PDL Status

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Motivations

- Parameter Description Language (PDL) is intended to be a “lingua franca” of parameters
  - Describes parameters in sufficient detail to allow workflow tool to check if parameters can be “piped” between services.
    - Physical properties
      - Nature, meaning, unit, precision
    - Computing
      - Numerical Type, UCD, Utype, SKOS concept
  - Also has ability to describe constraints on parameters
    - Physical constraints
    - Arbitrary conditions
- Not a description of parameter “values” cf. UWS

Uses

- Searching for compatible services
  - Definitions in registry
- Auto generation of user interfaces
  - Constraints can allow client-side checking
- Generic service containers that can be "configured" with the PDL to create new services quickly – e.g. AstroGrid CEA
- Translating to existing systems parameter descriptions – e.g. Taverna

Implementation

- PDL grammar and syntax fixed by XML schema
- Code to read instances in Java generated by JAXB
- PDL verifier
  - Will read an instance and verify the constraints
- Simple Swing GUI

Example

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<UWS_Service xmlns="http://www.ivoa.net/xml/Parameter/v0.1"
      xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      xsi:schemaLocation="http://www.ivoa.net/xml/Parameter/v0.1 UWS2-
V1.1.xsd">
      <ServiceId>PDR_ONLINE</ServiceId>
      <serviceName>PDR-1D</serviceName>
      <Description>Description layer of the PDR code</Description>
      <ParameterList>
            <parameter>
                  <Name>F_ISRF</Name>
                  <ParameterType>integer</ParameterType>
                  <Unit>None</Unit>
                  <Precision>0</Precision>
            </parameter>
            <parameter>
                  <Name>radm</Name>
                  <ParameterType>real</ParameterType>
            </parameter>
            <parameter>
                  <Name>radp</Name>
                  <ParameterType>real</ParameterType>
            </parameter>
            <parameter>
                  <Name>d_sour</Name>
                  <ParameterType>real</ParameterType>
            </parameter>
            <parameter>
                  <Name>srcpp</Name>
                  <ParameterType>string</ParameterType>
            </parameter>
            <parameter>
                  <Name>srcpp_spectrum</Name>
                  <ParameterType>Spectrum</ParameterType>
            </parameter>
            ...
```

Parameter list

```
<ParameterGroup>
    <Name>RadiationFieldAndGeometry</Name>
    <parameterRef parameterName="F_ISRF" />
    <parameterRef parameterName="radm" />
    <parameterRef parameterName="radp" />
    <parameterRef parameterName="d_sour" />
    <parameterRef parameterName="srcpp" />
    <parameterRef parameterName="srcpp_spectrum" />
</ParameterGroup>
```

Parameter groups

```
<conditionalStatement xsi:type="IfThenConditionalStatement">
    <if>
        <Criterion xsi:type="Criterion">
            <expression xsi:type="AtomicParameterExpression">
                <parameterRef parameterName="d_sour" />
            </expression>
            <conditionType xsi:type="ValueDifferentOf">
                <Value>0</Value>
            </conditionType>
            <logicalConnector xsi:type="and">
                <criterion xsi:type="Criterion">
                    <expression xsi:type="AtomicParameterExpression">
                        <parameterRef parameterName="srcpp" />
                    </expression>
                    <conditionType xsi:type="BelongToSet">
                        <Value>spectro1</Value>
                        <Value>spectro2</Value>
                        <Value>spectroN</Value>
                    </conditionType>
                </criterion>
            </logicalConnector>
        </Criterion>
    </if>
    <then>
        <Criterion xsi:type="Criterion">
            <expression xsi:type="AtomicParameterExpression">
                <parameterRef parameterName="srcpp_spectrum" />
            </expression>
            <conditionType xsi:type="IsNull" />
        </Criterion>
    </then>
</conditionalStatement>
```

Constraints

Future Work

- Tool for generating/translating parameter definitions
  - Add a new representation of the PDL
    - XML at the moment is rather like ADQL/X – looks like a parse tree for computer consumption – difficult for humans
- Integrate descriptions with CEA
- Tool for computing interoperability graphs between services
- Implementations in other computer languages

Status

- Work is done in GoogleCode repository
  - http://code.google.com/p/vo-param/
    - Contains implementation of a PDL verifier and a simple user interface.
    - Maven repository for above
    - Source for documents below
- Existing IVOA working draft
  - http://www.ivoa.net/Documents/PDL/20120516/index.html
- Implementation note
  - http://vo-param.googlecode.com/svn/trunk/model/documentation/PDL_ImplementingNote.pdf
- Collaborations welcome