="unbounded" />
      <xsd:element name="ExclusiveExecution" type="xsd:string"
        minOccurs="0" maxOccurs="1" />
    </xsd:sequence>
      <xsd:attribute name="name" type="xsd:string" />
      <xsd:attribute name="description" type="xsd:string" />
  </xsd:complexType>
</xsd:element>

<xsd:element name="Architecture">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="CPUDescription" type="xsd:string"
        minOccurs="0" maxOccurs="unbounded"/>
```

```
      <xsd:element name="CPUCount" type="xsd:integer"
        minOccurs="0" maxOccurs="1"/>
      <xsd:element name="CPUSpeed" type="xsd:string"
        minOccurs="0" maxOccurs="1"/>
      <xsd:element name="PhysicalMemory" type="xsd:string"
        minOccurs="0" maxOccurs="1"/>
    </xsd:sequence>
  </xsd:complexType>
 </xsd:element>

 <xsd:element name="Network">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="NetworkDescription" type="xsd:string"
        minOccurs="0" maxOccurs="1"/>
      <xsd:element name="NetworkCount" type="xsd:integer"
        minOccurs="0" maxOccurs="1"/>
      <xsd:element name="NetworkBandwidth" type="xsd:string"
        minOccurs="0" maxOccurs="1"/>
    </xsd:sequence>
  </xsd:complexType>
 </xsd:element>

<!--=========================================================================-->

 <xsd:element name="DataAttributes">
  <xsd:complexType>
  <xsd:sequence>
    <xsd:element ref="File"
        minOccurs="0" maxOccurs="unbounded"/>
  </xsd:sequence>
 </xsd:complexType>
 </xsd:element>

<!--=========================================================================-->

 <xsd:element name="File">
```

```
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="FileName" type="xsd:string"
          minOccurs="1" maxOccurs="1"/>
        <xsd:element name="FileSystemName" type="xsd:string"
          minOccurs="0" maxOccurs="1"/>
        <xsd:sequence minOccurs="1" maxOccurs="unbounded">
          <xsd:choice minOccurs="1" maxOccurs="1">
            <xsd:element name="Source" type="xsd:string"
              minOccurs="1" maxOccurs="1"/>
            <xsd:element name="Target" type="xsd:string"
              minOccurs="1" maxOccurs="1"/>
          </xsd:choice>
        </xsd:sequence>
        <xsd:element name="CreationFlag" type="xsd:string"
          minOccurs="0" maxOccurs="1" />
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>

</xsd:schema>
```

[Text Slide C]

XML Sections

Common Tags
o JobIndentification
o ProcessTopology
o Environment
o SoftwareRequirements
o Limits
o Queue
o Application
o DataAttributes

Resource
HostType
Host
 o Environment
 o Limits
Architecture

Action Items:
o Change HostType to HostGroup

[Text Slide D]

```
<!-- Default Overall ------------------------------------------------------------------------ -->
<ExecutionUserID>
</ExecutionUserID>

<OperatingSystem>
</OperatingSystem>

<ProcessTopology>
</ProcessTopology>

<?>
</?>

<Resource>
  <!-- Default general resource requirements for the job... -->
</Resource>

<Environment>
  <!-- Default general env requirements for the job... -->
</Environment>

<Limits>
  <!-- Default general limits for the job... -->
</Limits>

<!-- Specific Host -------------------------------------------------------------------------- -->
<Host>
  <HostName>
    <!-- HostName for this specific Host -->
  </HostName>

  <ExecutionUserID>
  </ExecutionUserID>

  <OperatingSystem>
  </OperatingSystem>
```

```
  <ProcessTopology>
  </ProcessTopology>

  <Resource>
    <!-- Resource requirements specific to this Host... -->
  </Resource>

  <Environment>
    <!-- Env requirements specific to this Host... -->
  </Environment>

  <Limits>
    <!-- Limits requirements specific to this Host... -->
  </Limits>
</Host>

<!-- Host Group ---------------------------------------------------------------------- -->
<HostGroup>
  <ExecutionUserID>
  </ExecutionUserID>

  <OperatingSystem>
  </OperatingSystem>

  <ProcessTopology>
  </ProcessTopology>

  <Resource>
    <!-- Resource requirements specific to the HostGroup... -->
  </Resource>

  <Environment>
    <!-- Env requirements specific to the HostGroup... -->
  </Environment>

  <Limits>
```

```
  <!-- Limits requirements specific to this HostGroup... -->
 </Limits>

 <!-- Host --------------------------- -->
 <Host>
  <HostName>
   <!-- HostName for this specific Host -->
  </HostName>

  <ExecutionUserID>
  </ExecutionUserID>

  <OperatingSystem>
  </OperatingSystem>

  <ProcessTopology>
  </ProcessTopology>

  <Resource>
   <!-- Resource requirements specific to this Host... -->
  </Resource>

  <Environment>
   <!-- Env requirements specific to this Host... -->
  </Environment>

  <Limits>
   <!-- Limits requirements specific to this Host... -->
  </Limits>
 </Host>

 <!-- Host --------------------------- -->
 ...
 <!-- Host --------------------------- -->
 ...

</HostGroup>
```

<!-- -- -->

[Text Slide E]