3D Portrayal Services
Use Cases

OGC TC Meeting Atlanta 09/17/08

Arne Schilling
Department of Geography,
University of Bonn
schilling@geographie.uni-bonn.de

Benjamin Hagedorn
Hasso-Plattner-Institut for Software Systems Engineering,
University of Potsdam
benjamin.hagedorn@hpi.uni-potsdam.de

universitätbonn Geographie

Contents

Purpose of Document

1. **Input for discussion on the standardization activities**
2. **Focus on WPVS, W3DS, and Styling (SLD)**
3. **Provide examples of selected use cases / scenarios**
4. **Outline the technical interactions with OGC services for 3D Portrayal**
5. **Identify missing functionality**
6. **Document could become a Best Practices Paper**

Document available on OGC Portal / Pending Documents (08-140)
http://portal.opengeospatial.org/files/?artifact_id=29649&version=1

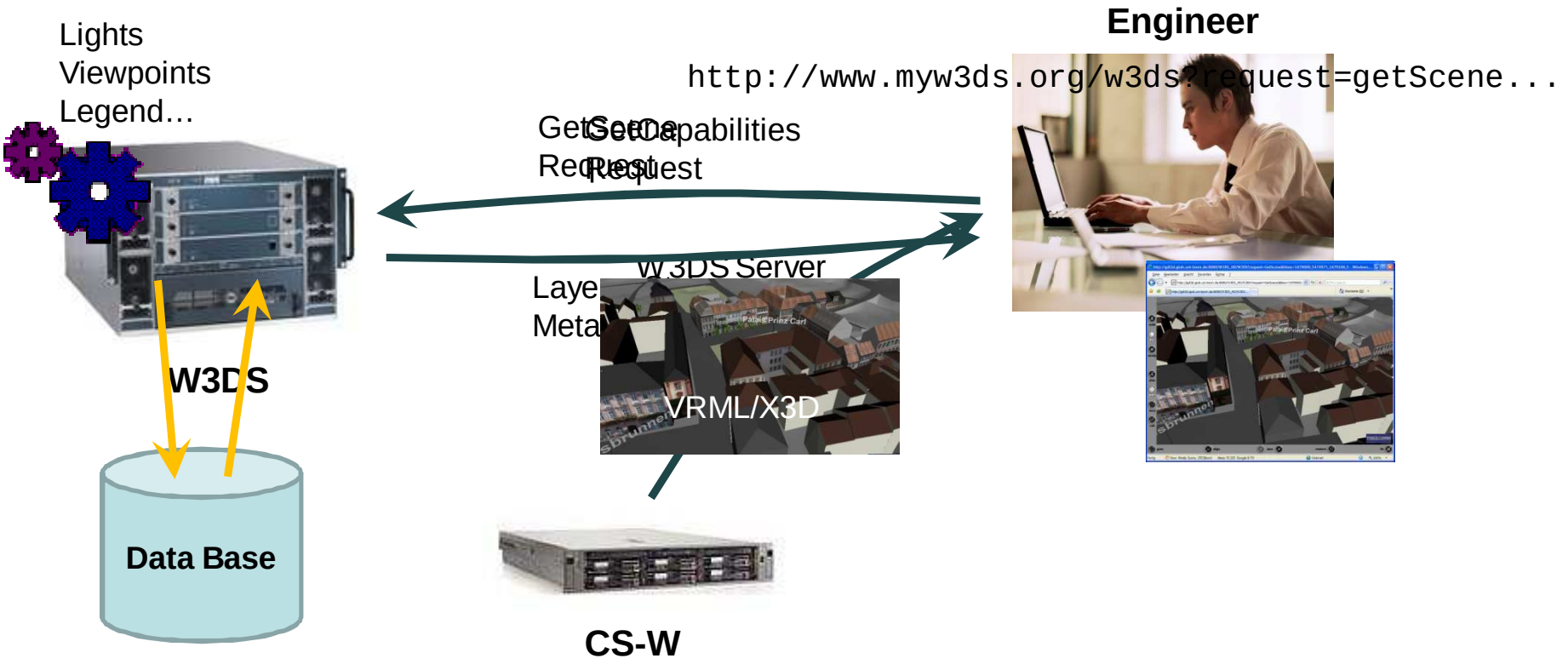
Use Case #1: Get 3D Map

Concept

"Standard" Use Case as described in the W3DS specification
Get static 3D scene of a specific area
3D scene is "complete" (contains lights, viewpoint, legend)
Result ready for exploration or publication

Use Case #1: Get 3D Map

Interaction



universitätbonn Geographie

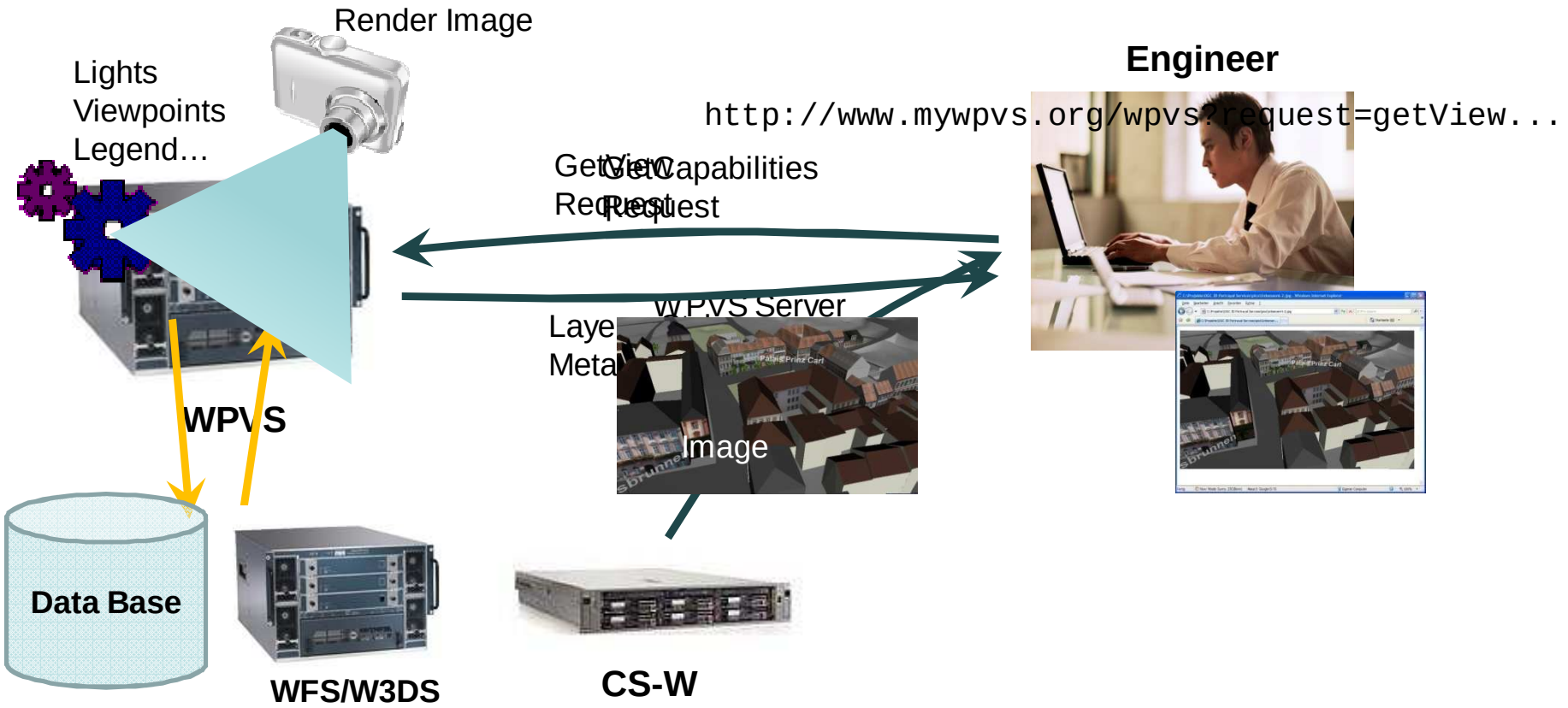
Use Case #2: Get Perspective View on 3D Map

Concept

"Standard" Use Case as described in the WPVS specification
Get perspective image/view of a specific area
Advantage: server can implement complex rendering algorithms (ray tracing, soft shadows, radiocity, caustics etc.)
No need of 3D plugin, can be used by any client
Result ready for publication (high quality)

Use Case #2: Get Perspective View on 3D Map

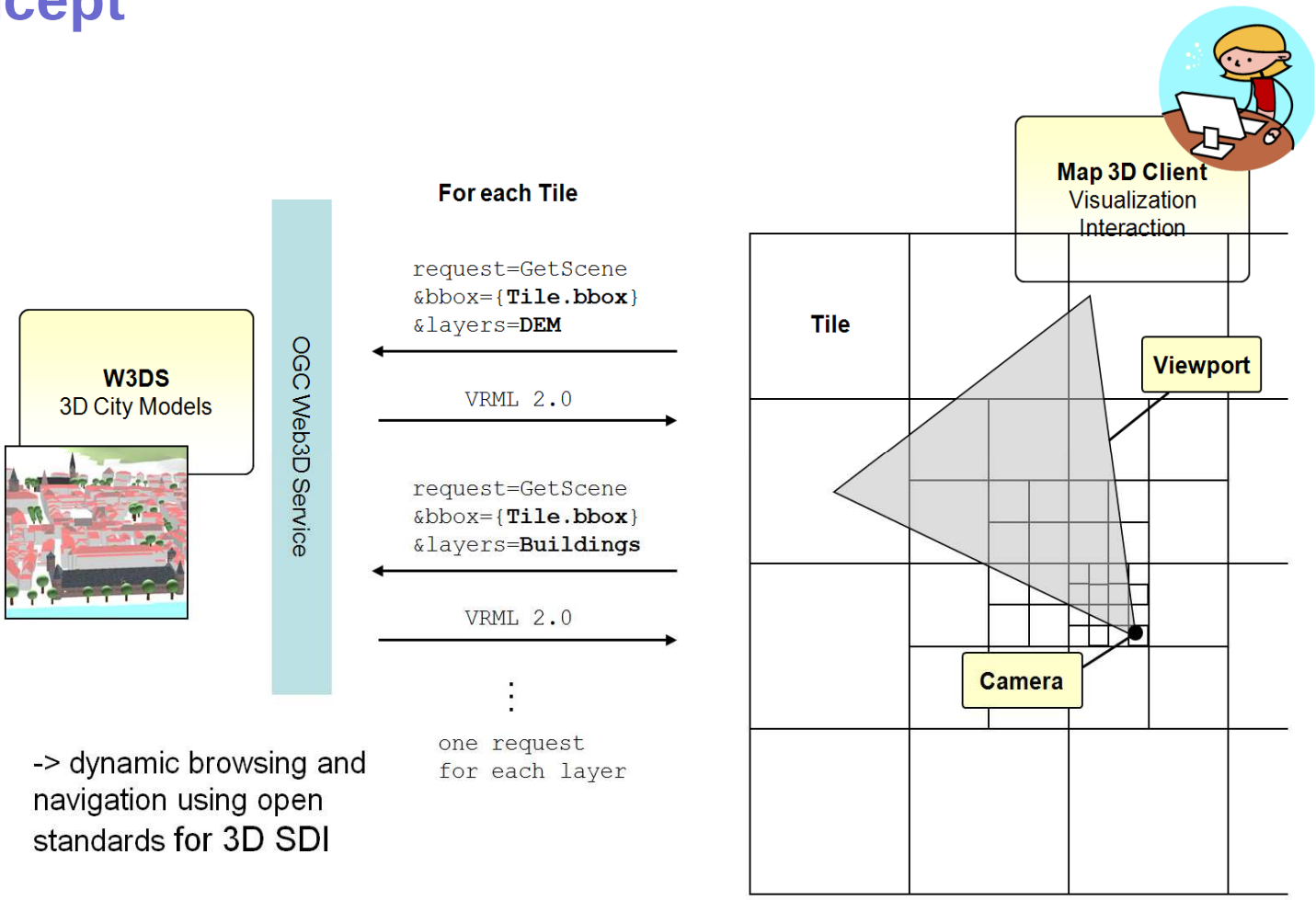
Interaction



universitätbonn Geographie

Use Case #3: Serve Virtual Globe Application

Concept



universitätbonn Geographie

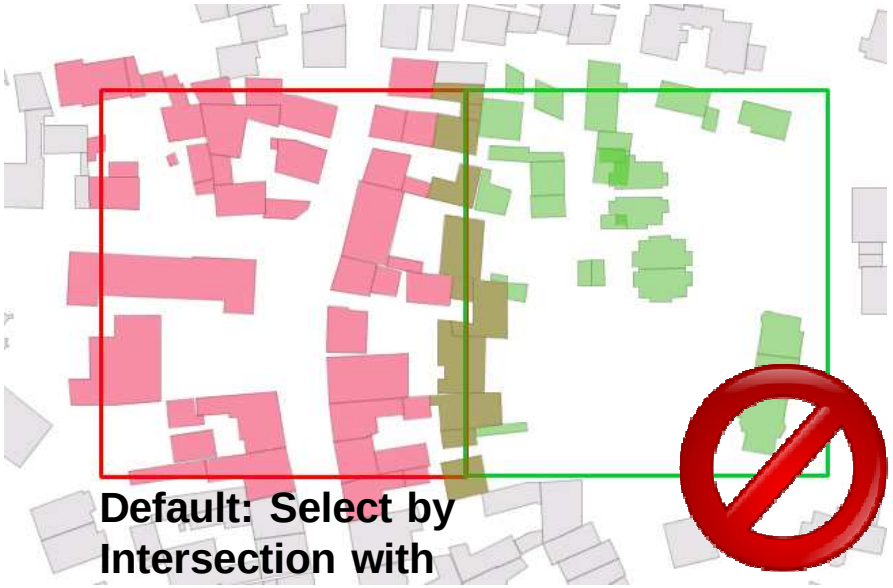
Use Case #3: Serve Virtual Globe Application - Concept

Video dsfds285-100.avi

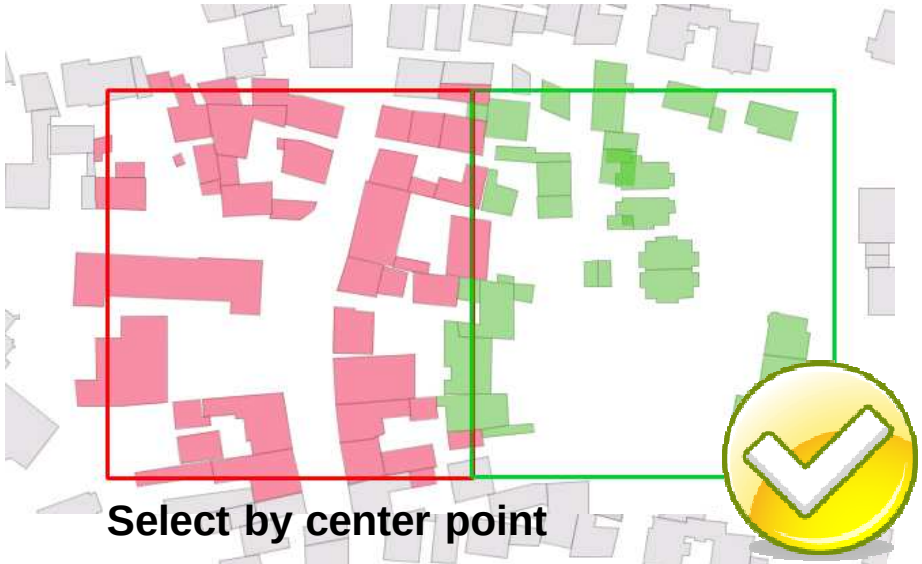
Use Case #3: Serve Virtual Globe Application

Prerequisites

Spatial Selection of Features
-> avoid redundancy



Default: Select by Intersection with bbox



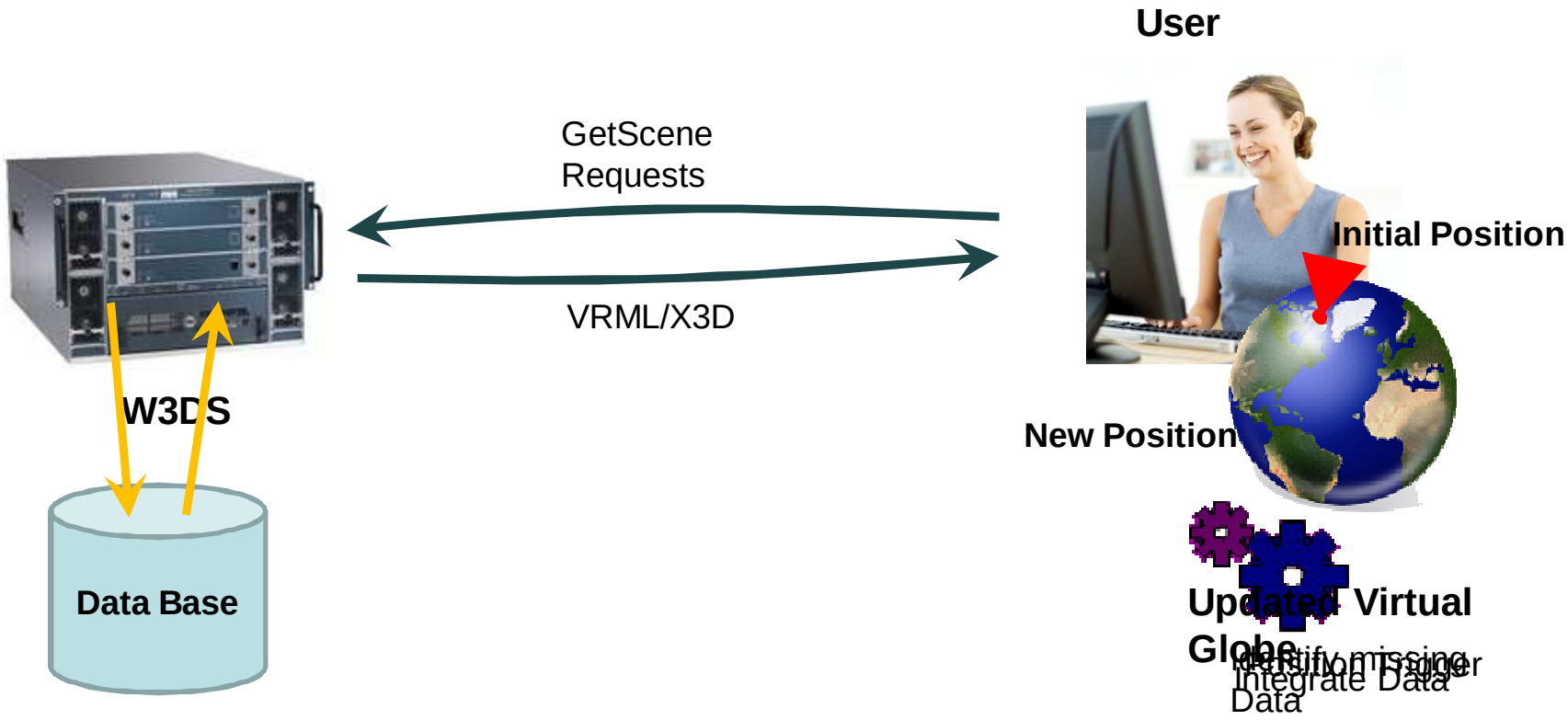
Select by center point

Intersect features with bbox

universitätbonn Geographie

Use Case #3: Serve Virtual Globe Application

Interaction



Use Case #4: Get Custom Styled 3D Map

Concept

- **Use Styled Layer Descriptor (SLD) for controlling the map style**
- **Styling is controlled and defined by the user**
- **SLD document must be transmitted with GetScene or GetView request**
- **Styling is based on available feature attributes**

Use Case #4: Get Custom Styled 3D Map

Prerequisites

- **Portrayal Service must be capable of processing the attached SLD document**
- **Additional request for obtaining information about available feature attribute names and values**

DescribeLayer Operation specified in SLD Profile of the WMS Implementation (OGC 05-078r4)

GetDescription Operation specified in WPVS sixth draft

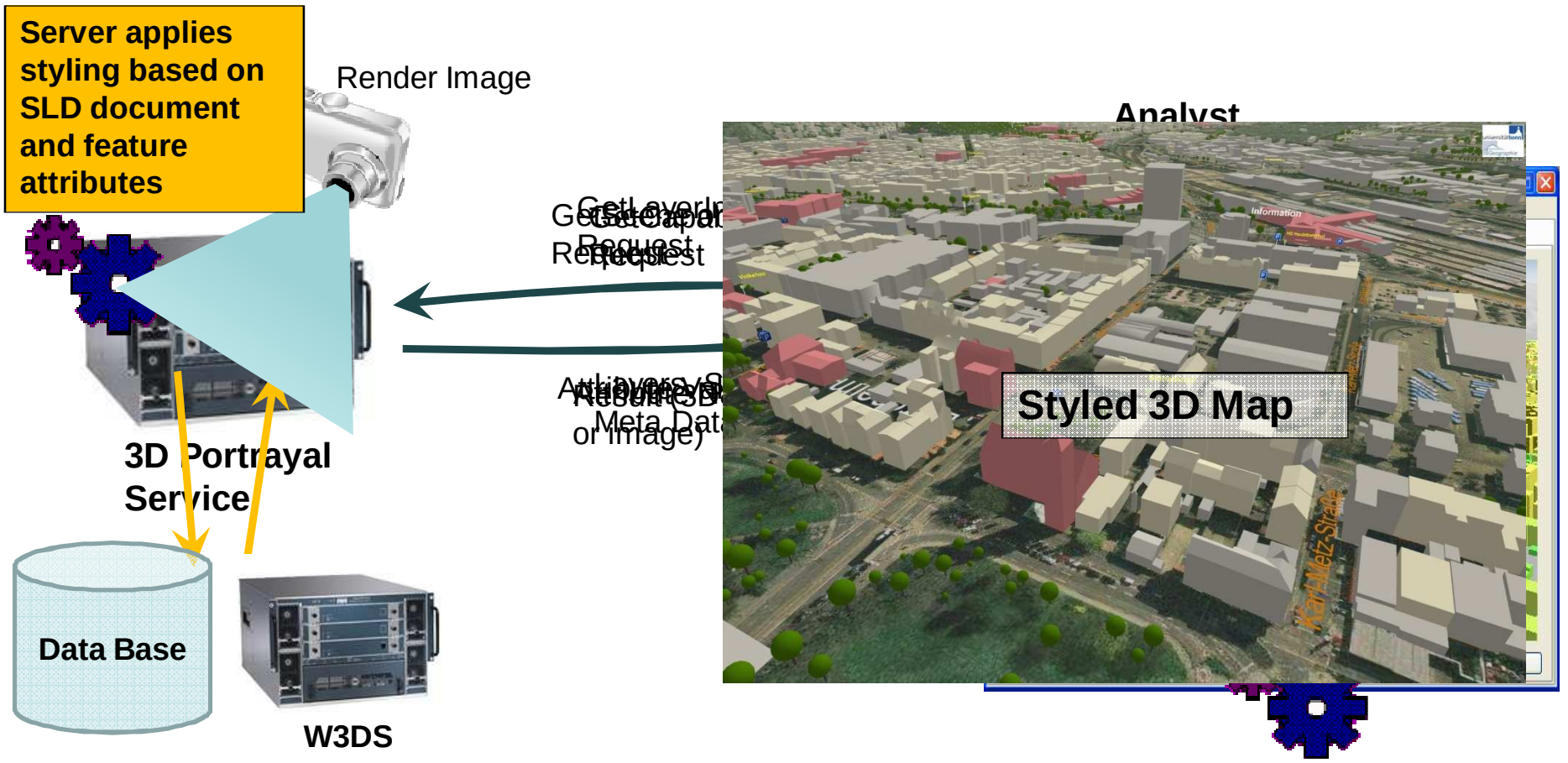
GetResourceByID in OWS Common (OGC 06-121r3)

GetLayerInfo (W3DS unofficial draft)

-> Need for Harmonization?

Use Case #4: Get Custom Styled 3D Map

Interaction



universitätbonn Geographie

Use Case #5: Integrate Planned Object into 3D Map

Concept

- **User (e.g. an Architect) has a 3D CAD drawing of a planned object**
- **He wants to integrate the CAD model into the city model provided by a 3D Portrayal Service**
- **3D CAD model can be exported into CityGML**

-> existing object on the server needs to be replaced by the planned object

Use Case #5: Integrate Planned Object into 3D Map

Prerequisites

GetFeatureInfo Request (as defined in WMS)

- **Purpose**: for retrieving attribute information of a selected feature

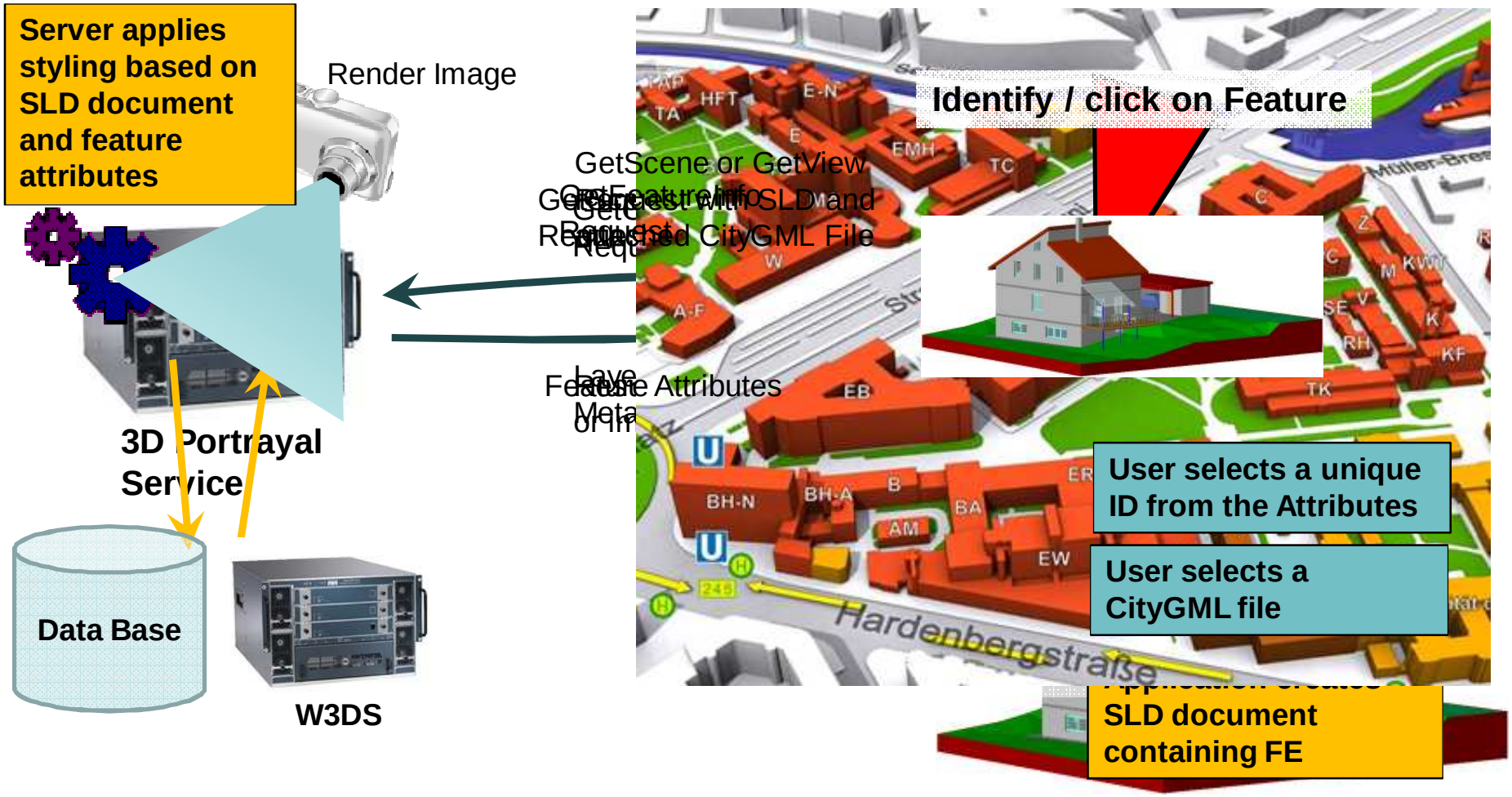
- **Basic Operation**: clicking on object on screen,
  pointing on object (VR environment)

- **Result**: complete list of attribute names and values of selected feature(s)

- **Selection method**: up to implementation

Use Case #5: Integrate Planned Object into 3D Map

Interaction



universitätbonn Geographie

Use Case #6: Roaming between Portrayal Services

Concept

- **Mobile User (PDA or integrated system) is downloading 3D maps while being on the road.**
- **He is always connected to the internet (Wifi, mobile network)**
- **3D Portrayal Service is assigned dynamically using the information from a Catalogue Service**

-> Switching between different Portrayal Services (Roaming)
-> same Map Style should be used (defined as SLD)

Use Case #6: Roaming between Portrayal Services

Interaction

OpenLS Route Service

3D Portrayal Service Region A

SLD

SLD

Mobile User

Routing Application

Static SLD Document

3D Portrayal Service Region B

CS-W

Conclusion

- **Complex client server interactions are possible**
- **Not just static images or scenes**
- **But: need to work on additional service operations**
- **Higher degree of realism and interactive frame rates can be achieved compared to WFS**
- **Both WFS/CityGML and 3D Portrayal Services have pros and cons -> different application areas.**

The End

Discussion?