

XML Schema Representation of a Simple Compute Resources

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1 Purpose

We propose a simple XML based schema to describe compute resources in the Grid. This information is essential for the discovery of compute resources with particular features. This document provides a Schema that is being developed last spring and summer as part of the Globus Java CoG Project. We intend to prepare a paper on the activity. As the schema needs much improvement we have so far not distributed it. Nevertheless, we find it timely to release this document as to initiate a discussion within the GIS and the GCE working groups.

1.1 Status

This document is in its infancies and many improvements are necessary.

2 Requirements and Goals

The requirements for a schema on compute resources are

- Creation of a working group that spawns multiple efforts based on the industry and the research community. This group should have ideally knowledgeable members dealing with schema definitions.
- The schema must be extendable.
- The schema must be simple .
- The schema must at one point include live time information (not addressed so far).
- The schema must address access control (not addressed in this document).
- It must support access control to the information.
- It must be possible to define a “personal” view of that resource through extension.

3 Bugs

- We have not looked at what others have done. We hope the GGF will help.
- Include a top level element ComputeResource.
- Serial numbers and other information have been taken out as this was not used
- Resource Owner has been taken out as this was not used. It would be better to have a separate document for this.

4 Compute Resource Schema

Schema **ComputeResource.xsd**

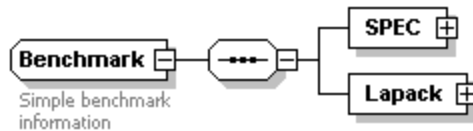
schema location: <C:\Documents and Settings\laszewsk\My Documents\test\ComputeResource.xsd>

Complex types [Benchmark](#)
[LoadAverage](#)
[Memory](#)
[MemoryUnits](#)
[OperatingSystem](#)

Simple types [percentage](#)

complexType **Benchmark**

diagram



children [SPEC](#) [Lapack](#)

annotation documentation Simple benchmark information

```
<xs:complexType name="Benchmark">
  <xs:annotation>
    <xs:documentation>Simple benchmark information</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="SPEC">
      <xs:complexType>
        <xs:sequence>
          <xs:element name="float" type="xs:double">
            <xs:annotation>
              <xs:documentation>the SPEC mark floating point value</xs:documentation>
            </xs:annotation>
          </xs:element>
          <xs:element name="int" type="xs:double">
            <xs:annotation>
              <xs:documentation>the SPEC mark integer value</xs:documentation>
            </xs:annotation>
          </xs:element>
          <xs:element name="year" type="xs:double">
            <xs:annotation>
              <xs:documentation>the year for the spec mark</xs:documentation>
            </xs:annotation>
          </xs:element>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
</xs:complexType>
```

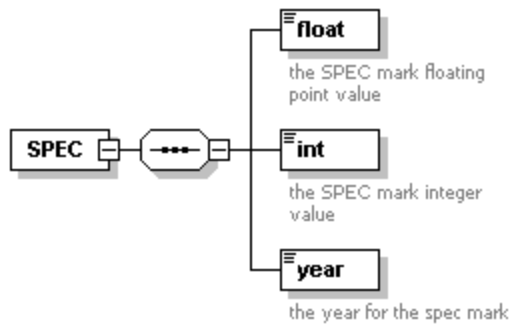
```

</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="Lapack">
<xs:complexType>
<xs:sequence>
<xs:element name="oneHundred" type="xs:double">
<xs:annotation>
<xs:documentation>a matrix multiplication with n=100</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="fiveHundred" type="xs:double">
<xs:annotation>
<xs:documentation>a matrix multiplication with n=500</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="thousand" type="xs:double">
<xs:annotation>
<xs:documentation>a matrix multiplication with n=1000</xs:documentation>
</xs:annotation>
</xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
</xs:sequence>
</xs:complexType>

```

element Benchmark/SPEC

diagram



children [float int year](#)

source

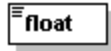
```

<xs:element name="SPEC">
<xs:complexType>
<xs:sequence>
<xs:element name="float" type="xs:double">
<xs:annotation>
<xs:documentation>the SPEC mark floating point value</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="int" type="xs:double">
<xs:annotation>
<xs:documentation>the SPEC mark integer value</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="year" type="xs:double">
<xs:annotation>
<xs:documentation>the year for the spec mark</xs:documentation>
</xs:annotation>
</xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>

```

element **Benchmark/SPEC/float**

diagram



the SPEC mark floating point value

type **xs:double**

annotation documentation the SPEC mark floating point value

```
source <xs:element name="float" type="xs:double">  
<xs:annotation>  
<xs:documentation>the SPEC mark floating point value</xs:documentation>  
</xs:annotation>  
</xs:element>
```

element **Benchmark/SPEC/int**

diagram



the SPEC mark integer value

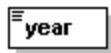
type **xs:double**

annotation documentation the SPEC mark integer value

```
source <xs:element name="int" type="xs:double">  
<xs:annotation>  
<xs:documentation>the SPEC mark integer value</xs:documentation>  
</xs:annotation>  
</xs:element>
```

element **Benchmark/SPEC/year**

diagram



the year for the spec mark

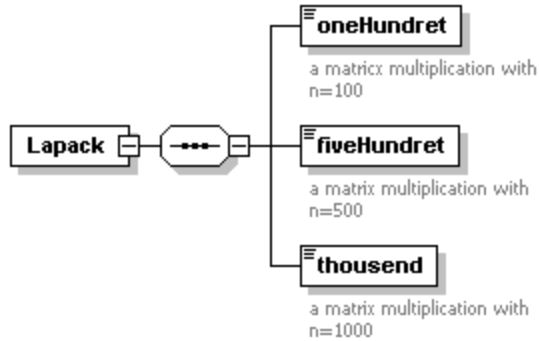
type **xs:double**

annotation documentation the year for the spec mark

```
source <xs:element name="year" type="xs:double">  
<xs:annotation>  
<xs:documentation>the year for the spec mark</xs:documentation>  
</xs:annotation>  
</xs:element>
```

element **Benchmark/Lapack**

diagram



children [oneHundred](#) [fiveHundred](#) [thousand](#)

source

```
<xs:element name="Lapack">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="oneHundred" type="xs:double">
        <xs:annotation>
          <xs:documentation>a matrix multiplication with n=100</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="fiveHundred" type="xs:double">
        <xs:annotation>
          <xs:documentation>a matrix multiplication with n=500</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="thousand" type="xs:double">
        <xs:annotation>
          <xs:documentation>a matrix multiplication with n=1000</xs:documentation>
        </xs:annotation>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

element **Benchmark/Lapack/oneHundred**

diagram



type **xs:double**

annotation documentation a matrix multiplication with n=100

source

```
<xs:element name="oneHundred" type="xs:double">
  <xs:annotation>
    <xs:documentation>a matrix multiplication with n=100</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **Benchmark/Lapack/fiveHundred**

diagram



type **xs:double**

annotation documentation a matrix multiplication with n=500

```
source <xs:element name="fiveHundred" type="xs:double">
  <xs:annotation>
    <xs:documentation>a matrix multiplication with n=500</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **Benchmark/Lapack/thousand**

diagram



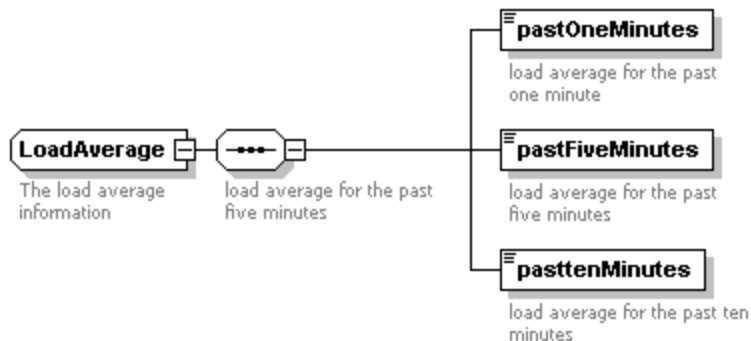
type **xs:double**

annotation documentation a matrix multiplication with n=1000

```
source <xs:element name="thousand" type="xs:double">
  <xs:annotation>
    <xs:documentation>a matrix multiplication with n=1000</xs:documentation>
  </xs:annotation>
</xs:element>
```

complexType **LoadAverage**

diagram



children [pastOneMinutes](#) [pastFiveMinutes](#) [pasttenMinutes](#)

annotation documentation The load average information

```
source <xs:complexType name="LoadAverage">
  <xs:annotation>
    <xs:documentation>The load average information</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:annotation>
      <xs:documentation>load average for the past five minutes</xs:documentation>
      <xs:documentation>load average for the past ten minutes</xs:documentation>
    </xs:annotation>
  </xs:sequence>
</xs:complexType>
```

```

<xs:element name="pastOneMinutes" type="percentage">
  <xs:annotation>
    <xs:documentation>load average for the past one minute</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="pastFiveMinutes" type="percentage">
  <xs:annotation>
    <xs:documentation>load average for the past five minutes</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="pasttenMinutes" type="percentage">
  <xs:annotation>
    <xs:documentation>load average for the past ten minutes</xs:documentation>
  </xs:annotation>
</xs:element>
</xs:sequence>
</xs:complexType>

```

element LoadAverage/pastOneMinutes

diagram



type [percentage](#)

facets minExclusive 0
maxExclusive 100

annotation documentation load average for the past one minute

source

```

<xs:element name="pastOneMinutes" type="percentage">
  <xs:annotation>
    <xs:documentation>load average for the past one minute</xs:documentation>
  </xs:annotation>
</xs:element>

```

element LoadAverage/pastFiveMinutes

diagram



type [percentage](#)

facets minExclusive 0
maxExclusive 100

annotation documentation load average for the past five minutes

source

```

<xs:element name="pastFiveMinutes" type="percentage">
  <xs:annotation>
    <xs:documentation>load average for the past five minutes</xs:documentation>
  </xs:annotation>
</xs:element>

```

element LoadAverage/pasttenMinutes

diagram

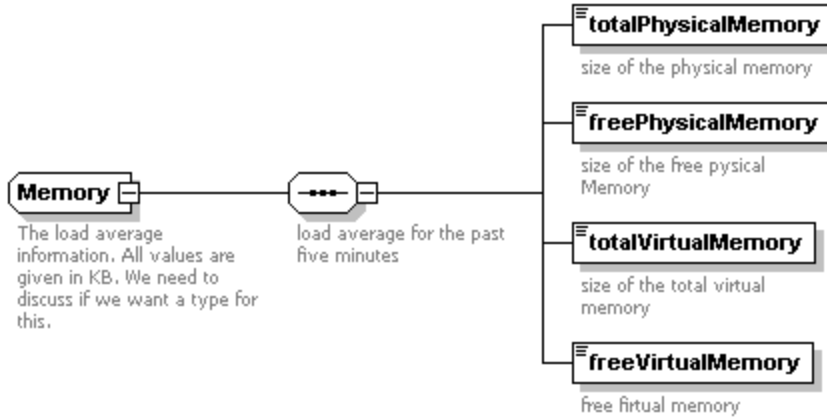


type [percentage](#)

facets minExclusive 0
maxExclusive 100
annotation documentation load average for the past ten minutes
source <xs:element name="pasttenMinutes" type="percentage">
<xs:annotation>
<xs:documentation>load average for the past ten minutes</xs:documentation>
</xs:annotation>
</xs:element>

complexType Memory

diagram



children [totalPhysicalMemory](#) [freePhysicalMemory](#) [totalVirtualMemory](#) [freeVirtualMemory](#)
annotation documentation The load average information. All values are given in KB. We need to discuss if we want a type for this.

source <xs:complexType name="Memory">
<xs:annotation>
<xs:documentation>The load average information. All values are given in KB. We need to discuss if we want a type for this.</xs:documentation>
</xs:annotation>
<xs:sequence>
<xs:annotation>
<xs:documentation>load average for the past five minutes</xs:documentation>
<xs:documentation>load average for the past ten minutes</xs:documentation>
</xs:annotation>
<xs:element name="totalPhysicalMemory" type="xs:positiveInteger">
<xs:annotation>
<xs:documentation>size of the physical memory</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="freePhysicalMemory" type="xs:positiveInteger">
<xs:annotation>
<xs:documentation>size of the free physical Memory</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="totalVirtualMemory" type="xs:positiveInteger">
<xs:annotation>
<xs:documentation>size of the total virtual memory</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="freeVirtualMemory" type="xs:positiveInteger">
<xs:annotation>
<xs:documentation>free firtual memory</xs:documentation>
</xs:annotation>
</xs:element>
</xs:sequence>
</xs:complexType>

element **Memory/totalPhysicalMemory**

diagram



type **xs:positiveInteger**

annotation documentation size of the physical memory

source

```
<xs:element name="totalPhysicalMemory" type="xs:positiveInteger">
  <xs:annotation>
    <xs:documentation>size of the physical memory</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **Memory/freePhysicalMemory**

diagram



type **xs:positiveInteger**

annotation documentation size of the free physical Memory

source

```
<xs:element name="freePhysicalMemory" type="xs:positiveInteger">
  <xs:annotation>
    <xs:documentation>size of the free physical Memory</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **Memory/totalVirtualMemory**

diagram



type **xs:positiveInteger**

annotation documentation size of the total virtual memory

source

```
<xs:element name="totalVirtualMemory" type="xs:positiveInteger">
  <xs:annotation>
    <xs:documentation>size of the total virtual memory</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **Memory/freeVirtualMemory**

diagram



type **xs:positiveInteger**

annotation documentation free virtual memory

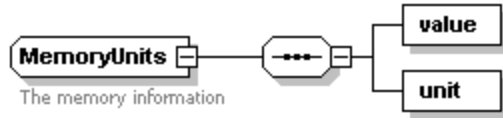
source

```
<xs:element name="freeVirtualMemory" type="xs:positiveInteger">
  <xs:annotation>
```

```
<xs:documentation>free firtual memory </xs:documentation>
</xs:annotation>
</xs:element>
```

complexType **MemoryUnits**

diagram



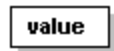
children [value](#) [unit](#)

annotation documentation The memory information

```
source <xs:complexType name="MemoryUnits">
  <xs:annotation>
    <xs:documentation>The memory information </xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="value"/>
    <xs:element name="unit"/>
  </xs:sequence>
</xs:complexType>
```

element **MemoryUnits/value**

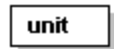
diagram



```
source <xs:element name="value"/>
```

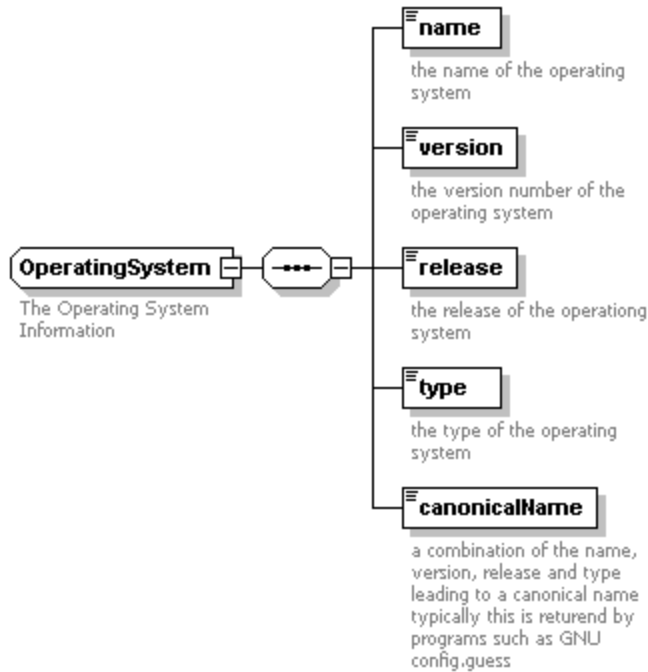
element **MemoryUnits/unit**

diagram



```
source <xs:element name="unit"/>
```

complexType **OperatingSystem**
diagram



children [name](#) [version](#) [release](#) [type](#) [canonicalName](#)
 annotation documentation The Operating System Information

```

source <xs:complexType name="OperatingSystem">
  <xs:annotation>
    <xs:documentation>The Operating System Information</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="name" type="xs:string">
      <xs:annotation>
        <xs:documentation>the name of the operating system</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="version" type="xs:string">
      <xs:annotation>
        <xs:documentation>the version number of the operating system</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="release" type="xs:string">
      <xs:annotation>
        <xs:documentation>the release of the operating system</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="type" type="xs:string">
      <xs:annotation>
        <xs:documentation>the type of the operating system</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="canonicalName" type="xs:string">
      <xs:annotation>
        <xs:documentation>a combination of the name, version, release and type leading to a canonical name typically this is returned by programs such as GNU config.guess</xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>
</xs:complexType>
  
```

element **OperatingSystem/name**

diagram



the name of the operating system

type **xs:string**

annotation documentation the name of the operating system

source

```
<xs:element name="name" type="xs:string">
  <xs:annotation>
    <xs:documentation>the name of the operating system</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **OperatingSystem/version**

diagram



the version number of the operating system

type **xs:string**

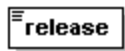
annotation documentation the version number of the operating system

source

```
<xs:element name="version" type="xs:string">
  <xs:annotation>
    <xs:documentation>the version number of the operating system</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **OperatingSystem/release**

diagram



the release of the operating system

type **xs:string**

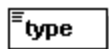
annotation documentation the release of the operating system

source

```
<xs:element name="release" type="xs:string">
  <xs:annotation>
    <xs:documentation>the release of the operating system</xs:documentation>
  </xs:annotation>
</xs:element>
```

element **OperatingSystem/type**

diagram



the type of the operating system

type **xs:string**

annotation documentation the type of the operating system

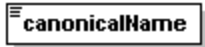
```

source <xs:element name="type" type="xs:string">
  <xs:annotation>
    <xs:documentation>the type of the operating system</xs:documentation>
  </xs:annotation>
</xs:element>

```

element **OperatingSystem/canonicalName**

diagram



a combination of the name, version, release and type leading to a canonical name typically this is returned by programs such as GNU config.guess

```

type xs:string
annotation documentation a combination of the name, version, release and type leading to a canonical name typically this is returned by programs such as GNU config.guess
source <xs:element name="canonicalName" type="xs:string">
  <xs:annotation>
    <xs:documentation>a combination of the name, version, release and type leading to a canonical name typically this is returned by programs such as GNU config.guess</xs:documentation>
  </xs:annotation>
</xs:element>

```

simpleType **percentage**

```

type restriction of xs:double
used by elements LoadAverage/pastFiveMinutes LoadAverage/pastOneMinutes LoadAverage/pasttenMinutes
facets minExclusive 0
       maxExclusive 100
annotation documentation A Datatype representing values from 0 to 100
source <xs:simpleType name="percentage">
  <xs:annotation>
    <xs:documentation>A Datatype representing values from 0 to 100</xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:double">
    <xs:minExclusive value="0"/>
    <xs:maxExclusive value="100"/>
  </xs:restriction>
</xs:simpleType>

```

5 ComputeResource.xsd

```

<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XML Spy v4.3 U (http://www.xmlspy.com) by Gregor Laszewski (ANL) -->
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified" attributeFormDefault="unqualified">
  <xs:complexType name="OperatingSystem">
    <xs:annotation>
      <xs:documentation>The Operating System Information</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="name" type="xs:string">
        <xs:annotation>
          <xs:documentation>the name of the operating system</xs:documentation>

```

```

        </xs:annotation>
    </xs:element>
    <xs:element name="version" type="xs:string">
        <xs:annotation>
            <xs:documentation>the version number of the operating system</xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="release" type="xs:string">
        <xs:annotation>
            <xs:documentation>the release of the operating system</xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="type" type="xs:string">
        <xs:annotation>
            <xs:documentation>the type of the operating system</xs:documentation>
        </xs:annotation>
    </xs:element>
    <xs:element name="canonicalName" type="xs:string">
        <xs:annotation>
            <xs:documentation>a combination of the name, version, release and type leading to a
canonical name typically this is returned by programs such as GNU config.guess</xs:documentation>
        </xs:annotation>
    </xs:element>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="percentage">
    <xs:annotation>
        <xs:documentation>A Datatype representing values from 0 to 100</xs:documentation>
    </xs:annotation>
    <xs:restriction base="xs:double">
        <xs:minExclusive value="0"/>
        <xs:maxExclusive value="100"/>
    </xs:restriction>
</xs:simpleType>
<xs:complexType name="LoadAverage">
    <xs:annotation>
        <xs:documentation>The load average information</xs:documentation>
    </xs:annotation>
    <xs:sequence>
        <xs:annotation>
            <xs:documentation>load average for the past five minutes</xs:documentation>
            <xs:documentation>load average for the past ten minutes</xs:documentation>
        </xs:annotation>
        <xs:element name="pastOneMinutes" type="percentage">
            <xs:annotation>
                <xs:documentation>load average for the past one minute</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="pastFiveMinutes" type="percentage">
            <xs:annotation>
                <xs:documentation>load average for the past five minutes</xs:documentation>
            </xs:annotation>
        </xs:element>
        <xs:element name="pastTenMinutes" type="percentage">
            <xs:annotation>
                <xs:documentation>load average for the past ten minutes</xs:documentation>
            </xs:annotation>
        </xs:element>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="Memory">
    <xs:annotation>
        <xs:documentation>The load average information. All values are given in KB. We need to discuss if we want
a type for this.</xs:documentation>
    </xs:annotation>
    <xs:sequence>
        <xs:annotation>
            <xs:documentation>load average for the past five minutes</xs:documentation>
            <xs:documentation>load average for the past ten minutes</xs:documentation>
        </xs:annotation>

```

```

<xs:element name="totalPhysicalMemory" type="xs:positiveInteger">
  <xs:annotation>
    <xs:documentation>size of the physical memory</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="freePhysicalMemory" type="xs:positiveInteger">
  <xs:annotation>
    <xs:documentation>size of the free physical Memory</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="totalVirtualMemory" type="xs:positiveInteger">
  <xs:annotation>
    <xs:documentation>size of the total virtual memory</xs:documentation>
  </xs:annotation>
</xs:element>
<xs:element name="freeVirtualMemory" type="xs:positiveInteger">
  <xs:annotation>
    <xs:documentation>free virtual memory </xs:documentation>
  </xs:annotation>
</xs:element>
</xs:sequence>
</xs:complexType>
<xs:complexType name="MemoryUnits">
  <xs:annotation>
    <xs:documentation>The memory information </xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="value"/>
    <xs:element name="unit"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="Benchmark">
  <xs:annotation>
    <xs:documentation>Simple benchmark information</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="SPEC">
      <xs:complexType>
        <xs:sequence>
          <xs:element name="float" type="xs:double">
            <xs:annotation>
              <xs:documentation>the SPEC mark floating point
value</xs:documentation>
            </xs:annotation>
          </xs:element>
          <xs:element name="int" type="xs:double">
            <xs:annotation>
              <xs:documentation>the SPEC mark integer
value</xs:documentation>
            </xs:annotation>
          </xs:element>
          <xs:element name="year" type="xs:double">
            <xs:annotation>
              <xs:documentation>the year for the spec
mark</xs:documentation>
            </xs:annotation>
          </xs:element>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
    <xs:element name="Lapack">
      <xs:complexType>
        <xs:sequence>
          <xs:element name="oneHundred" type="xs:double">
            <xs:annotation>
              <xs:documentation>a matrixx multiplication with
n=100</xs:documentation>
            </xs:annotation>
          </xs:element>
          <xs:element name="fiveHundred" type="xs:double">

```

```

n=500</xs:documentation>
    <xs:annotation>
        <xs:documentation>a matrix multiplication with
    </xs:annotation>
</xs:element>
<xs:element name="thousand" type="xs:double">
    <xs:annotation>
        <xs:documentation>a matrix multiplication with
n=1000</xs:documentation>
    </xs:annotation>
</xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
</xs:sequence>
</xs:complexType>
<xs:annotation>
    <xs:documentation>This schem defines a very simple starting point for defining compute
resources.</xs:documentation>
</xs:annotation>
</xs:schema>

```