

EOxServer

Web Coverage Service 2.0 MapServer Implementation

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2012-06-08 HMA AWG Meeting

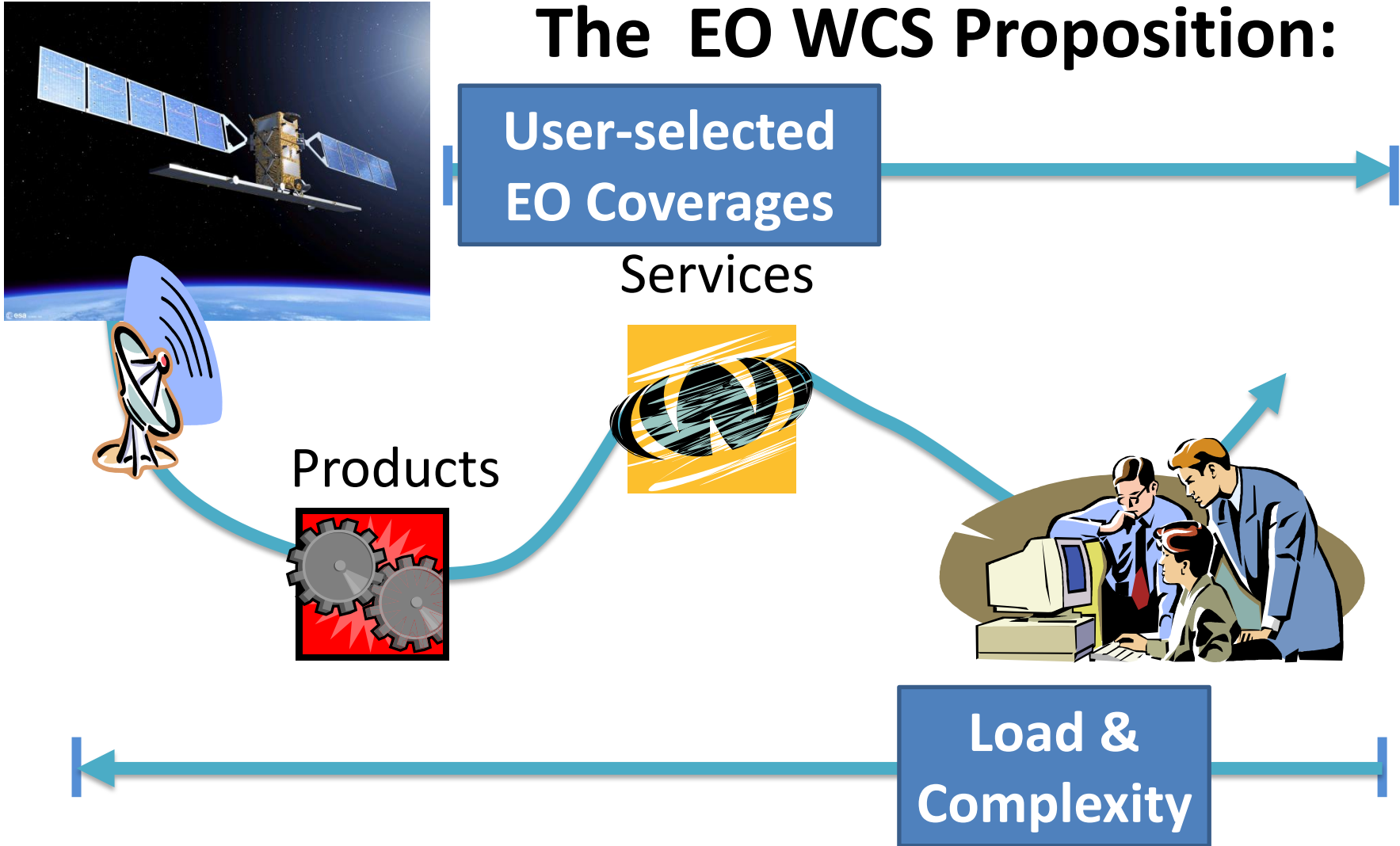
Outline

- Illustration of EO-WCS Proposition and Principles
- Reference Implementation of WCS 2.0 and EO-WCS 1.0 based on MapServer and EOxServer (Results and Conclusions from O3S Project)

Please check also “WCS Standardization & Reference Implementation” presentation by EOX at 2012-02-15 HMA AWG Meeting for:

- Status and Ongoing Work of (EO-) WCS Specification and Standardization

The EO WCS Proposition:



EO-WCS Demo – the Data

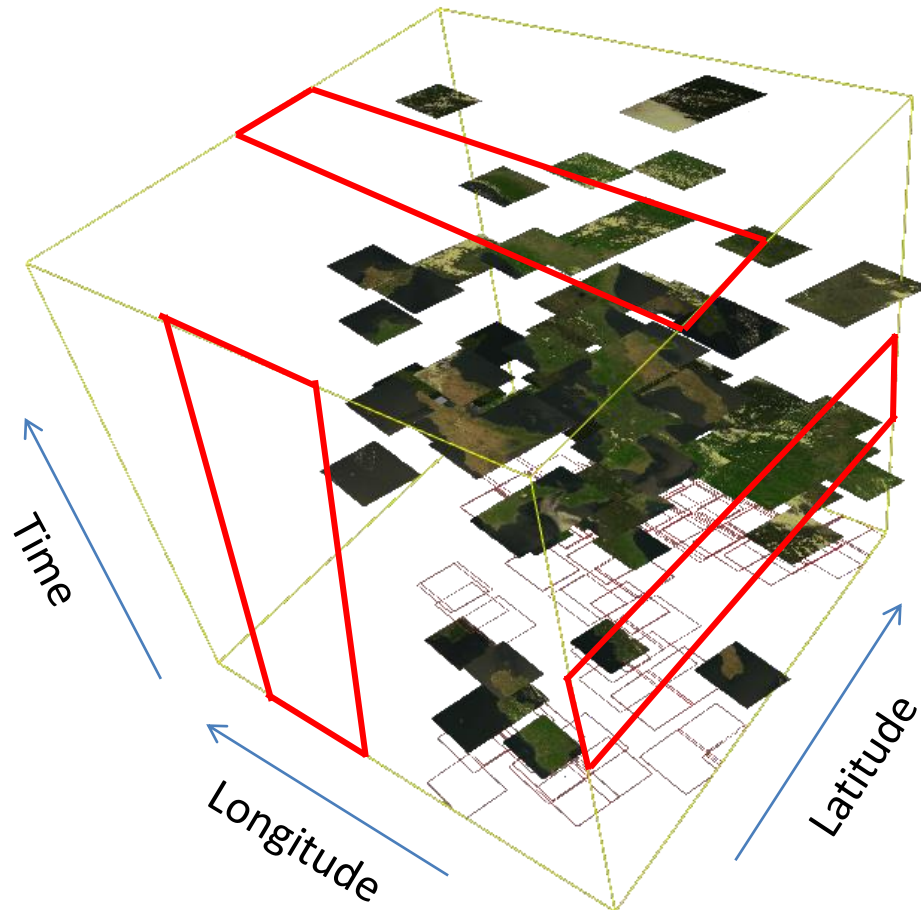


IMAGE2009 "Data Cube"

Data © GMES, availability
FTP@CDS

IRS-p6/Resourcesat-1 with gap
filling by Spot-4/-5, HR2 25 m,
SWIR, VNIR, orthorectified,
cloud <5% per country, EU 38,
multiple coverages collected
from mid 2008 to mid 2009

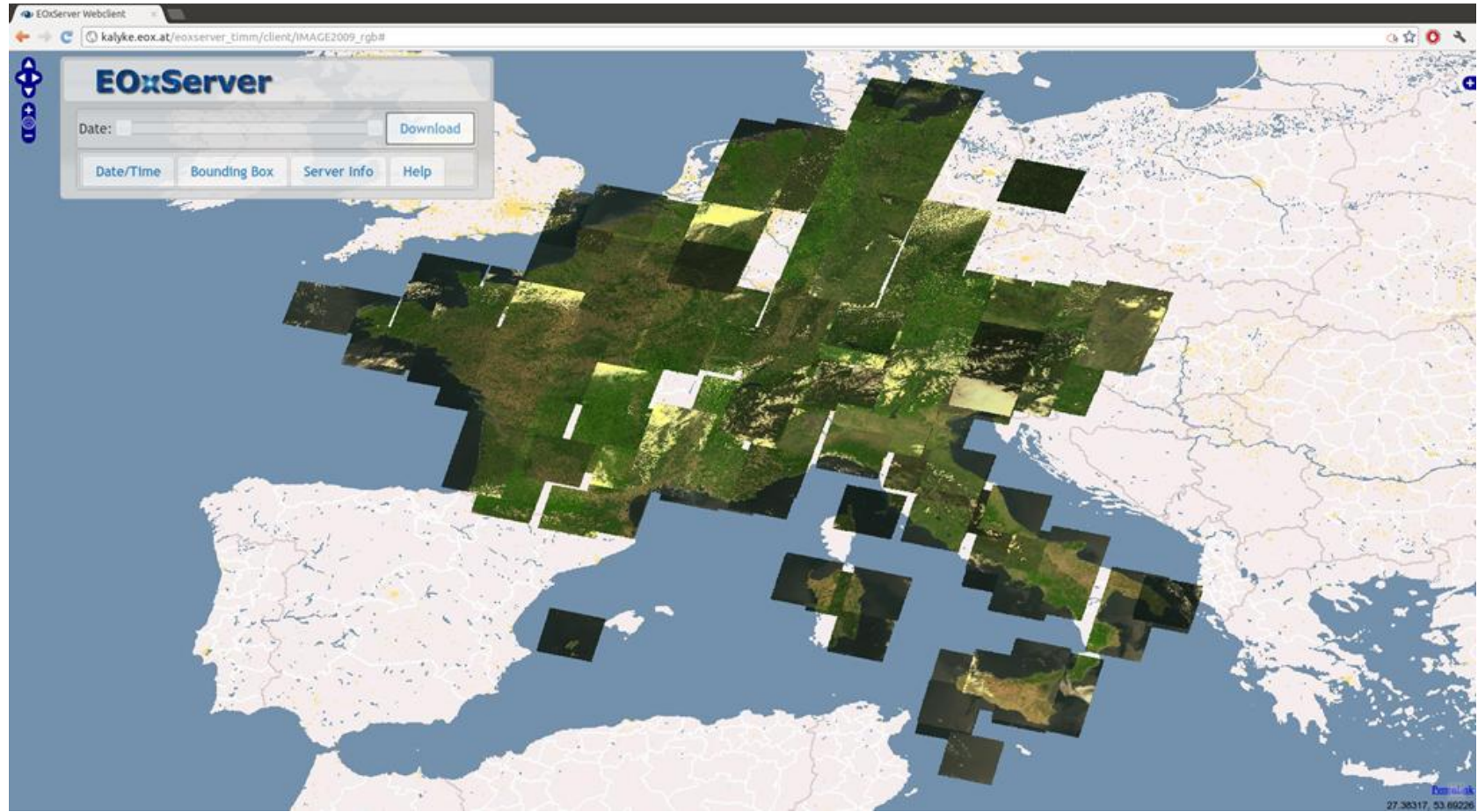
Registered into EOxServer for
demo: 227 Scenes, 60 Gbyte:
4 band originals and 3 band
RGB

3D "Aquarium" courtesy FP7
EarthServer project

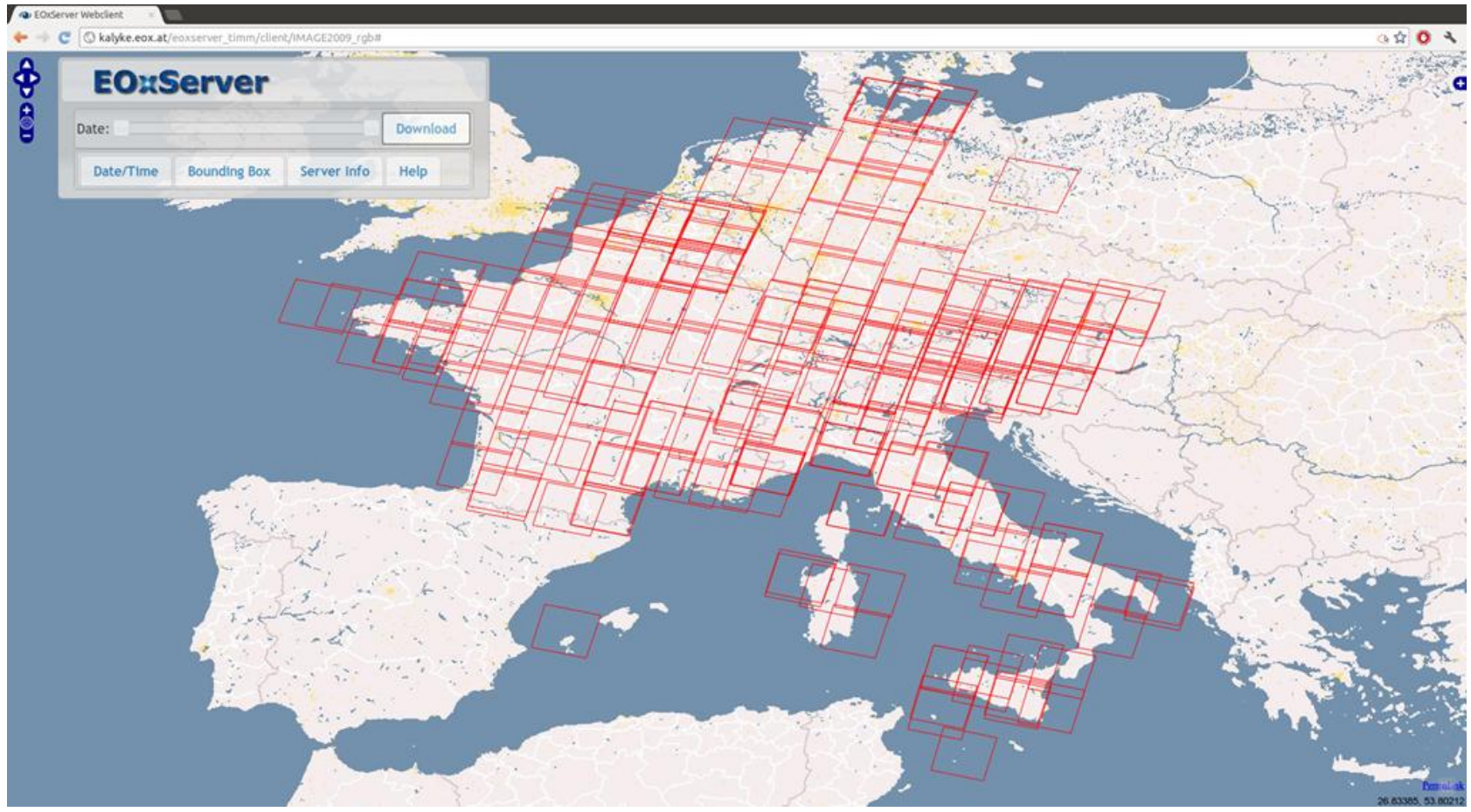
EO-WCS Demo – the Client

- The EOxServer Embedded Client allows to illustrate EO-WCS principles:
 - WMS Request/Response for discovering/viewing coverages
 - WCS Request/Response including all possible EO WCS operations and parameter specifications
 - Open/Save of downloaded coverages
- This Client was used to produce the following slides

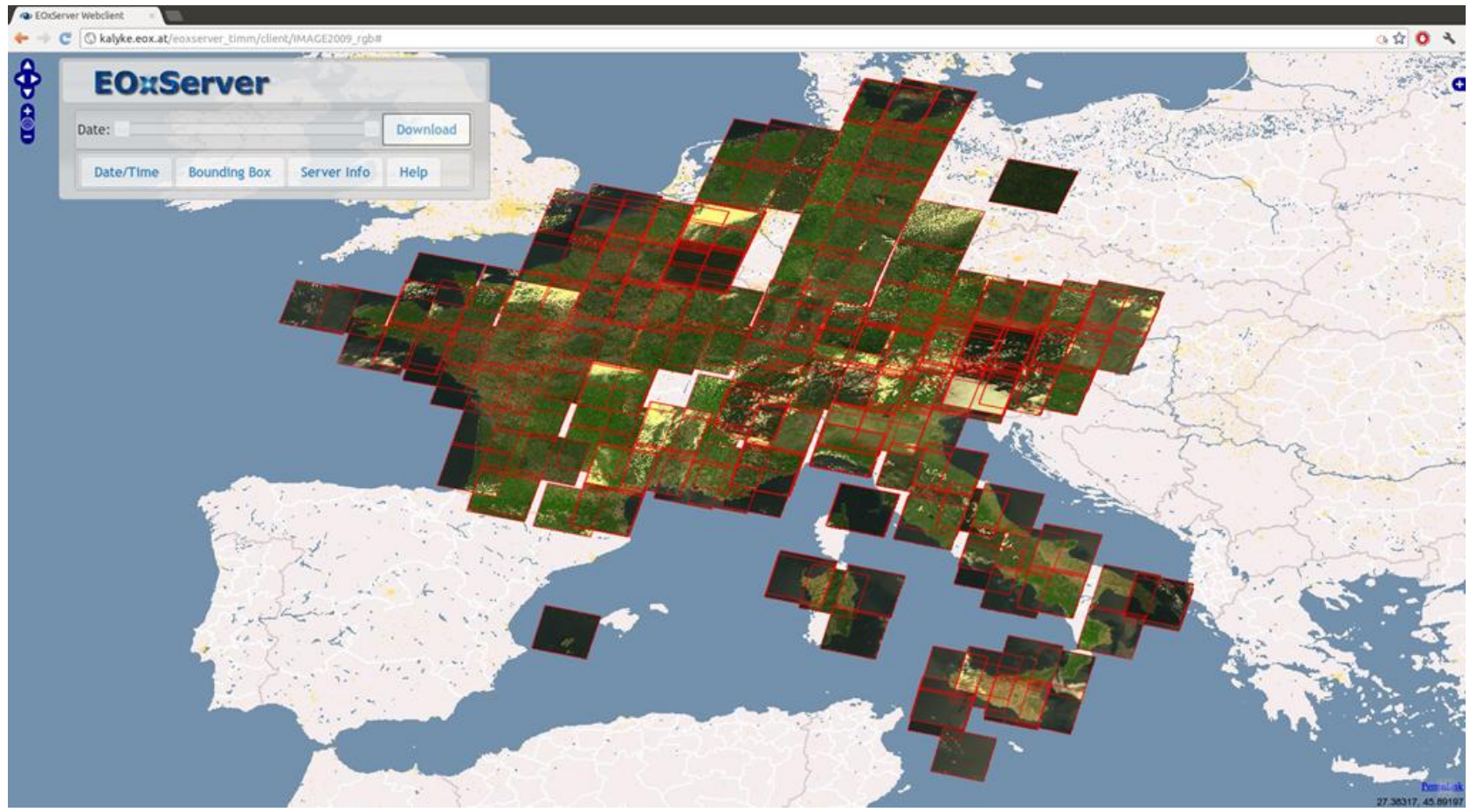
WMS View, Latest Data on Top



WMS View, Outlines



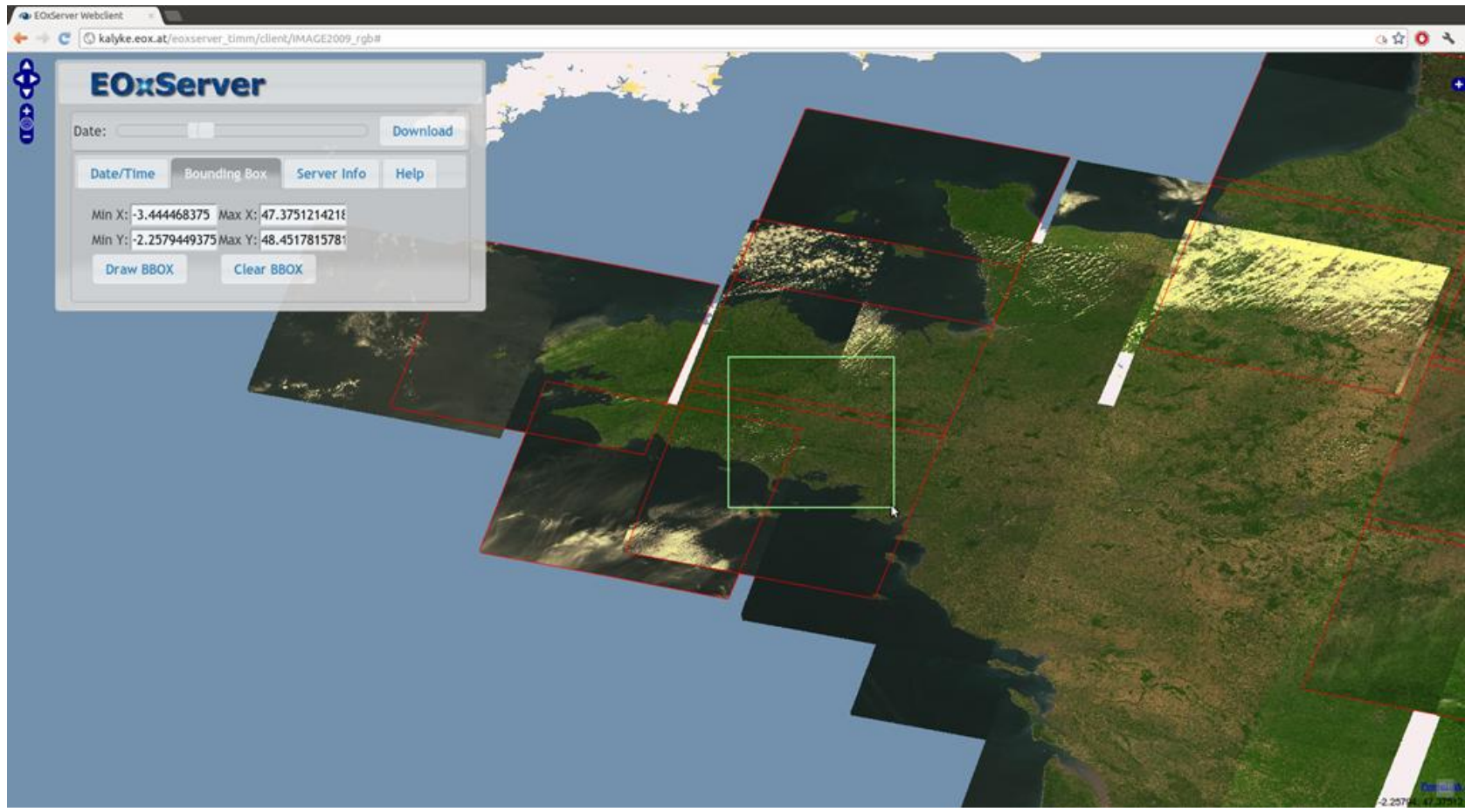
WMS View, Combined



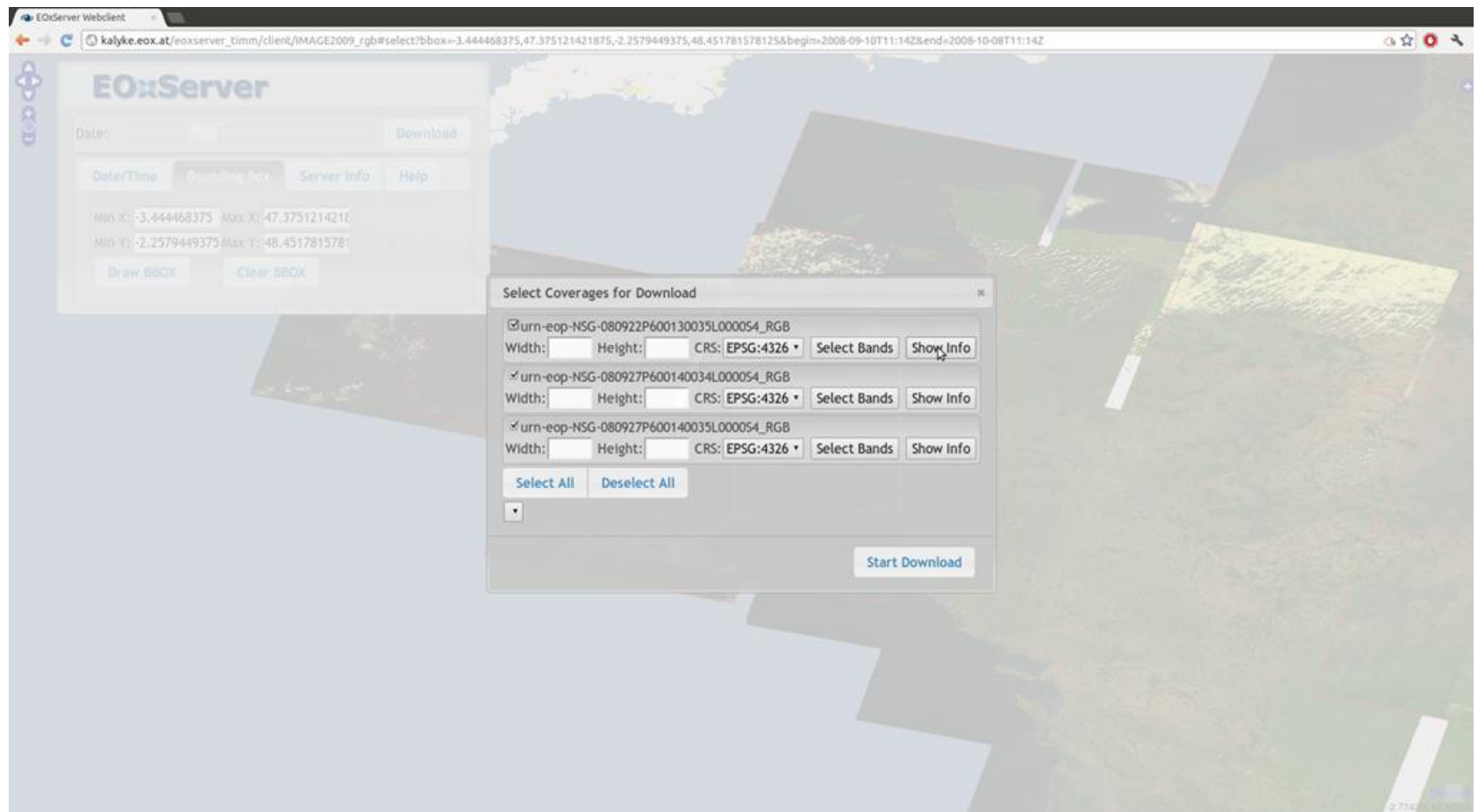
ToI Subsetting



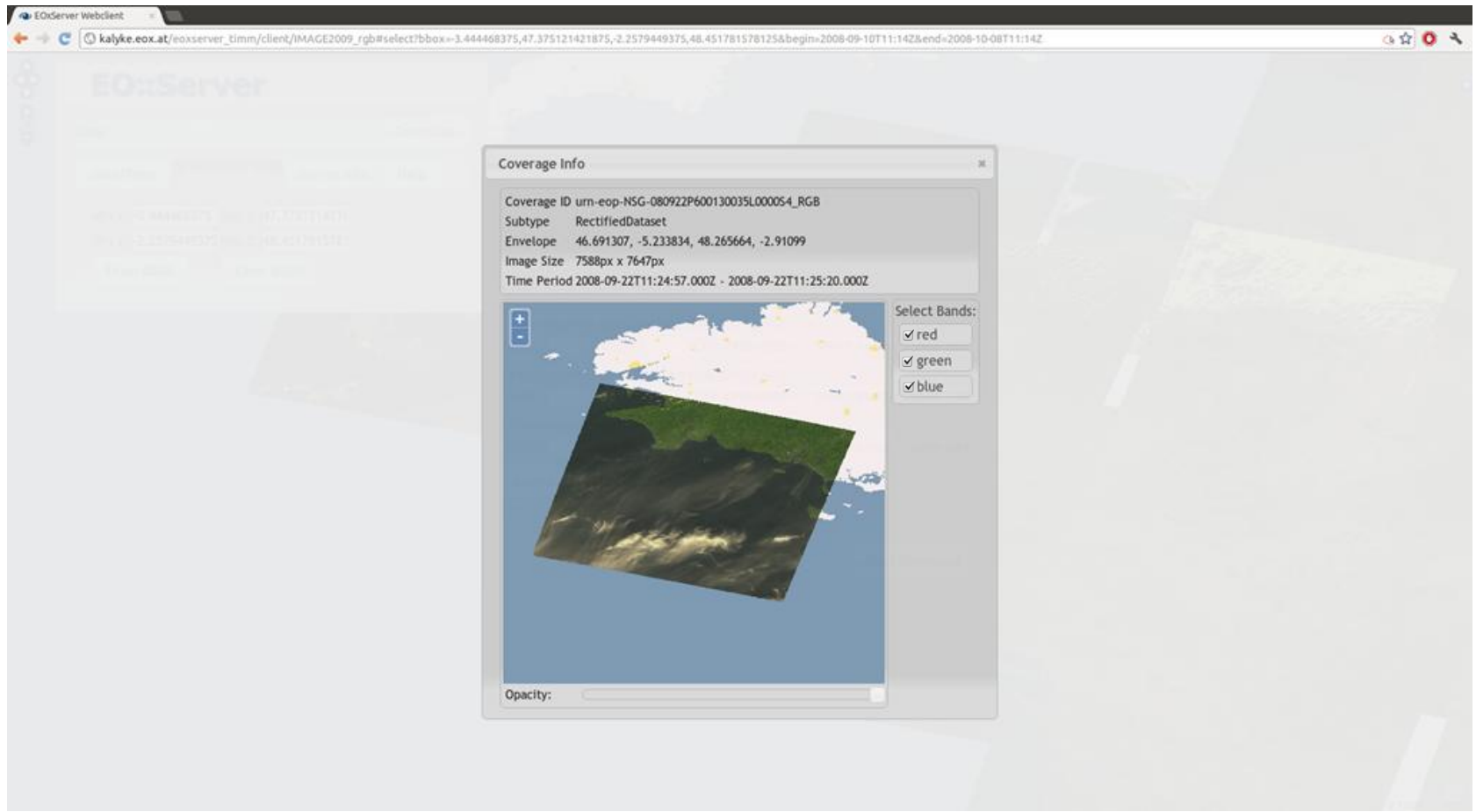
AoI Subsetting



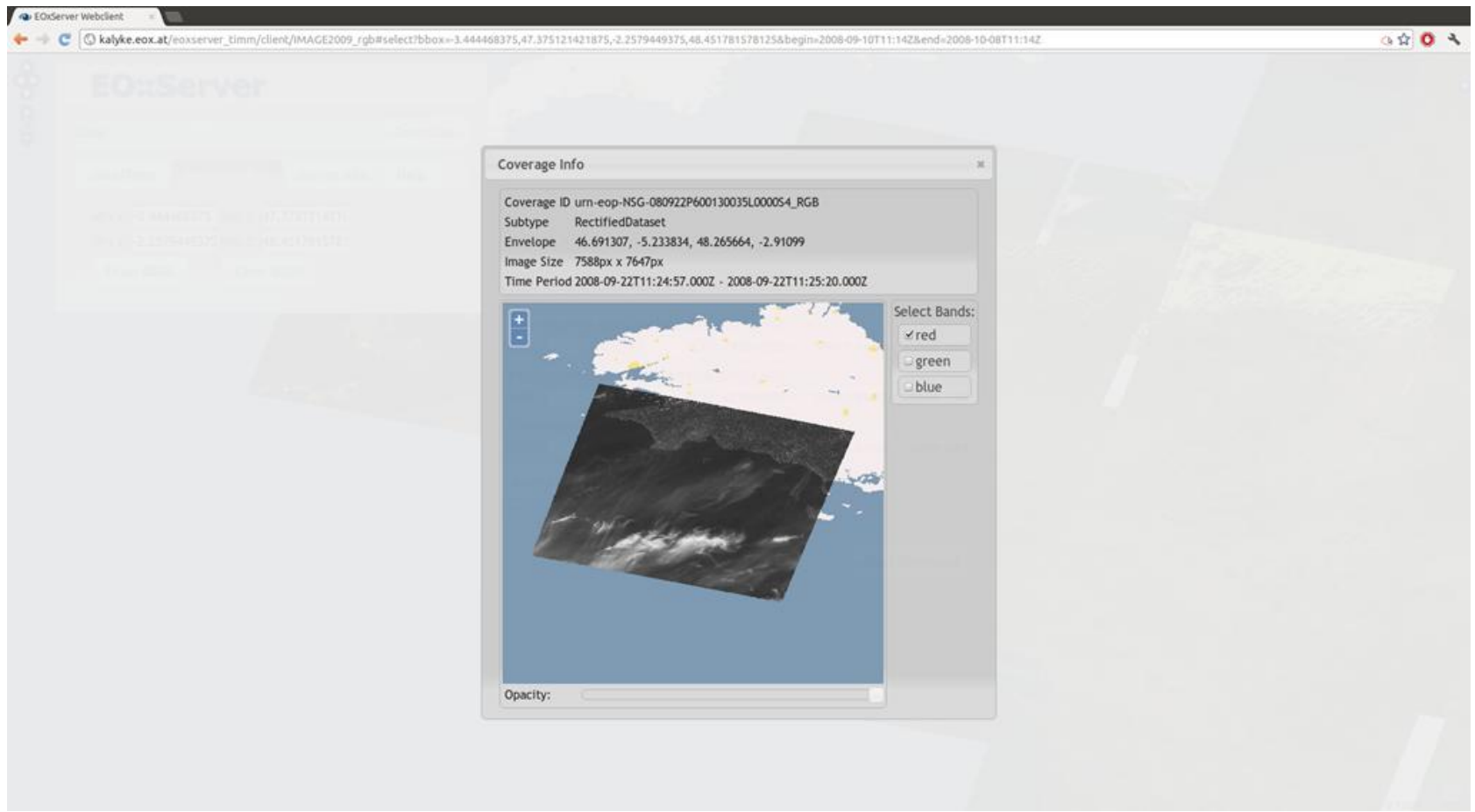
Dataset and CRS Selection



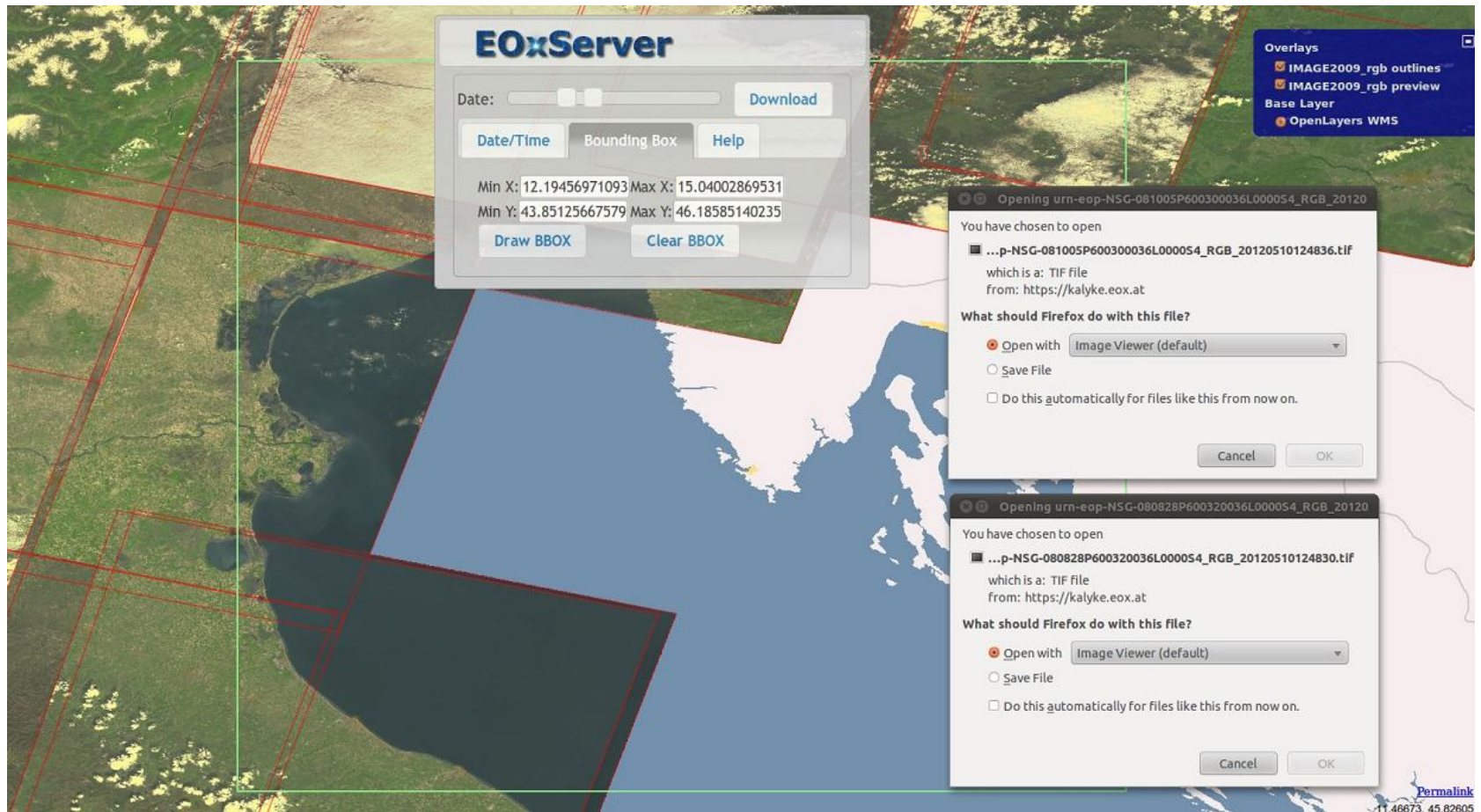
Band Selection



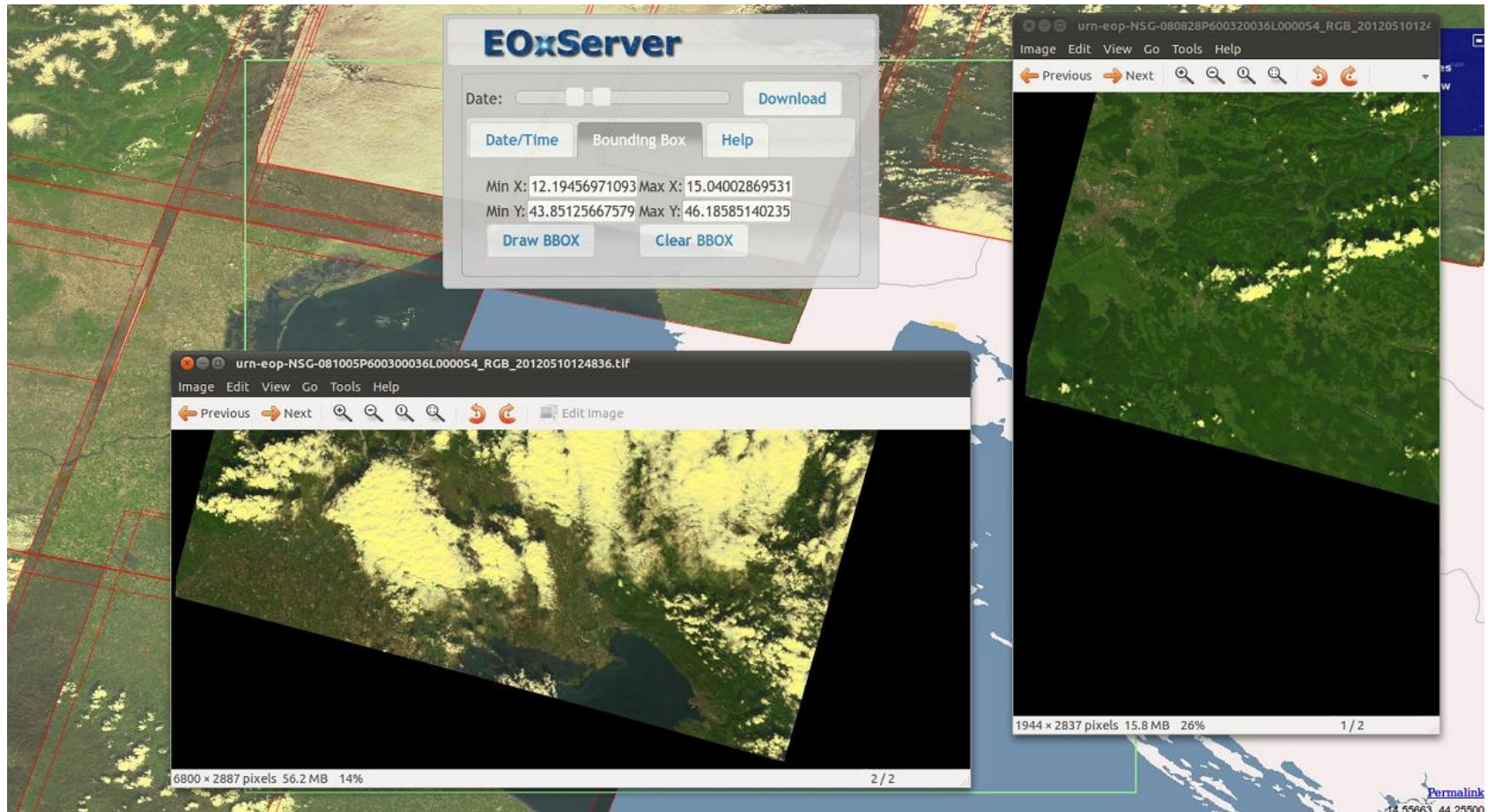
Band Selection



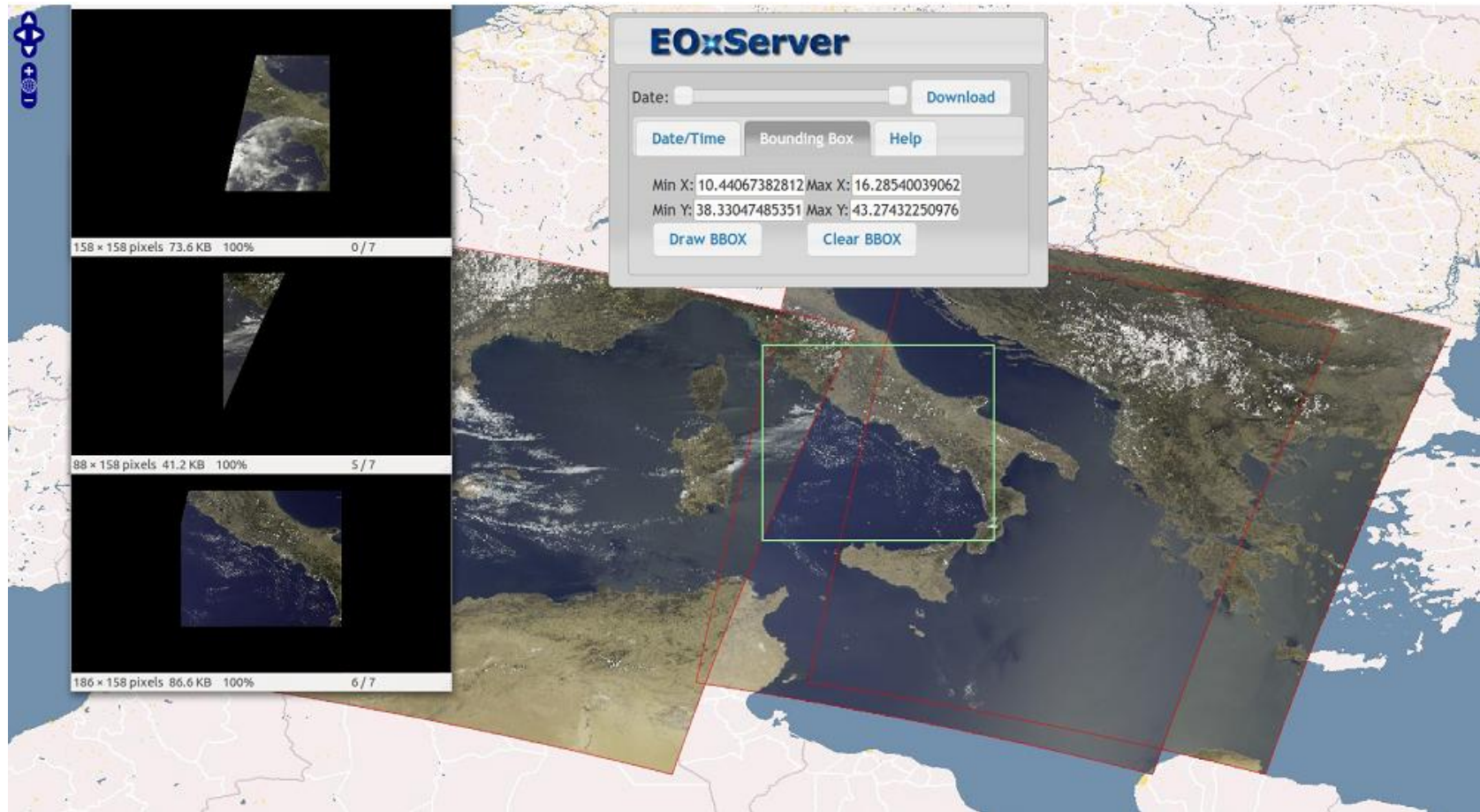
Open/Save of Downloads



Downloads Clipped to AoI



Downloads Clipped to AoI



Downloads of Full Scenes

The screenshot displays the EOxServer web interface. On the left, a vertical sidebar contains navigation icons. The main area shows a satellite map of Europe with a red bounding box drawn over it. A control panel titled "EOxServer" is overlaid on the map, featuring a "Date:" field, a "Download" button, and tabs for "Date/Time", "Bounding Box", and "Help". Below the tabs are input fields for "Min X:", "Max X:", "Min Y:", and "Max Y:", along with "Draw BBOX" and "Clear BBOX" buttons. On the far left, a vertical stack of three thumbnail images is shown, each with its dimensions, file size, and zoom level (59%). The thumbnails are labeled "1 / 3", "2 / 3", and "3 / 3" respectively.

EO-WCS Terminology

- "RectifiedGridCoverage"
Illustrated in the foregoing demo: geo- or ortho-rectified scenes clipped to AoI or as full scenes intersecting the AoI downloaded as separate files
- "RectifiedStitchedMosaic"
Geo- or ortho-rectified scenes stitched together (latest on top, no radiometric adjustment), clipped to AoI, and downloaded as single file
- "ReferenceableGridCoverage"
Original image geometry, nonetheless AoI selection is possible via geographic coordinates
- "DescribeEOCoverageSet"
Spatio-temporal search on metadata, an additional WCS operation

EO-WCS Standardization

- EO-WCS 1.0.0 – Public comment period passed of “OGC 10-140, OGC WCS 2.0 Application Profile - Earth Observation”
 - One comment received
 - Adjustments to GMLCOV and WCS corrigenda
- Ready for voting
- Further conformance testing scheduled in OWS-9

Reference Implementations

-  **MapServer** open source web mapping Release 6.0

- WCS 2.0.0 via KVP & XML/POST
- Anticipating future extensions (CRS, Scaling & Interpolation, Band subsetting, Encodings)

- **EOxServer** Release 0.2
 - EO-WCS 1.0.0 & EO-WMS on top of MapServer

- **SOAP Proxy**
 - Proxy to add XML/SOAP for WCS & EO-WCS

Results of ESA GSTP-5 Activity

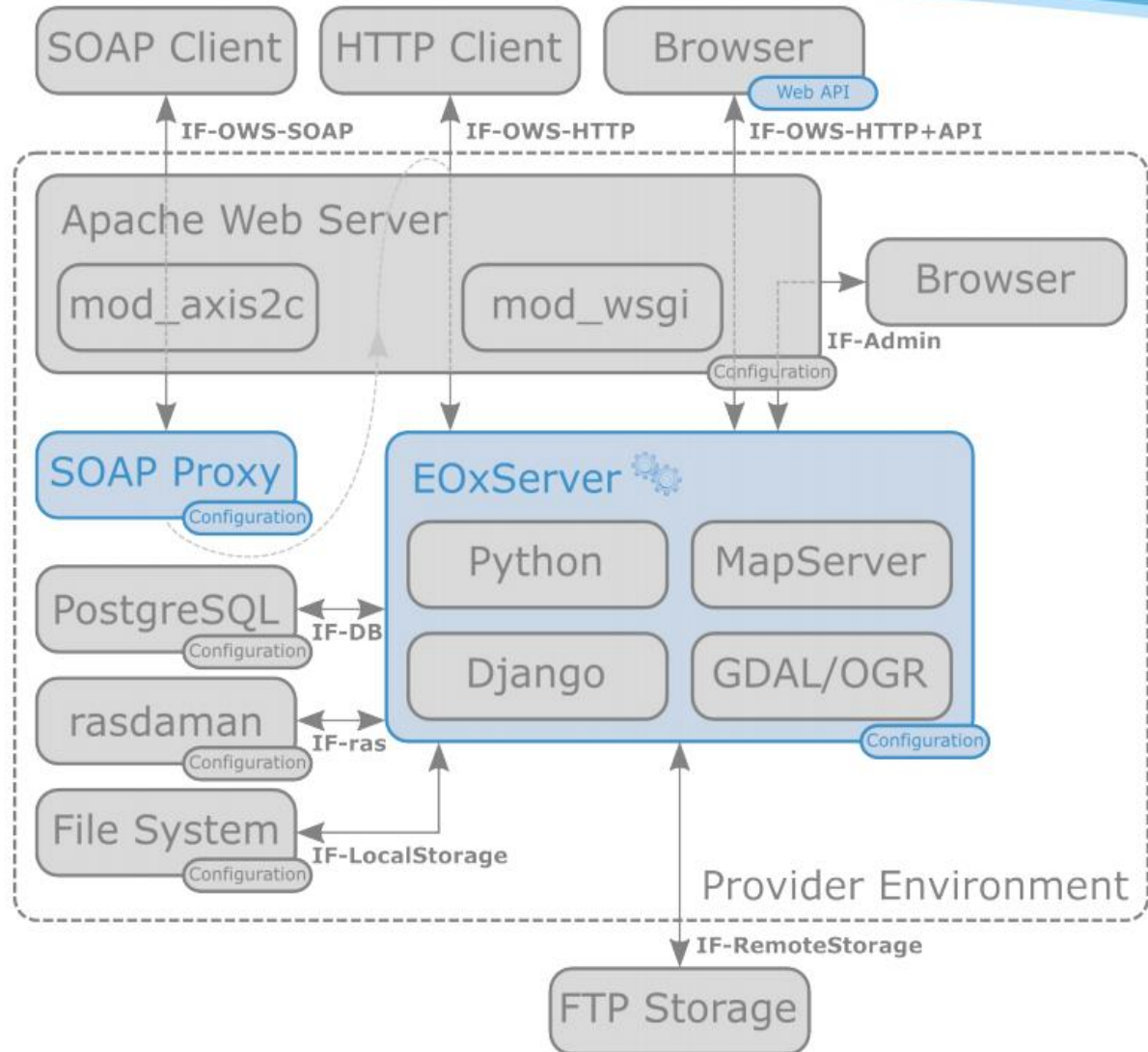


Open-Standard Online Observation Service

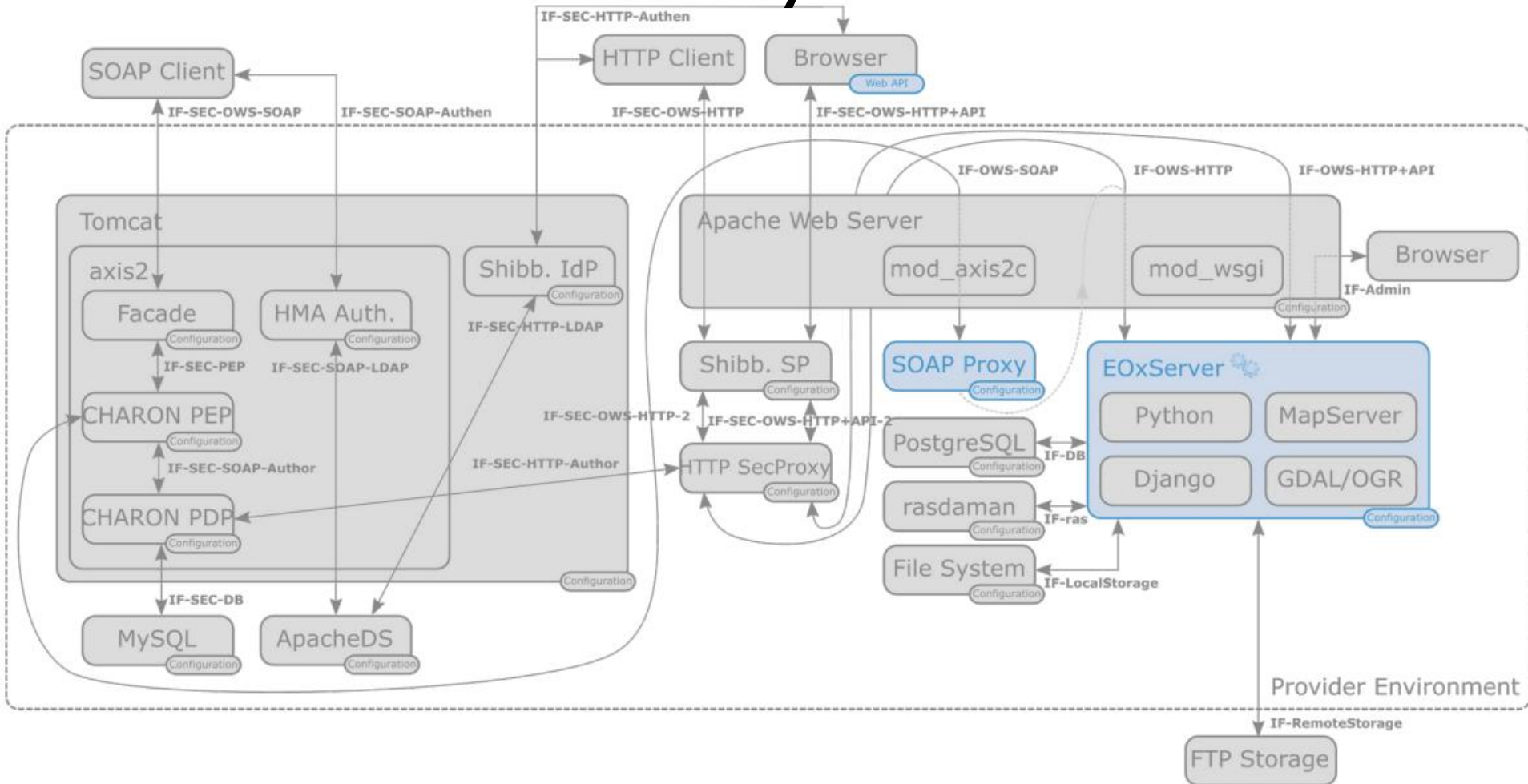
EOxServer in Brief

- MIT-style license and based on Open Source SW
- Version 0.2.0 released on May 4th 2012
- WCS, EO-WCS, WMS, EO-WMS, WCS-T (synchronous & asynchronous)
- Rectified- & ReferenceableGridCoverages
- Client for demonstrating integrated usage of EO-WMS & EO-WCS (used for generation of above EO WCS demo slides)
- Admin app & Log viewer
- Command line tools: "eoxserver-admin.py create_instance ...", eoxs_add_dataset_series, eoxs_register_dataset, eoxs_synchronize
- Python Package Index (PyPI) Rectified- and ReferenceableGridCoverages
- DatasetSeries and StitchedMosaics
- Integration with security system (IDMS)

O3S Software System (excl. IDMS)



O3S Software System



EOxServer

logged in as meissls | [Logout](#) | [Preferences](#) | [Help/Guide](#) | [About Trac](#)

	Wiki	Timeline	Roadmap	Browse Source	View Tickets	New Ticket	Search	Admin
	Start Page	Index	History	Last Change	Rename page			

Welcome to the EOxServer Open Source Project

EOxServer is a server for Earth Observation (EO) data

EOxServer's mission: *To provide an Open Source software framework to ease the online provision of big Earth Observation data archives via Open Standard services for efficient exploitation by users.*

- Open Source: MIT-style license
- software framework: Entirely based on Open Source (Python, MapServer, Django, GDAL, etc.)
- ease online provision: Admin GUI and command line data registration
- big Earth Observation data archives: Operators register existing raster data archives
- Open Standard services: Open in the sense of freely available; Open Geospatial Consortium (OGC); WMS, WCS, EO-WMS, EO-WCS
- efficient exploitation by users: User defined sub-setting; view and download

Welcome to the EOxServer Open Source Project
[EOxServer is a server for Earth Observation \(EO\) data](#)
[EOxServer Technical Details](#)
[EOxServer Wiki](#)
[Testing](#)
[User Notes](#)
[Developer Notes](#)

[Download EOxServer](#)

[EOxServer Documentation \(pdf\)](#)

[EOxServer Demonstration \(Explanations\)](#)

[EOxServer Mailing Lists](#)

Work on EOxServer has been partly funded by the [European Space Agency \(ESA\)](#) in the frame of the [HMA-FO](#) and [O3S](#) projects.



EOxServer

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Enter search terms or a module, class or function name.

EOxServer's English Documentation

EOxServer is a Python application and framework for presenting Earth Observation (EO) data and metadata.

EOxServer implements the OGC Implementation Specifications EO-WCS and EO-WMS on top of MapServer's WCS and WMS implementations.

EOxServer is released under the *EOxServer Open License* a MIT-style license and written in Python and entirely based on Open Source software including MapServer, Django/GeoDjango, GDAL, SpatiaLite, or PostGIS, and PROJ.4.

Here you find the English documentation for users and developers of EOxServer.

- EOxServer Users' Guide
- EOxServer Developers' Guide
- EOxServer Requests for Comments
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EOxServer

Project Cost

This calculator estimates how much it would cost to hire a team to write this project from scratch. [More »](#)

Include	<input type="text" value="Markup And Code"/>
Codebase	10,057
Effort (est.)	2 Person Years
Avg. Salary	\$ 55000 /year
	\$ 121,713

estimates how much it would cost to write this project from scratch.

18,492 LOC

4 Person Years

\$ 55000 /year

\$ 231,517

Project Cost

Avg. Salary \$ 55000 /year

Effort (est.) 7 Person Years

\$ 386,563

Updated May 07, 2012

EOxServer, updated 03 Nov 2011 more at ohloh

http://www.ohloh.net/p/eoxserver

Outlook – Scaling up

- Ongoing deployments of EOxServer etc. in stakeholder projects:
 - EarthServer – “Big Analytics on Big Data” in FP7 INFRA
 - CryoLand - GMES Downstream Service Snow & Land Ice
 - DREAM Online Data Access Server Open Source (Reference Installations at EUSC, ESRIN, and NLR)
- Possible deployments:
 - Front-end to ESRIN Data Farm (GPOD Archive) or other Cloud Archives
 - Dissemination interface for Image20** from CDS
 - Others?
- Multi-party developers team continues to be very active in coordinated Scrum process

Selling the Story

(to decision makers)

- **AWG is invited to make recommendations on how to improve the following two slides**
- The slides are attempting a high-level selling proposition for the implementation of EO-WCS in future Ground Segments (in comparison with today's FTP-based and data-driven workflows)

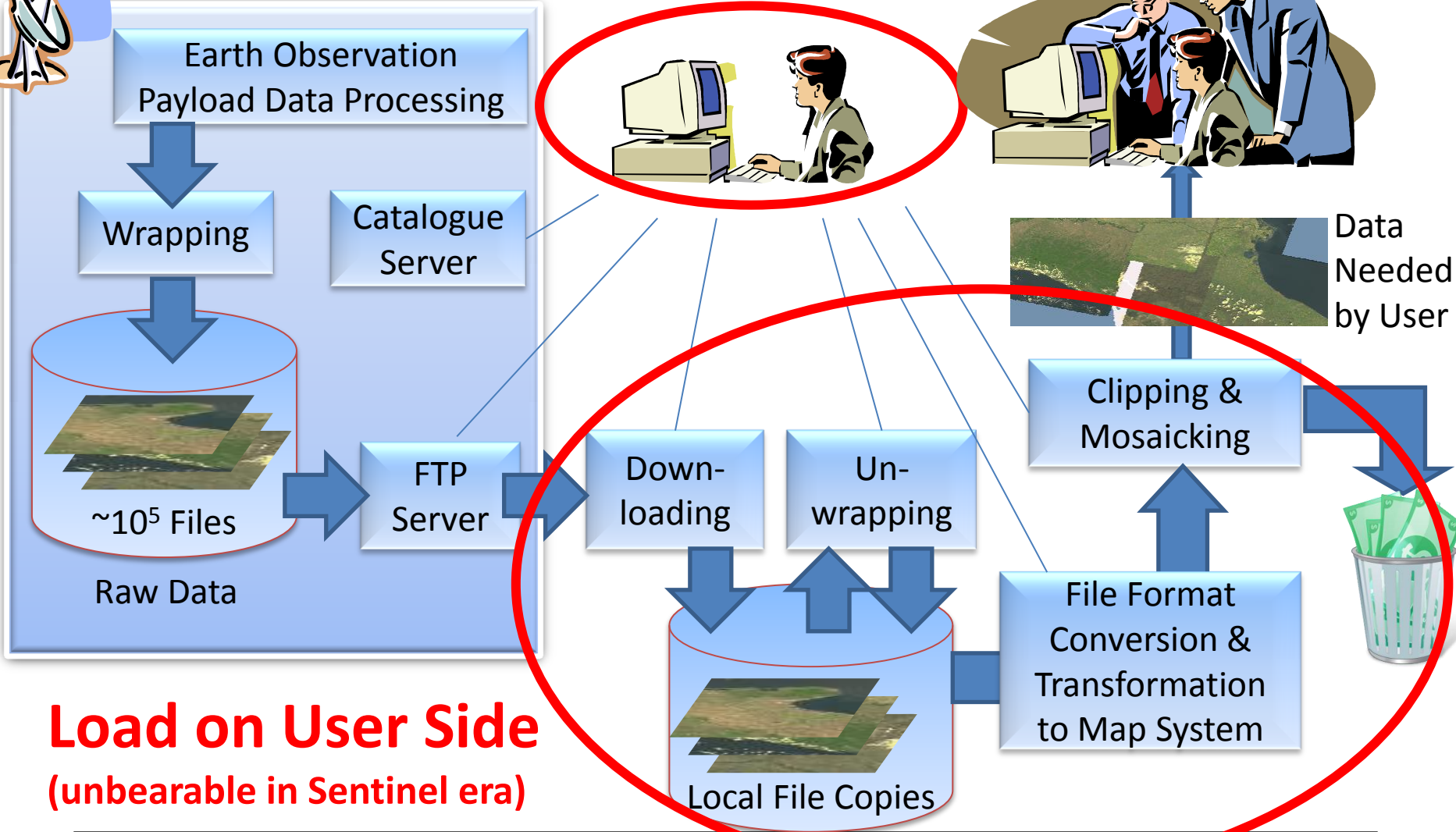
- The slides were presented at the ESA Technology Transfer Broker Meeting, Vienna, 15 March 2012. EOxServer has been accepted for the Technology Forum Database under ref. 1486 ([http://www.technology-forum.com/index.php?id=55&tx_wfqbe_pi1\[uid\]=763](http://www.technology-forum.com/index.php?id=55&tx_wfqbe_pi1[uid]=763))

The virtual market place
TECHNOLOGY FORUM



Ground Segment

EO Data Users



Load on User Side
(unbearable in Sentinel era)

Ground Segment

EO Data Users

Earth Observation
Payload Data Processing

EOxServer

Data
Regist-
ration

WCS
Server

**Standard
Protocol**

Down-
loading



Data
Needed
by User



~10⁵ Files

Raw Data

Load on Provider Side
(comparatively moderate)

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Work on EOxServer has been partly funded by the European Space Agency (ESA) in the frame of the HMA-FO and O3S projects.



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