



Footprint Service Specification



Gretchen Greene, Tamás Budavári
Space Telescope Science Institute
The Johns Hopkins University



Introduction

- ⊕ Footprints are spatial geometric descriptions
 - ⊠ Also known as regions or areas on the sky
 - ⊠ Currently most representations are locally defined
- ⊕ ***Footprint services*** will return these regions and...
 - ⊠ Need to be compliant with VO query language
ee.g., REGION in ADQL
 - ⊠ Compliant with DAL 2.0 and complementary to TAP



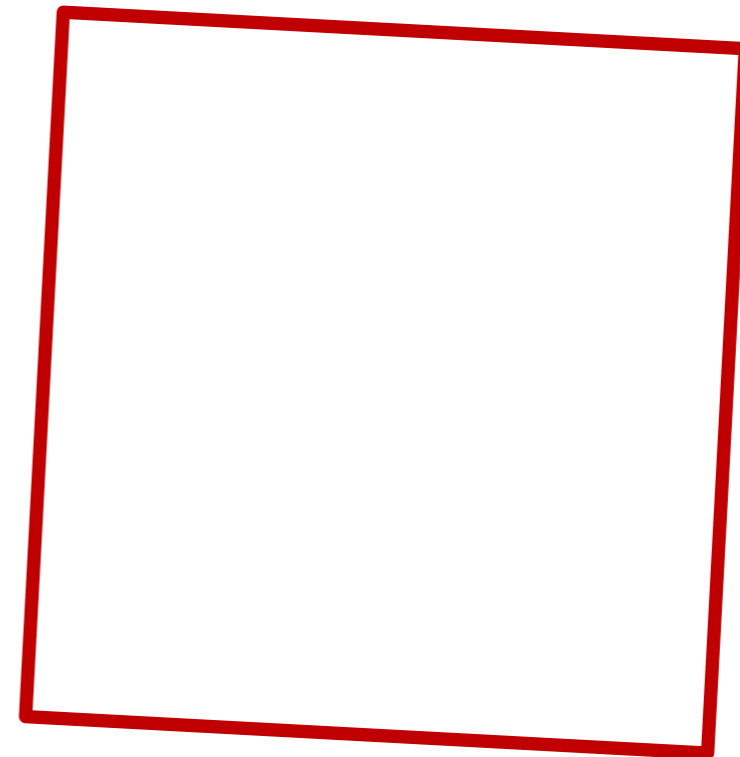
Performance

- ❁ Footprint indexing provides key performance mechanism for large scale network distributed search
 - ❁ Data Filter - basic 2D constrained search algorithms
 - ❁ well established spherical partitioning schemes
 - ❁ database lib plugins (e.g. pgsphere & jhu/server sphlib)



Field of View

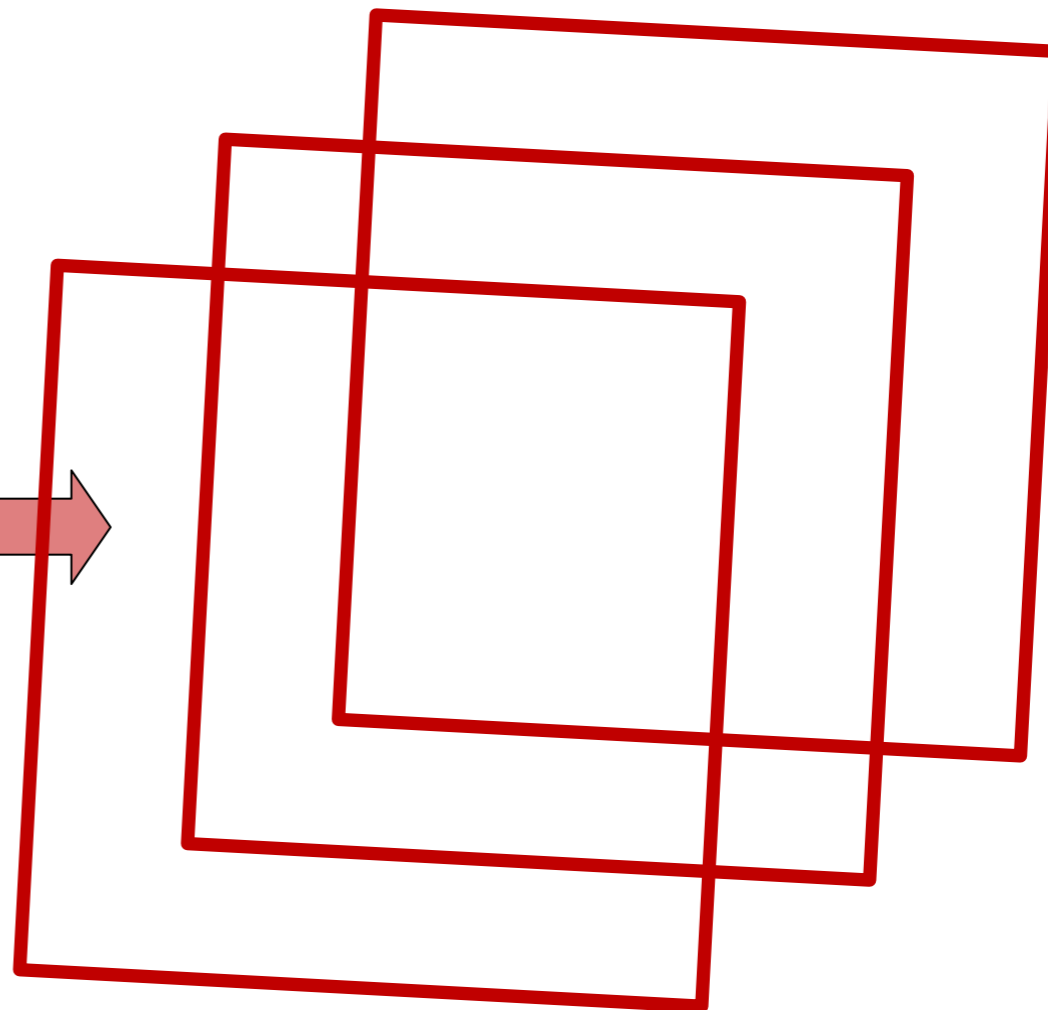
 Outline of observation(s)





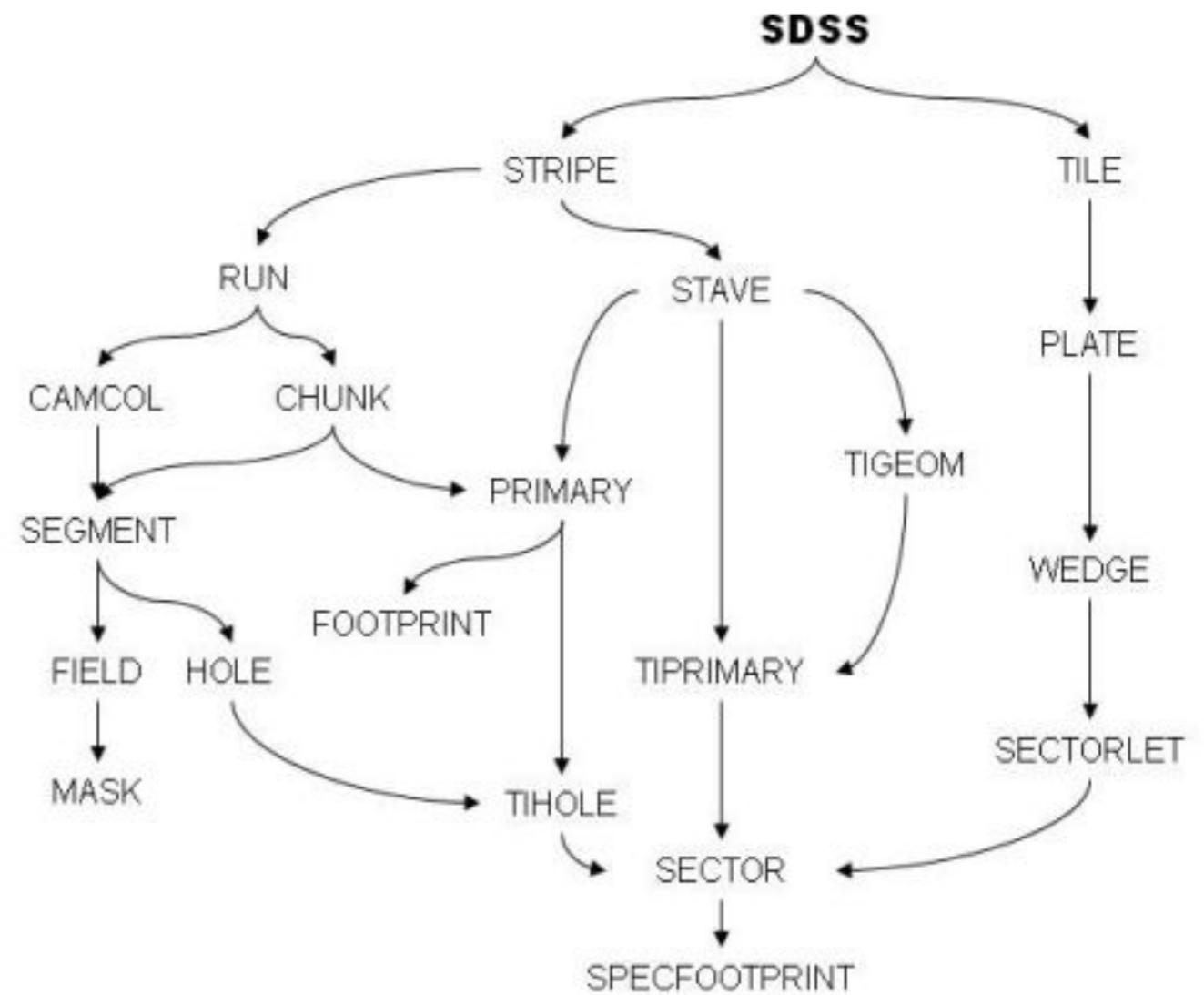
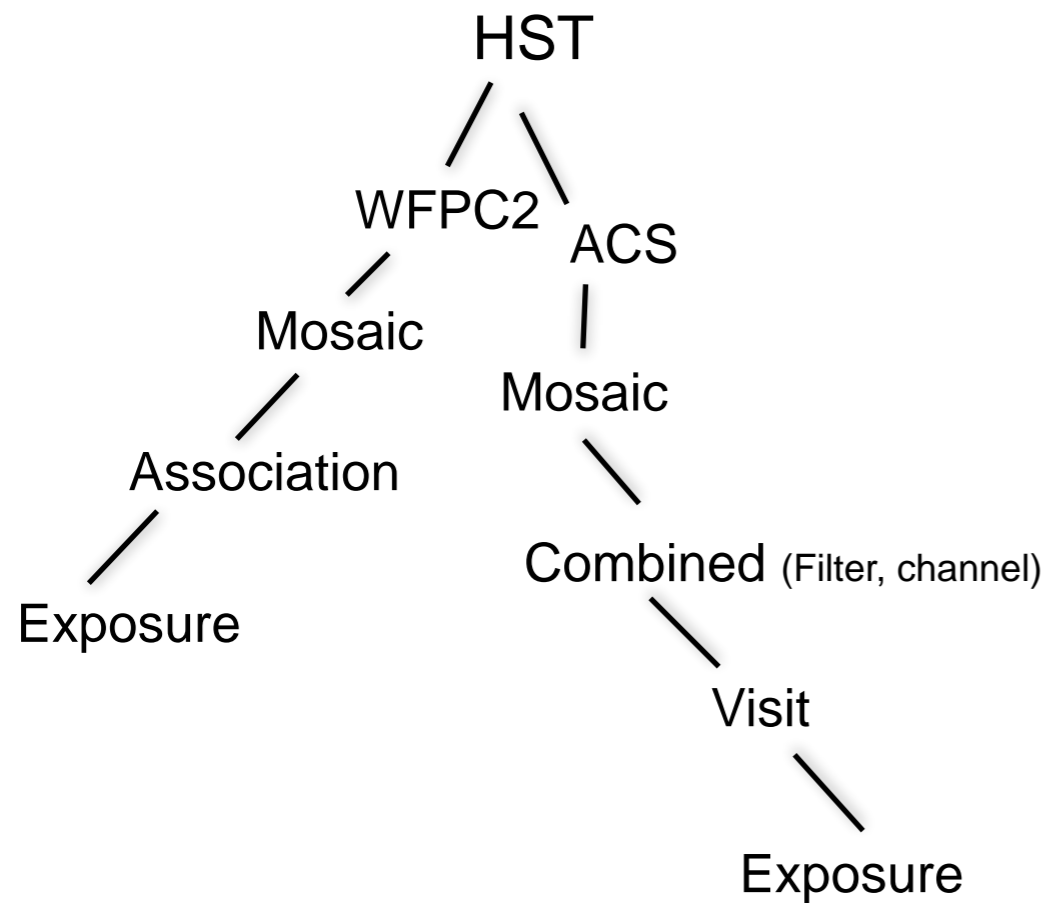
Field of View

 Outline of observation(s)





Footprint Hierarchy





Footprint Services – Level 1

- ✚ Simplest way to return the footprint





- ✚ GetFootprint()
 - ▣ Could be precise or approximate
 - ▣ Use fill_factor to signal it

- ✚ Doesn't even have to be dynamic...






Footprint Services – Level 2

Access methods

-  GetRegion(id, format)
-  GetArea(id)
-  GetMasks()
-  GetTypes()

Search methods

-  Contains()
-  FindByPoint()
-  FindByKey()





IVOA standard identifiers: IVORN

-  <ivo://stsci.edu/hst/wfpc2/mosaic/...>





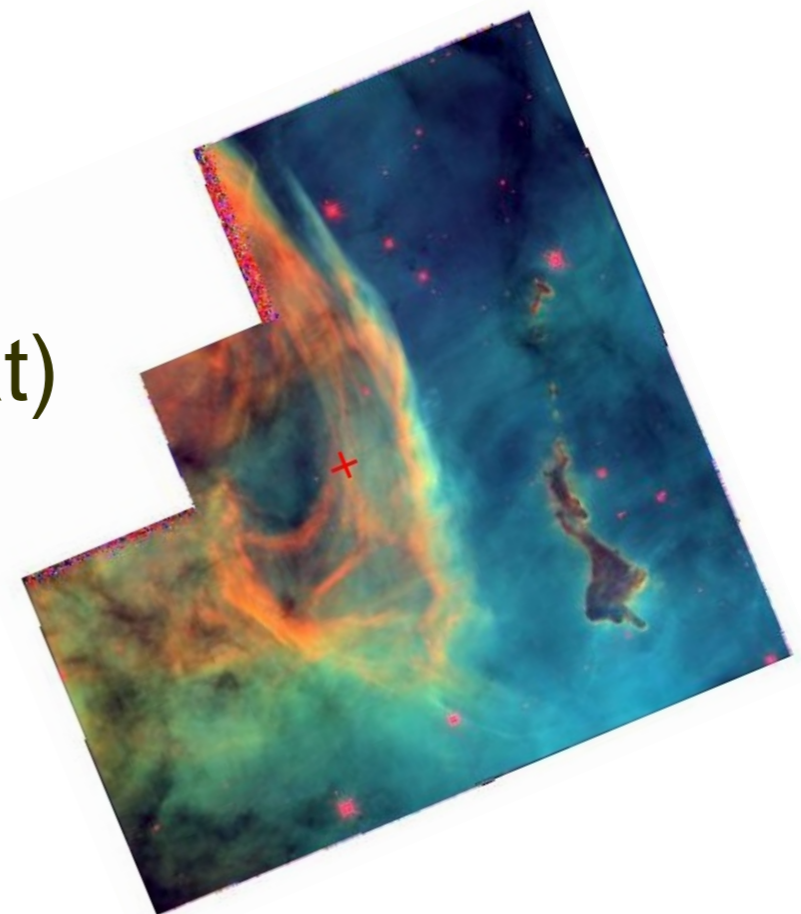
Footprint Services – Level 3

Operations methods

-  Intersection(region, region, format)
-  Union(region, region, format)
-  DistinctUnion(region, region, format)
-  Difference(region, region, format)

Morph methods

-  Dilate(region, buffer, format)
-  Erode(region, buffer, format)



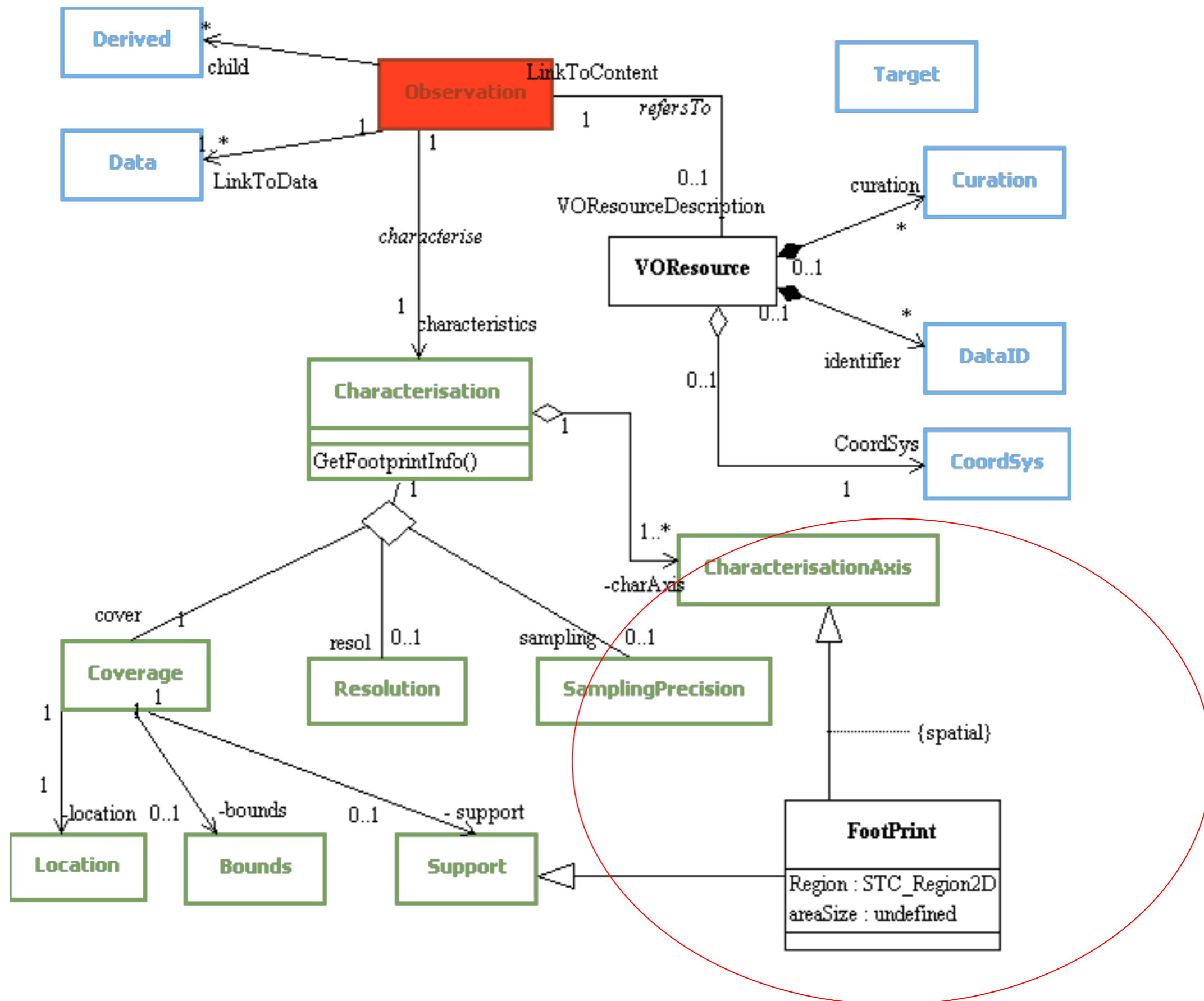


Data Model Progress

- ✿ **Characterization has been in place**
 - ▣ Contains spatial coverage in STC Region
 - ▣ Resolved minor issues with XSD

- ✿ **New Observation DM**
 - ▣ Represent images, spectra, etc.
 - ▣ Contains characterization

- ✿ **Enables footprint service specification!**





In Summary, Our Updated Plans

✚ Complete IVOA Working Draft

- ✚ Accommodate the levels of complexity
- ✚ Develop Use Cases with Observation Data Model/ Characterization/Provenance
- ✚ Define DAL compliant interface request spec
- ✚ Resolve issues with response formats (VOTable with STC/s, STC types, Obs DM)

✚ Footprints mean different things

- ✚ Registry metadata for access to levels of geometric descriptions
- ✚ Resolve local legacy with more universal solution



Summary

Field of View and Footprint concepts

- Drawing and interoperable archive spatial manipulation

Observation DM

- Along w/ characterization can represent footprints
- VOTable w/STC

Now specification is straightforward

- Geometry is IVOA compliant!

<http://arxiv.org/abs/1005.2606>. Astro-ph. Spherical lib