productTypeServed in VODataService

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The Use Case: Global dataset discovery

"Give me all services publishing astronomical images"

This used to be: "Give me all SIAP services".

With ObsTAP, SIAP1, SIAP2, and possibly plain TAP, that's a thing of the past.

Also: Polyvalent protocols like ObsTAP or (in practice) SSAP need to be explicit on what product types they serve.

In the current VO, there at least 3 SSAP services that really serve time series. With SSAP's successor, expected to be good for all product types that Obscore is good for, being explicit about the product types will be as important there as it already is in ObsTAP.

Proposed Solution

Add a `productTypeServed` element to VODataService's `DataResource` type:

```
<ri:Resource status="active" xsi:type="vs:CatalogResource">
  <title>DaCHS Development Site Obscore Table</title>
  <shortName>GAVO DC Obscore</shortName>
  <identifier>ivo://org.gavo.dc/__system__/obscore/ObsCore</identifier>
  <curation>
    ...
    <temporal>12414.256 63023.51852</temporal>
    <spectral>2.820522229e-29 1.603508989e-08</spectral>
  </coverage>
  <productTypeServed>cube</productTypeServed>
  <productTypeServed>image</productTypeServed>
  <productTypeServed>spectrum</productTypeServed>
  <productTypeServed>timeseries</productTypeServed>
```

RegTAP Aspects

Getting data providers to reliably adopt this would take forever. Hence, RegTAP 1.4 should say:

- Resources with SIAP1 or SIAP2 capabilities get *image* unless they define `productTypeServed`

- Resources with SSAP get *spectrum* unless they define `productTypeServed`

[Obscore Resources don't exist yet (cf. the TableReg note).]

For global dataset discovery, we will need obscore records anyway; see `https://github.com/ivoa/TableReg` for a more thorough treatment of this part of the equation. For the present purpose, it is actually a good thing that these records will be written from scratch, because then they can be born with `productTypeServed`. In ObsTAP, we could not guess the way we can for SIA and SSA.

"Get image"?

Where would `productTypeServed` sit in RegTAP?

Simple plan: use a `/productTypeServed` xpath. Hence, to find all resources serving images, you would say:

```
SELECT ivoid
FROM  rr.res_detail
WHERE detail_xpath='/productTypeServed'
  AND detail_value='image'
```

Getting Fancy

With the `gavo_vocmatch` UDF available on reg.g-vo.org, you could even say "Give me anything that is spatially resolved":

```
SELECT ivoid
FROM  rr.res_detail
WHERE detail_xpath='/productTypeServed'
  AND 1=gavo_vocmatch(
    'product-type',
    'spatially-resolved-dataset',
    detail_value)
```

Perhaps go for `ivo_vocmatch` and require it for RegTAP?

Implementation Status

DaCHS 2.9.4 and later can produce productTypeServed and will do that automatically for obscore records.

The rest would – famous last words – be quick to do at least for reg.g-vo.org and pyVO.