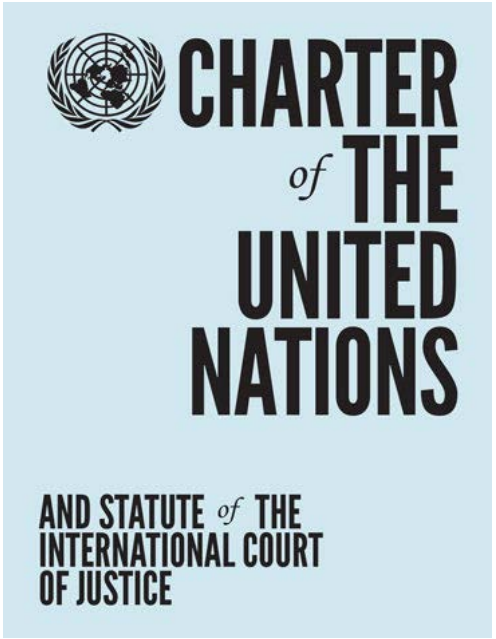
Boston, 16 August 2017

The UN Open GIS Initiative

Kyoung-Soo Eom, UN
Ricardo Arias, U.S. Africa Command (USAFRICOM)
Maria Antonia Brovelli, OSGeo and Politecnico di Milano, Italy
Ki-Joune Li, Pusan National University, South Korea
HaeKyong Kang, KRIHS, South Korea

UN Open GIS
INITIATIVE



WE THE PEOPLES OF THE UNITED NATIONS DETERMINED

- to save succeeding generations from the scourge of war, which twice in our lifetime has brought untold sorrow to mankind, and
- to reaffirm faith in fundamental human rights, in the dignity and worth of the human person, in the equal rights of men and women and of nations large and small, and
- to establish conditions under which justice and respect for the obligations arising from treaties and other sources of international law can be maintained, and
- to promote social progress and better standards of life in larger freedom,

AND FOR THESE ENDS

- to prac
- to unite
- to unite our strength to maintain international peace and security, and
- to employ international machinery for the promotion of the economic and social advancement of all peoples,

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OSGeo

UN Open GIS INITIATIVE

Empower everyone with open source geospatial

UN Open GIS Initiative

To Unite Our Strength *without Barrier*

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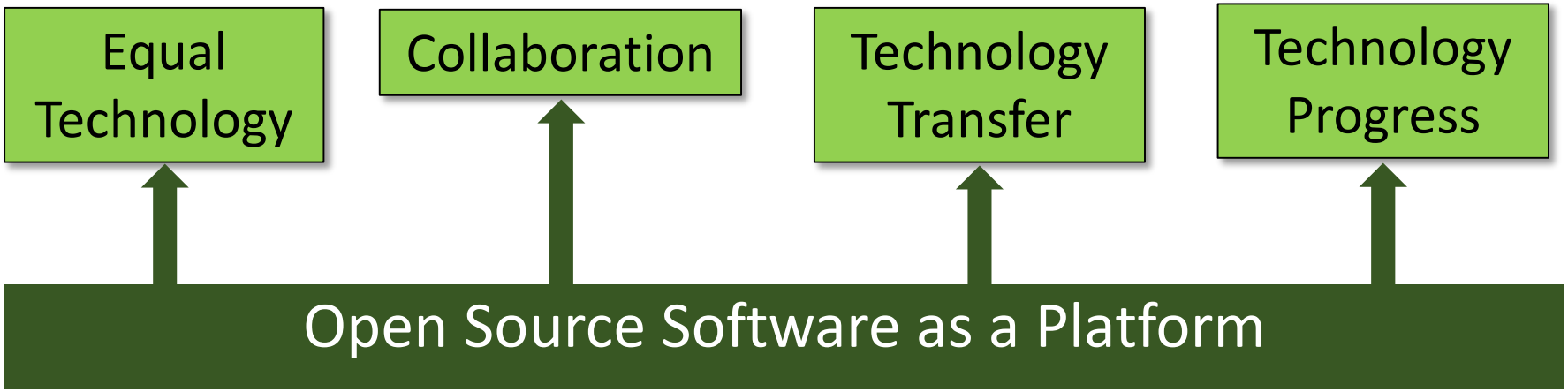
Open Source as an International Machinery



OSGeo

UN Global Service Centre, Brindisi, Italy. 7-11 March 2016

A Basic Understanding on UN Open GIS

UN Open GIS INITIATIVE

- UN is a International Organization, which functions like government
- UN GIS as a **National Spatial Data Infrastructure (NSDI)**

- NSDI
  - Framework (Base and Reference) Map
  - System and Services
  - Capacity (i.e, the ability of the individuals and the organization or the organizational units to perform functions effectively, efficiently and sustainably)
  - Institutional Arrangement
  - Standards

Goal and Scope of UN Open GIS Initiative

UN Open GIS
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NSDI Solutions

1. System and Services
2. Capacity

Scope of UN Open GIS

What is the UN Open GIS Initiative?

UN Open GIS INITIATIVE

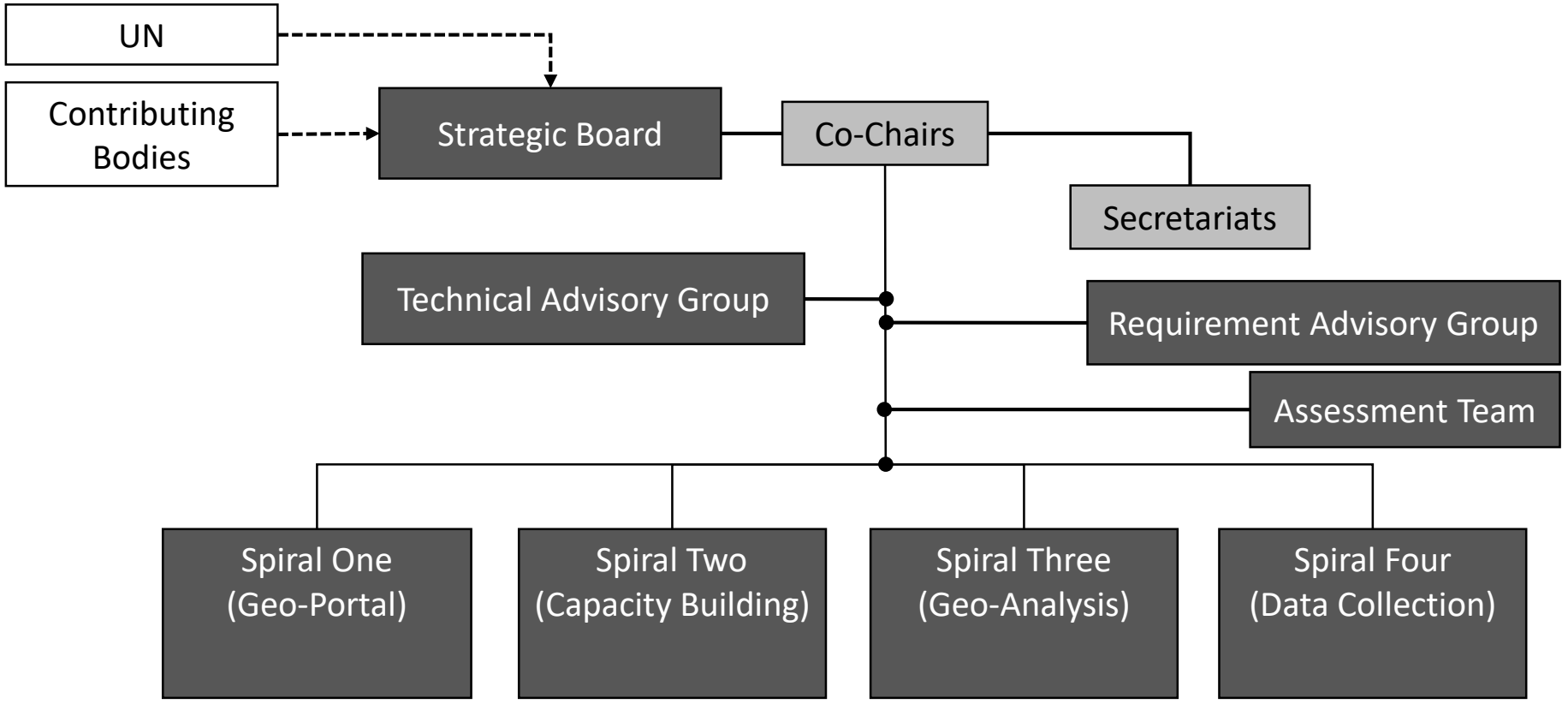
Goal

To identify and develop open source GIS software that meets the requirements of UN operations, taking full advantage of the expertise of mission partners. - from *UN Open GIS Strategy Manifesto*

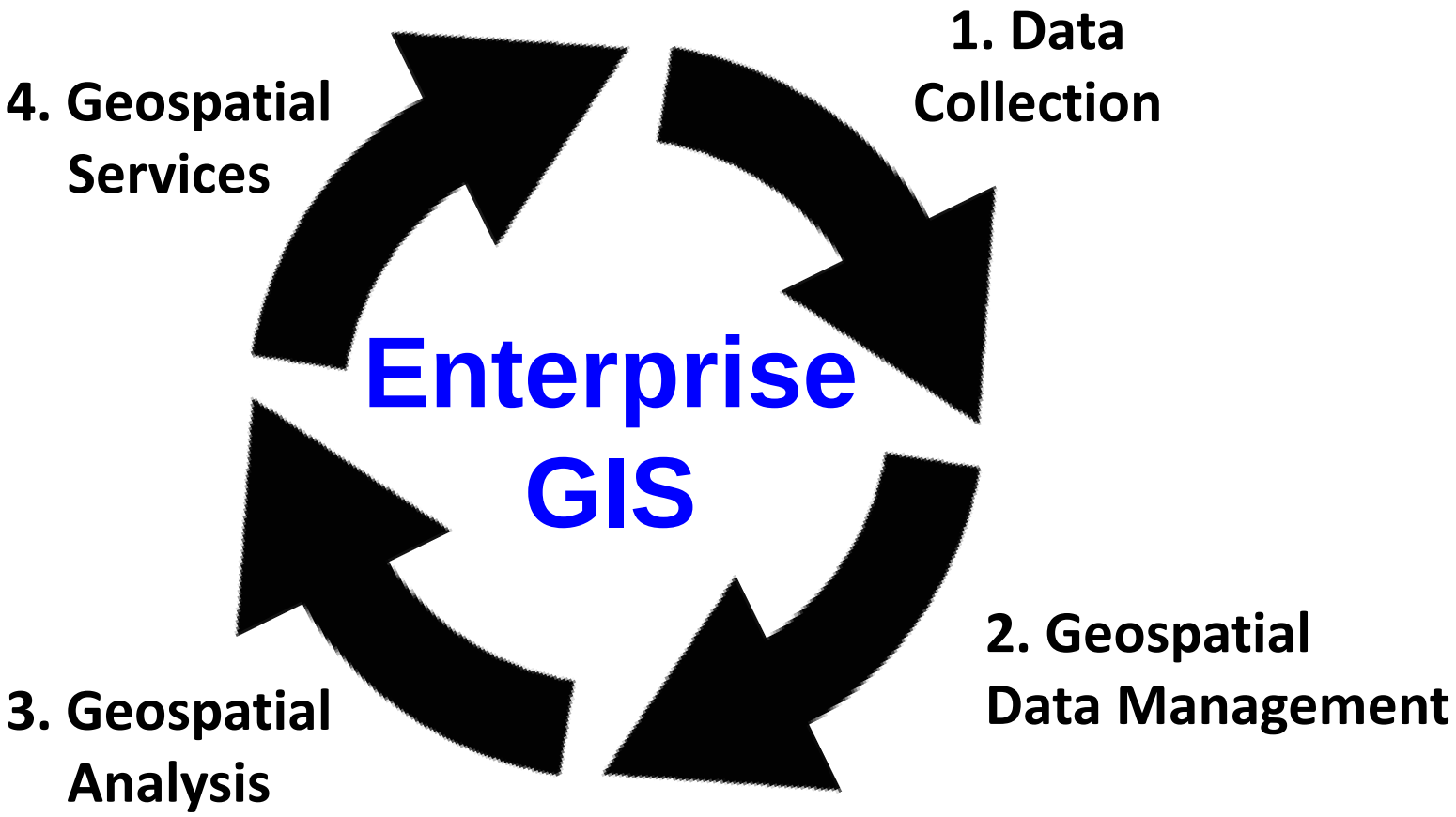
Current Members

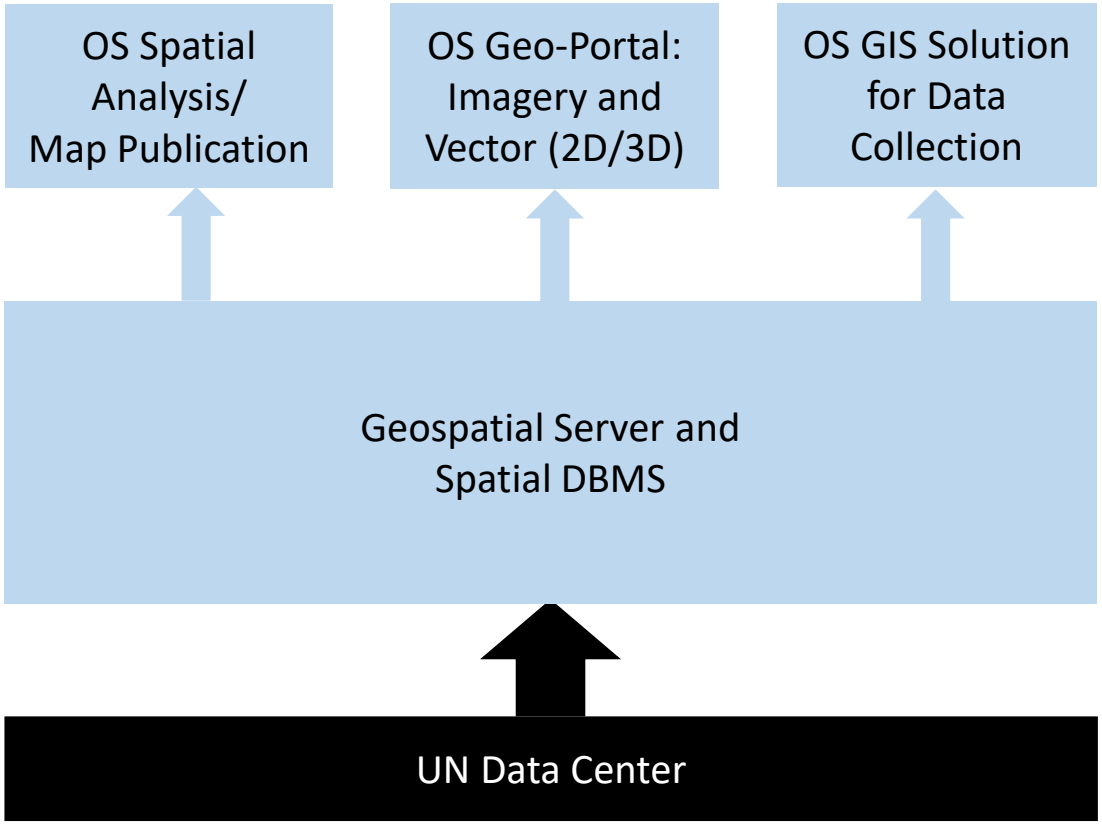
Members	Contributions
UN	Strategy, Requirement Analysis, Deployment, Assessment, Maintenance
US DoD, NGA	Geo-Portal (GeoSHAPE/Exchange), Training Support
KRIHS, Korea	Geo-Analysis, Geospatial Data Collection (OpenGDS)
GeoSDI, Italy	Geospatial Applications and Services (GeoSDI)
OSGeo	OS Knowledge, Documentation, Technical supports
GeoForAll	Technical Supports, Education
+	

UN Open GIS Initiative Structure



Why Called Spiral? - Incremental Approach


1. Data Collection
2. Geospatial Data Management
3. Geospatial Analysis
4. Geospatial Services
Enterprise GIS


OS Spatial Analysis/ Map Publication
OS Geo-Portal: Imagery and Vector (2D/3D)
OS GIS Solution for Data Collection
S/W Sharing
Geospatial Server and Spatial DBMS
Function Sharing
Data Sharing
UN Data Center
Infrastructure Sharing

UN Open GIS INITIATIVE

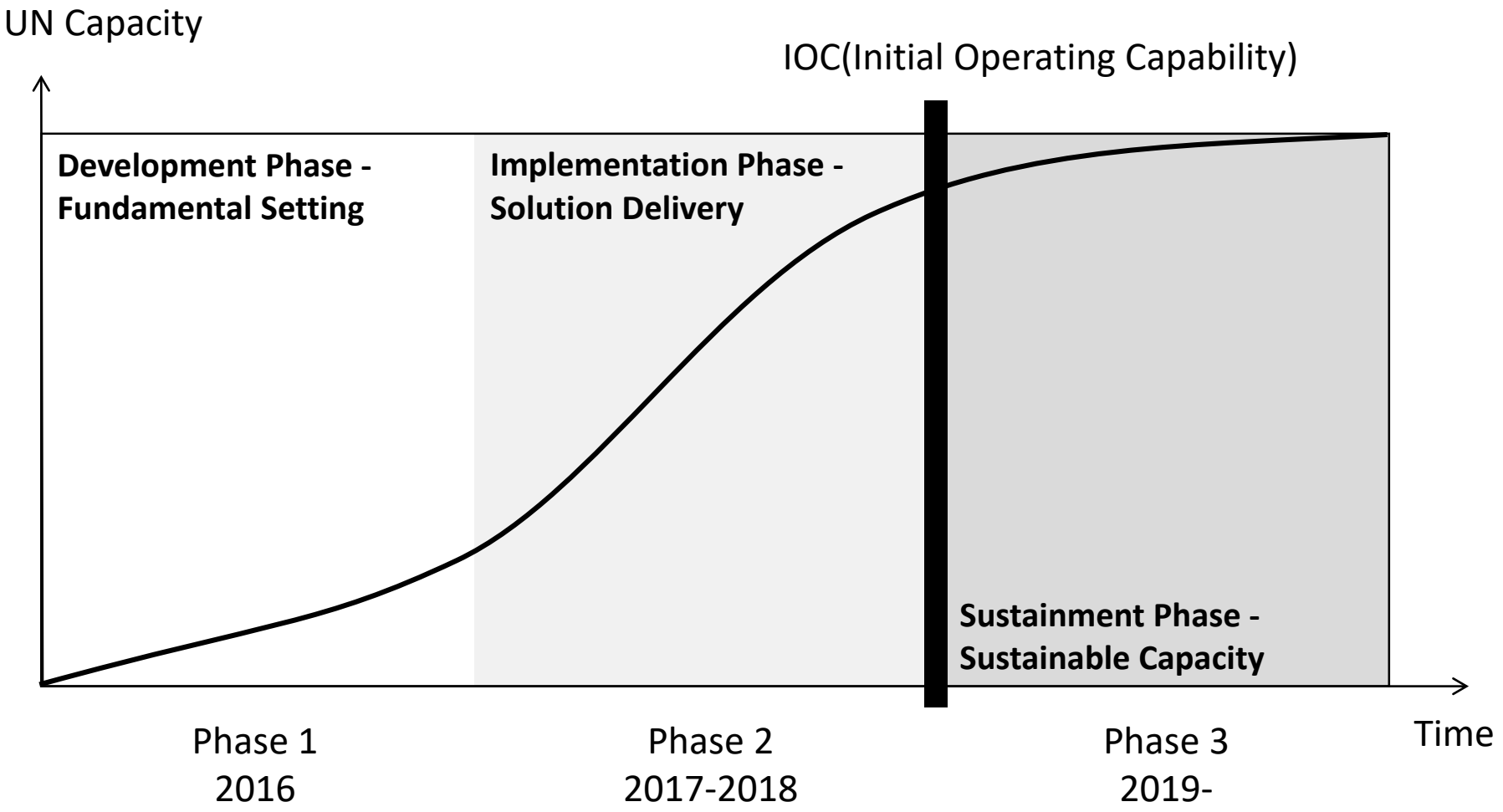
Capacity for

- Service Developments
- Supporting Requests from Fields
- Maintenance
- Technology Transfer to Developing Countries
- Technology Evolution

Individual Capacity

Institutional Capacity

Roadmap


UN Capacity
IOC(Initial Operating Capability)
Development Phase -
Fundamental Setting
Implementation Phase -
Solution Delivery
Sustainment Phase -
Sustainable Capacity
Time
Phase 1
2016
Phase 2
2017-2018
Phase 3
2019-

Roadmap – Three Phases

UN Open GIS INITIATIVE

Sustainable Capacity			1. Maintenance 2. Development of New Services and Functions 3. Transfer to 3rd Parties
Solution	Requirement Analysis	Development and Delivery of Solution	
System Infrastructure	System Infrastructure Deployment		
Training	Training Structure Setting-Up	Training and Capacity Building	Capacity Building Center
Governance	Governance Structure Setting-Up		
	Phase 1 **Development Phase** **- Fundamental setting**	Phase 2 **Implementation Phase** **- Solution Delivery**	Phase 3 **Sustainment Phase** **- Sustainable Capacity**

Spirals

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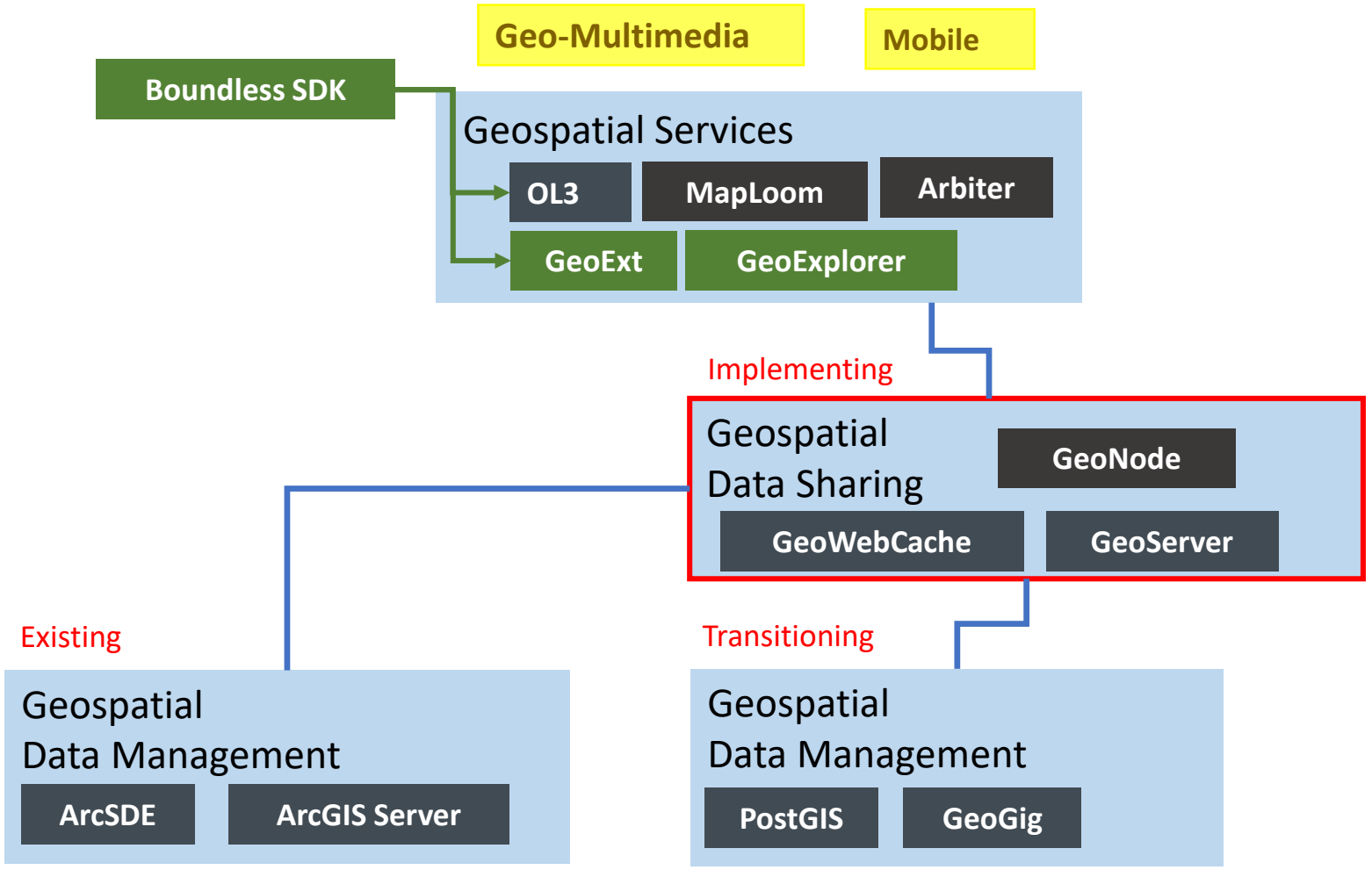
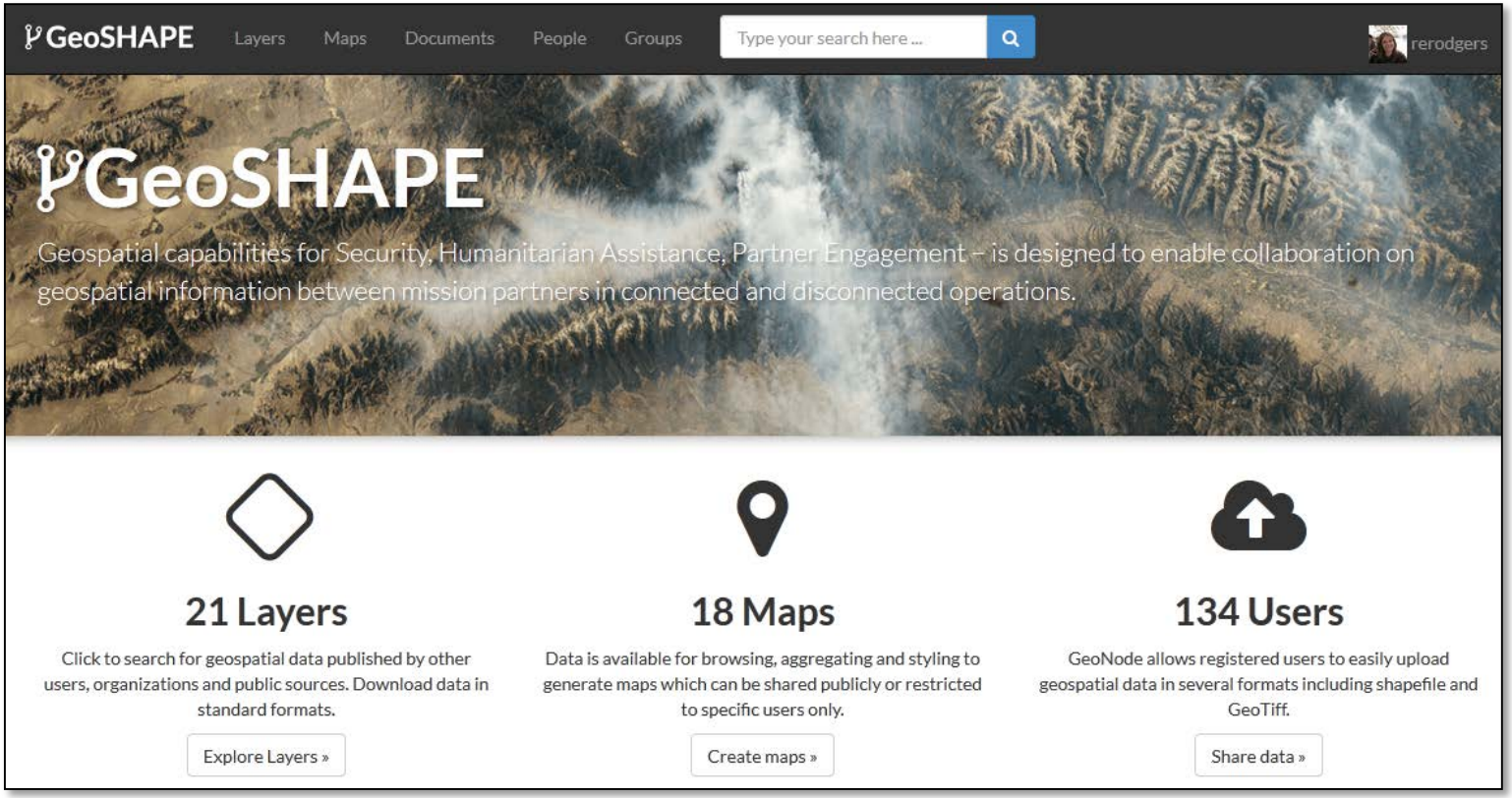
- **Spiral One**
  - **Goal** – to provide a Geo-Portal and setup a geospatial information infrastructure in UN
  - Led by Anthony Calamito from Boundless
  - Base Open Source Software – GeoSHAPE-Exchange
- **Spiral Two**
  - **Goal –** To assist capacity building for the UN by several training programs
  - Led by Maria Antonia Brovelli and Diego G. Ferreiro
  - Base GeoForAll/ Politecnico di Milano Beep Platform
- **Spiral Three**
  - **Goal** – to provide geo-analysis solutions for UN
  - Led by Hae-Kyong Kang
  - Base Open Source Software – OpenGDS/Analysis
- **Spiral Four**
  - **Goal –** to develop solutions for geospatial data collections, quality controls, and preprocessing of geospatial data
  - Led by Ki-Joune Li
  - Base Open Source Software - OpenGDS

UN Open GIS INITIATIVE – SPIRAL 1
System Infrastructure



Anthony Calamito (Boundless), GeoForAll webinar, 2016

UN Open GIS INITIATIVE – SPIRAL 1
System Infrastructure



Geospatial Capabilities for Security, Humanitarian Assistance, Partner Engagement (GeoSHAPE)

Anthony Calamito (Boundless), GeoForAll webinar, 2016

UN Open GIS INITIATIVE – SPIRAL 1
System Infrastructure

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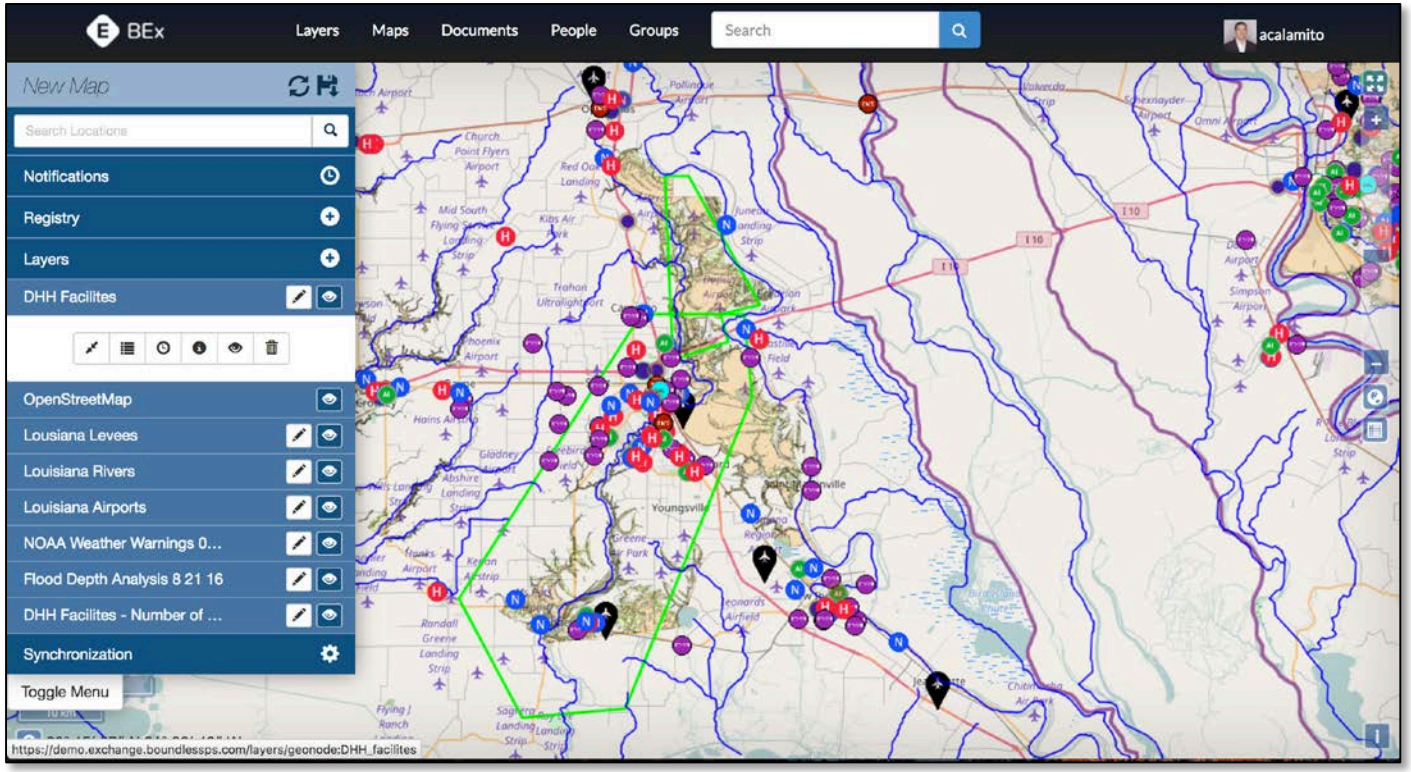
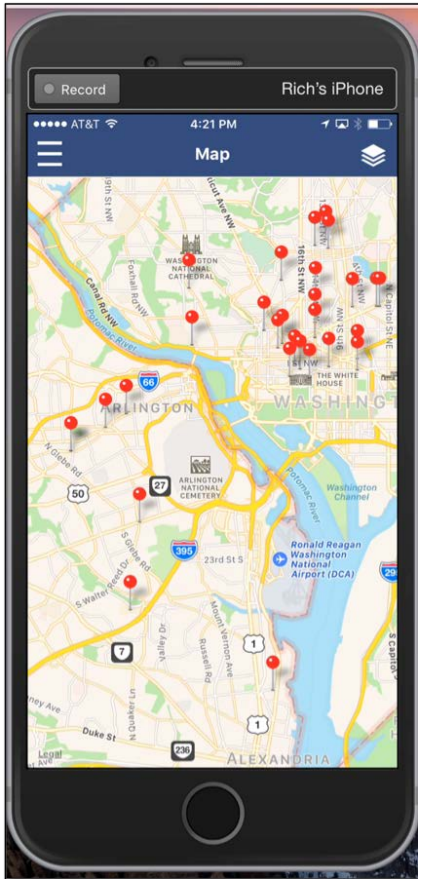
BOUNDLESS EXCHANGE





Survey

- Divided in three main parts:
  - About the staff member
  - About the staff's knowledge of Open Source GIS
  - About the staff's preferences on training modalities

- It was opened for about a month: 6th July to 2nd August

Summary about the survey

- OS vs Proprietary Software comparison. OS only wins in Customization, Open Standards and Overall Costs.
- Knowledge of software. The best known are the usual suspects: QGIS, PostGIS, GeoServer, OpenLayers
- Only 2 respondents have claimed to have official training on OS
- Priority for training: **Desktop and database** are on top.
- Vast majority of people prefer **on-site instructor-led training** and intensive course for 2-3 days.
- The courses should have an **exam** at the end according to most of the participants.

Collection of potential online training material

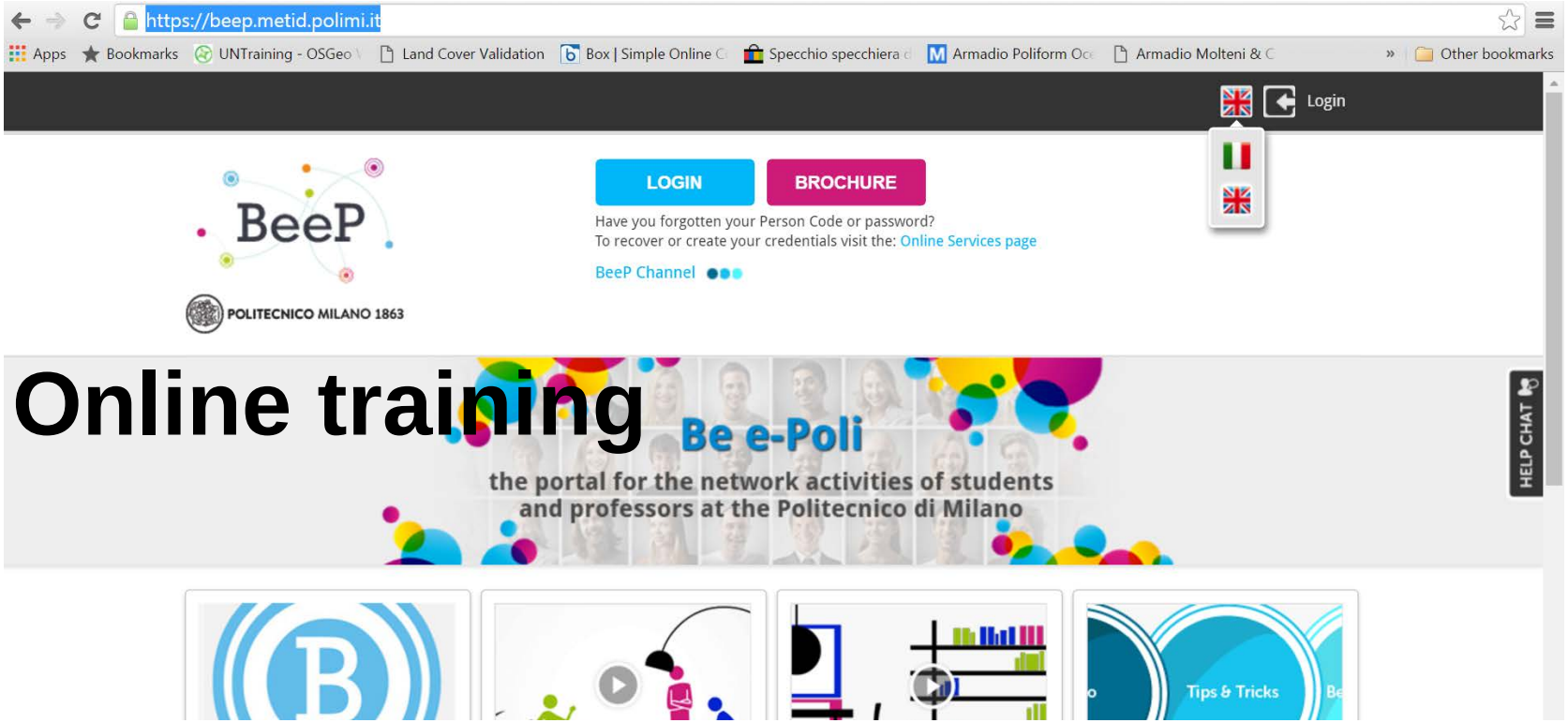
- https://wiki.osgeo.org/wiki/UNTraining

- 1 QGIS
- 2 gvSIG
- 3 GRASS GIS
- 4 GeoServer
- 5 OpenLayers
- 6 PostgreSQL
- 7 PostGIS
- 8 GeoGig

9 GeoNode
10 Rasdaman
11 OSGeo-Live
12 Bringing GEOSS services into practice
13 GeoMOOSE
14 GET-IT
15 Open Source Geospatial Notebooks
16 Developing Training Material

GeoForAll

UN Open GIS INITIATIVE – SPIRAL 2
Capacity Building



Alberta Albertella has Degree in Physics and PhD in Geodesy. From 2005-2012 Alberta was Scientific Partner at Technische Universitaet in Munich (Germany). Since 2012 she is Assistant Professor Dep. of Hydraulic and Environmental Engineering, Transport Infrastructures and Surveys Politecnico Milano. Alberta is author of 72 scientific papers. Principal research activities: Satellite Geodesy, Statistical and numerical data analysis with applications to physical geodesy (geoid estimation), remote sensing (image classification), digital Mapping.
alberta.albertella@polimi.it

POLITECNICO MILANO 1863

QGIS GeoAcademy Tutors

UN Open GIS INITIATIVE

Richard Smith is an Assistant Professor of Geographic Information Science at Texas A&M University - Corpus Christi and President of CartoFusion Technologies, Inc.
Richard's research interests are in cartography, systems integration, open-source curriculum development, and use of geospatial technology for disaster response. Richard is currently researching methods to partially automate the cartographic design process, maintaining the GeoAcademy curriculum, and is also building SituMap: a multi-user multi-touch collaborative mapping and planning application for use in time-sensitive situations
Richard.Smith@tamucc.edu

Thomas Mueller has been a geography professor at California University of Pennsylvania for 17 years. His interests include Geographic Information Systems, geography education and sports geography. His goal is to apply spatial theory to the real world, particularly using GIS, specifically through service learning. He has also taught numerous GIS workshops and built a successful geography research agenda through a variety of scholarly endeavors, including conference presentations, grants, technical reports, book reviews and publications in professional journals.
Mueller@calu.edu

Youngok Kang Her field of special interest is spatial data analysis and geo-visualization. In addition, she is also interested in applying GIS to K-12 program. After she got the Ph.d degree in Department of Geography at the Ohio State University, she had worked at Seoul Development Institute for 12 years with focus on GIS and Information Policy of City of Seoul for better citizen service and effective GIS implementation. And then she joined at the Ewha Womans University in 2007 and has taught GIS, cartography and spatial data analysis etc. until now. Recently, she wrote three books; two are high school textbooks related to GIS training and the other is a university level GIS practice textbook using QGIS, which is the first textbook in Korea using FOSS4G
ykang@ewha.ac.kr

GeoForAll

GeoAcademy

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PostGIS Tutors

UN Open GIS INITIATIVE

Mike Pumphrey Mike Pumphrey leads the training department at Boundless, which provides professional development to both novice and experienced users on all software in the Boundless ecosystem.
Mike is passionate about "translating computer into human", believing that software can only be great when it is understood by all. In this capacity, has also worked in both support and documentation roles, all in the pursuit of being an advocate for all users, not just the experts. He lives in Portland, Oregon, United States.
mike@boundlessgeo.com

Gregory Giuliani is a lecturer in Earth Observations at the Institute for Environmental Sciences of the University of Geneva.
He is also working with UN Environment/Science Division/Global Resource Information Database (GRID) where he coordinates Spatial Data Infrastructure activities.
Dr. Giuliani is a geologist and environmental scientist who specialized in Earth Observations, Geographical Information Systems (GIS) analyses and Spatial Data Infrastructures (SDI). After obtaining a degree in Earth Sciences, he went on to complete a master and a PhD in Environmental Sciences, specializing in remote sensing, GIS, and SDI. He previously worked as a GIS Consultant for the World Health Organization, as a University tutor in remote sensing and GIS and as a GIS Developper in a local Swiss GIS company. Dr. Giuliani as participated and lead several research groups within different EU-funded projects like
ACQWA (Assessing Climate Impacts on the Quantity and Quality of Water), EnviroGRIDS (Building Capacity for a Black Sea Basin Observation and Assessment System supporting Sustainable Development) or AfroMaison (Integrated Natural Resource Management in Africa). Dr. Giuliani participates and actively contribute to various Global Earth Observation System of Systems (GEOSS) activities led by the Group on Earth Observations (GEO).
gregory.giuliani@unepgrid.ch

GeoForAll

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Boundless

PostGIS Tutors

UN Open GIS INITIATIVE

Paolo Corti is currently working as a Geospatial Engineering Fellow at the Center for Geographic Analysis at Harvard University in the context of the WorldMap project, based on GeoNode. He is an environmental engineer who has been working as a geospatial analyst and developer for the EU Joint Research Center, the UN World Food Program and the Italian Government. He is an OSGeo Charter member and member of the GeoNode and pycsw PSC. He writes a blog about open source geospatial software at: http://www.paolocorti.net/
pcorti@fas.harvard.edu

Victoria Rautenbach is a lecturer in the Department of Geography, Geoinformatics and Meteorology at the University of Pretoria, South Africa. Victoria's research focuses on spatial data visualization to support decision making. She is also an enthusiastic contributor to open source / open data / open education work at University. She uses open source software, such as QGIS, GeoServer and PostGIS, in the modules that she teaches and for community engagement projects
victoria.rautenbach@gmail.com

Ivana Ivanova works as collaborating professor at the Department of Cartography of the Faculty of Science and Technology of the State University of São Paulo in Brazil. Prior to this she worked as lecturer/researcher at University of Twente in The Netherlands and at Slovak University of Technology in Bratislava in Slovakia.
Throughout her career as university lecturer Ivana developed and taught several subjects in Geoinformatics courses, in both face-to-face and distance education modalities. The topics the courses include design, implementation and use of spatial databases, principles of geographic information systems, spatial data quality and open-source web map application development.
Ivana's research interests are in the area of spatial data quality and spatial data infrastructures. Ivana has great experience in standardization – she was a representative of the Slovak national standardization organization in the outreach group in CEN/TC 287 Geographic information and served as a reviewer of the adaptation of the EN ISO 19100 series of norms into a national legal framework. She was a member of OGC's Working Group on Quality.
ivaiva3@gmail.com

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Boundless

GeoForAll

Exam and certificate

UN OPEN GIS

The Certificate is awarded to

ZAHURUL ISLAM

in recognition of the QGIS GeoAcademy Course Completion

Richard Smith
OSGeo and GeoAcademy

Youngok Kang
Ehwa Womans University

Thomas Mueller
OSGeo and GeoAcademy

Maria Antonia Brovelli
OSGeo and geoforall

Diego Gonzalez
United Nations

Alberta Albertella
Politecnico di Milano

Milan, 21 October 2016

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What's next?

- Geoshape
- Geoserver
- Openlayers

- On-site instructor-led training?
- Preparing new ad-hoc courses?

Keep in touch with us!!

https://wiki.osgeo.org/wiki/UnitedNations_Committee

UN Open GIS INITIATIVE – SPIRAL 3
Geo Analysis

- **Goal**

Aims at developing geo-analysis functions and solutions for UN missions.

- **Scope**
  - Development of 140 geo-analysis functions
  - Integration the geo-analysis functions into the outcome of SP1
  - Development of UI for UN business
  - Tutorials/manuals of SP3 (deliver to SP2)

- **Contributors** (in July 2017, parts)
  - Minpa Lee (Mangosystem, South Korea)
  - HaeKyong Kang (KRIHS, South Korea)
  - Jonathan Stewart (UNGSC)
  - Christine Wachira (MONUSCO)
  - Timur Obukhov (UN NY)

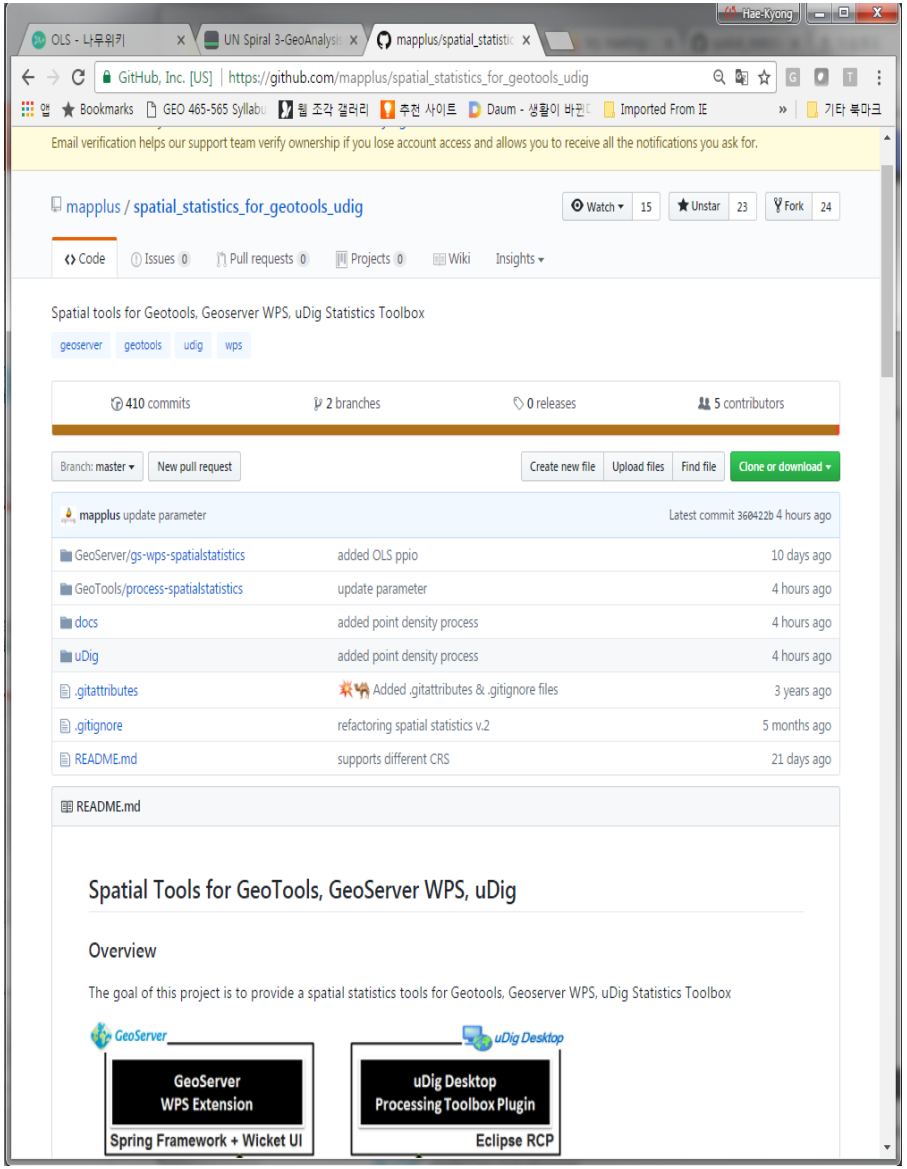
Minpa Lee,
Key Architect of UN Open GIS -SP3
Director of Research Center,
Mangosystem

UN Open GIS INITIATIVE – SPIRAL 3
Geo Analysis

- GitHub of Geo-Analysis

https://github.com/mapplus/spatial_statistics_for_geotools_udig

- Geo-Analysis functions are available to use via WPS and uDig.

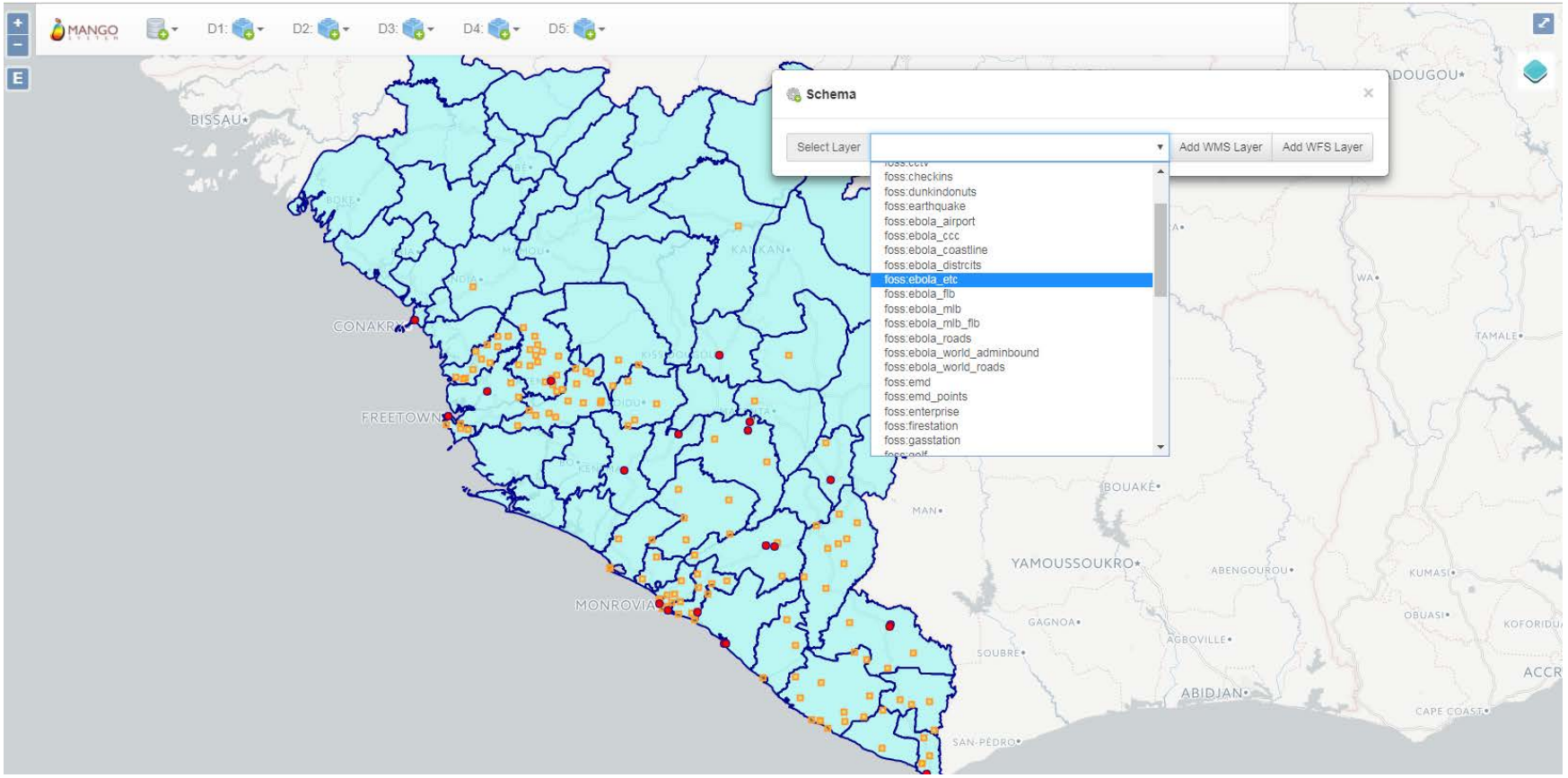


UN Open GIS INITIATIVE – SPIRAL 3
Geo Analysis

- Geo-Analysis functions via WPS

(The SP3-test-web is opened to access UN Open GIS members only.)

* Screenshot: Ebola related datasets loaded on the SP3-test-web.

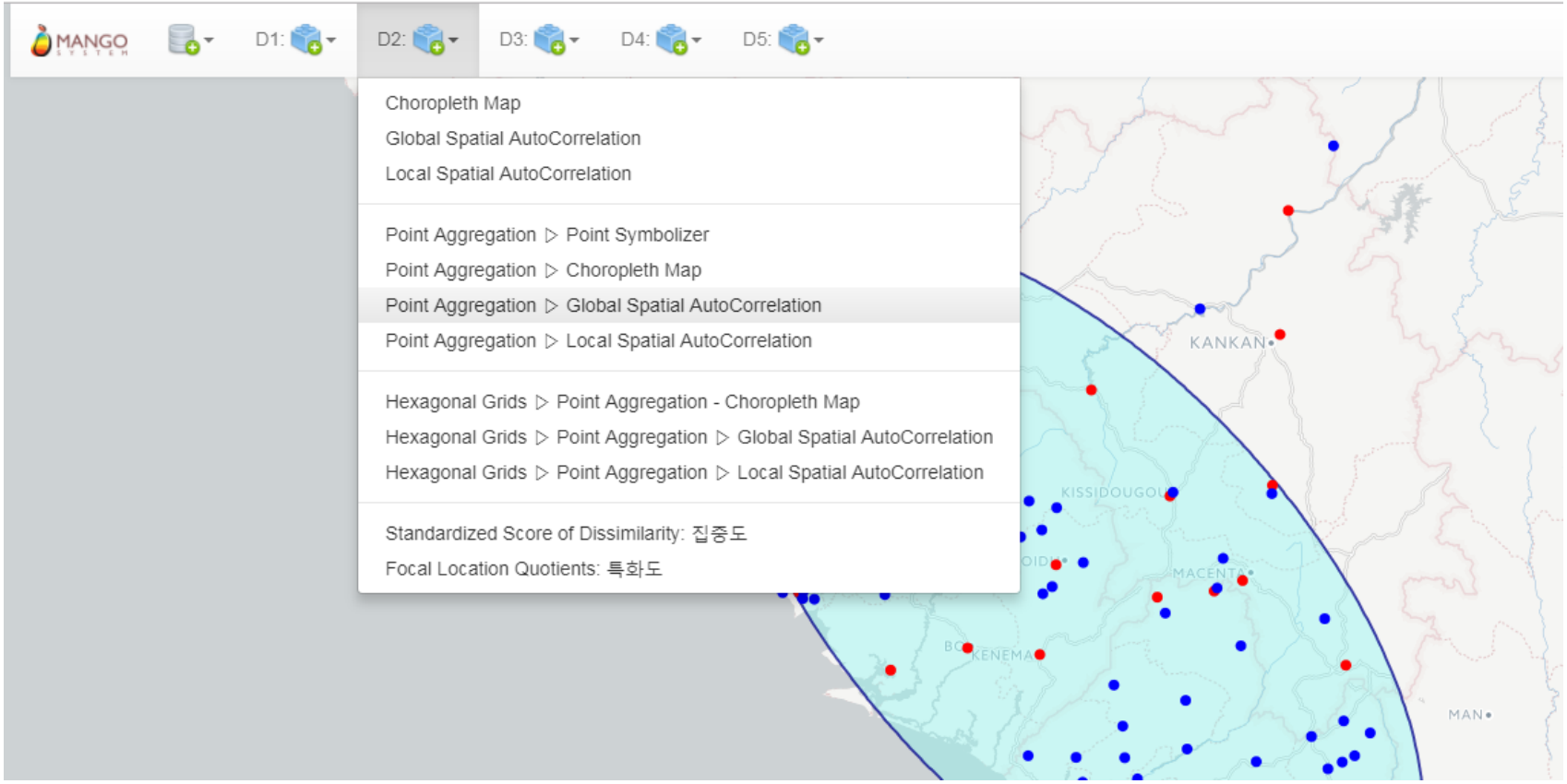


Geo Analysis

- Geo-Analysis functions via WPS

(The SP3-test-web is opened to access UN Open GIS members only.)

* Screenshot: Geo-analysis functions available on menu of the SP3-test-web.

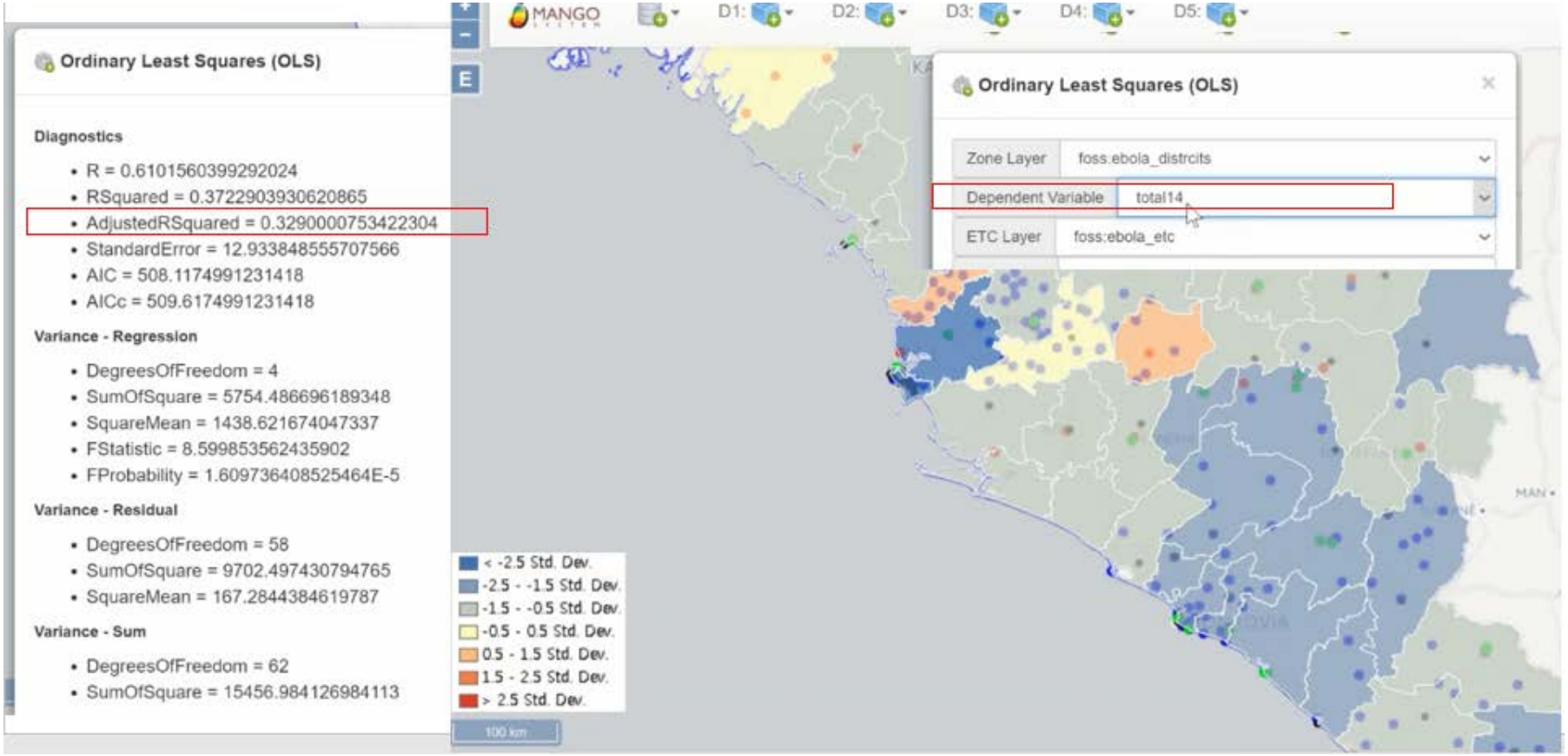


UN Open GIS INITIATIVE – SPIRAL 3
Geo Analysis

- Geo-Analysis functions via WPS

(The SP3-test-web is opened to access UN Open GIS members only.)

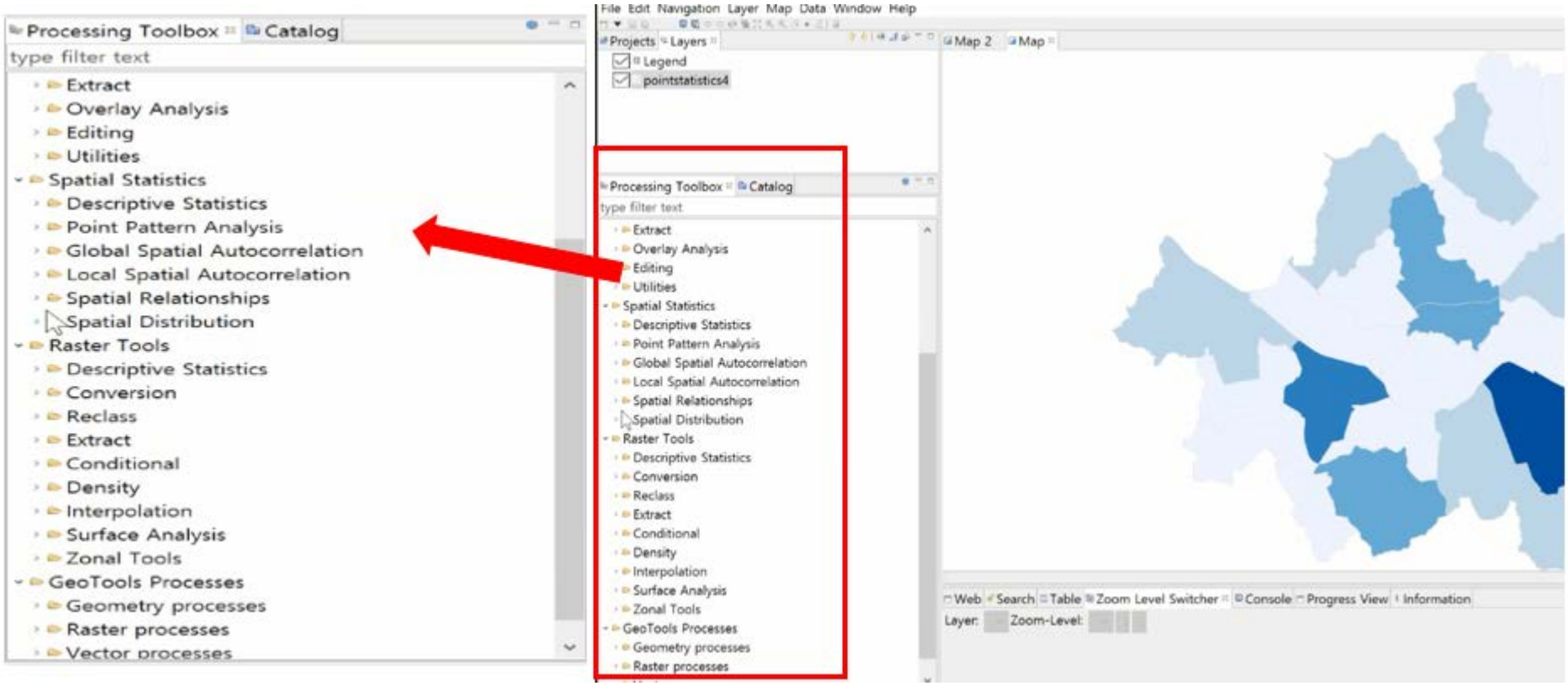
* Screenshot: OLS analysis results by using Ebola dataset



UN Open GIS INITIATIVE – SPIRAL 3
Geo Analysis

- Geo-Analysis functions via uDig (You can load the functions into your uDig)

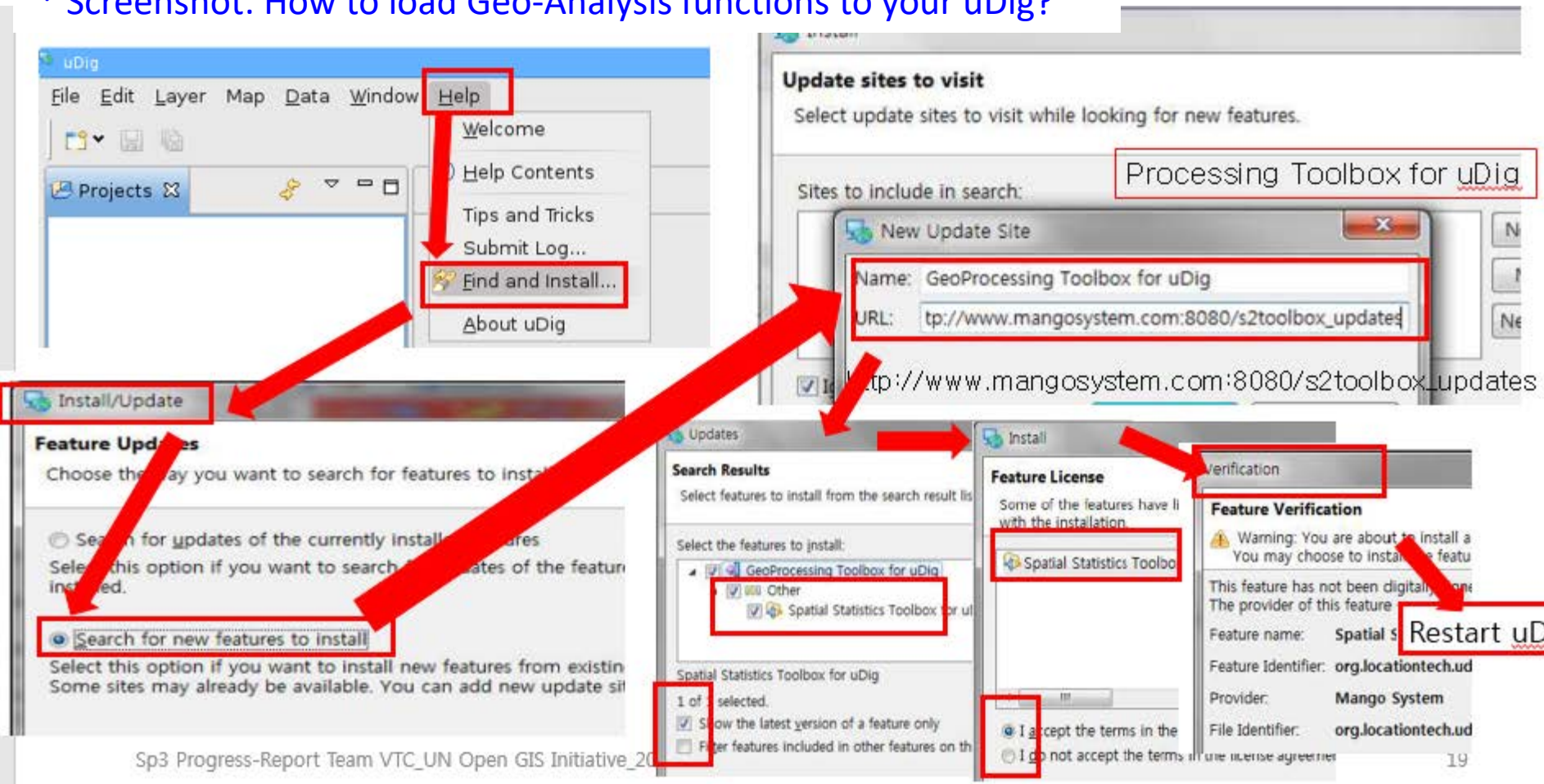
* Screenshot: Loaded Geo-Analysis functions into uDig Processing Toolbox



UN Open GIS INITIATIVE – SPIRAL 3
Geo Analysis

- Geo-Analysis functions via uDig (You can load the functions into your uDig)

* Screenshot: How to load Geo-Analysis functions to your uDig?



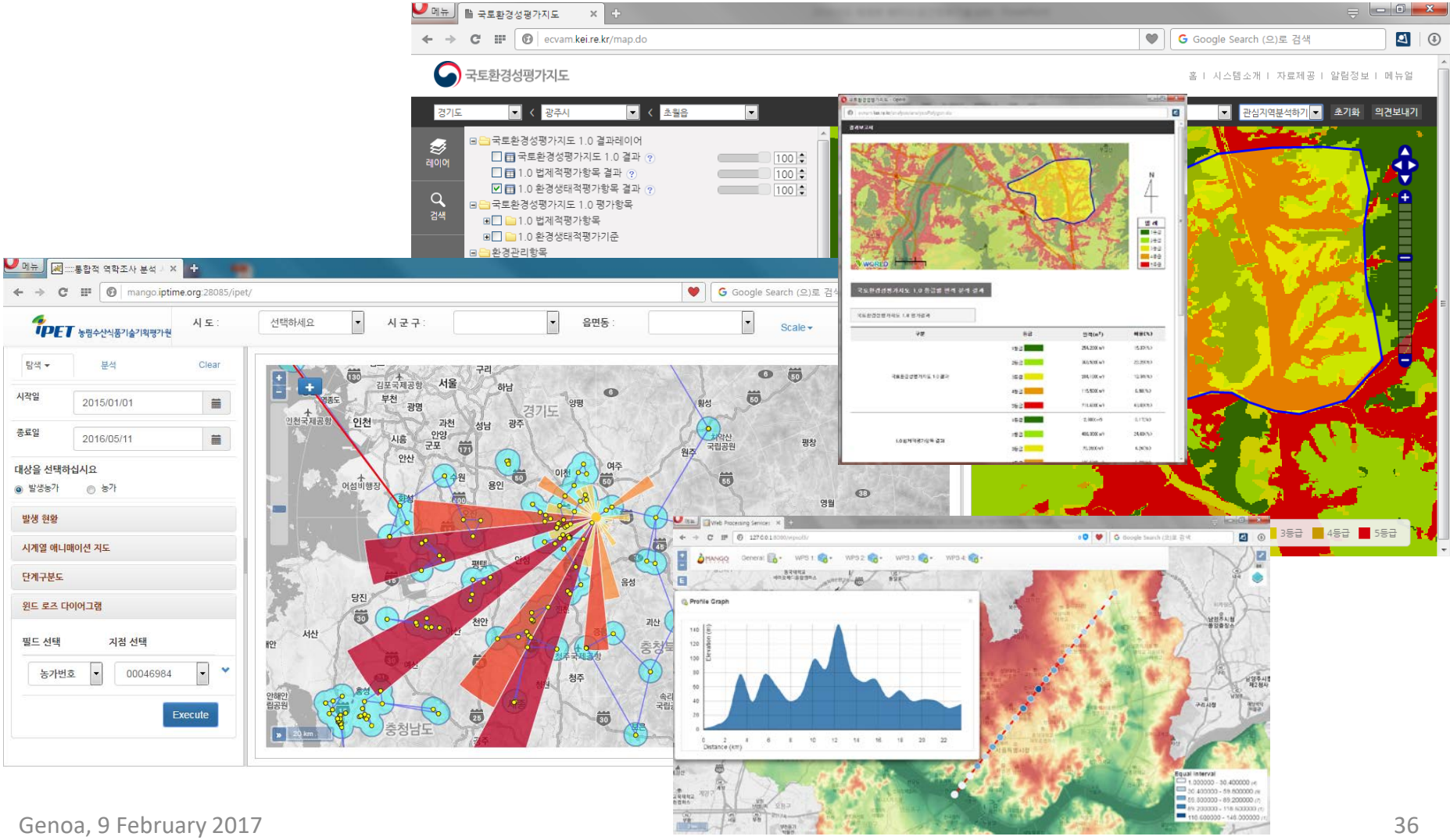
UN Open GIS INITIATIVE – SPIRAL 3
Geo Analysis functions

Analysis Function	Tool
1Summarise Data	Aggretate Points
	Summarize Nearby
	Summarize Within
2Find Locations	Find Existing Locations
	Derive New Locations
	Find Similar Locations
	Choose Best Facilities
	Create Viewshed
	Create Watersheds
	Trace Downstream
3Data Enrichment	Enrich Layer
4Analyse Patterns	Calculate Density
	Find Hot Spots
	Interpolate Points
5Use Proximity	Create Buffers
	Create Drive-Time Areas
	Find Nearest
	Plan Routes
	Connect Origins to Destinations
6Manage Data	Extract Data
	Dissolve Boundaries
	Merge Layers
	Overlay Layers
7Spatial Analysis	Buffer analysis
	Dissolve
	Union
	Merge
	Centroids and centers
7Spatial Analysis	Joins
	Aggregation &statistics functions
	Triangulated irregular networks
	Interpolation
	Concave and convex hulls
	Simplify features
	Filter / select by attribute
	Data classification
	Grids
	Distance calculations
8Map Enhancement	2D Histogram
	Adjacency Matrix
	Circular Brush
	Contour plot
	Color wheel
	Force-directed labels
	Geometric primitives, labels, connections
	Hexagonal binning
	Horizon chart
	Icon array
	Rollup (PivotGraph) layout
9Raster tool	Clipping
	Surface Analyses
	Masking
	Composite bands
	Zonal Statistic
	Distance analysis
	Interpolation

UN Open GIS INITIATIVE – SPIRAL 3
Geo Analysis functions

UN Open GIS INITIATIVE

* Screenshot: Use-Cases of Geo-Analysis functions

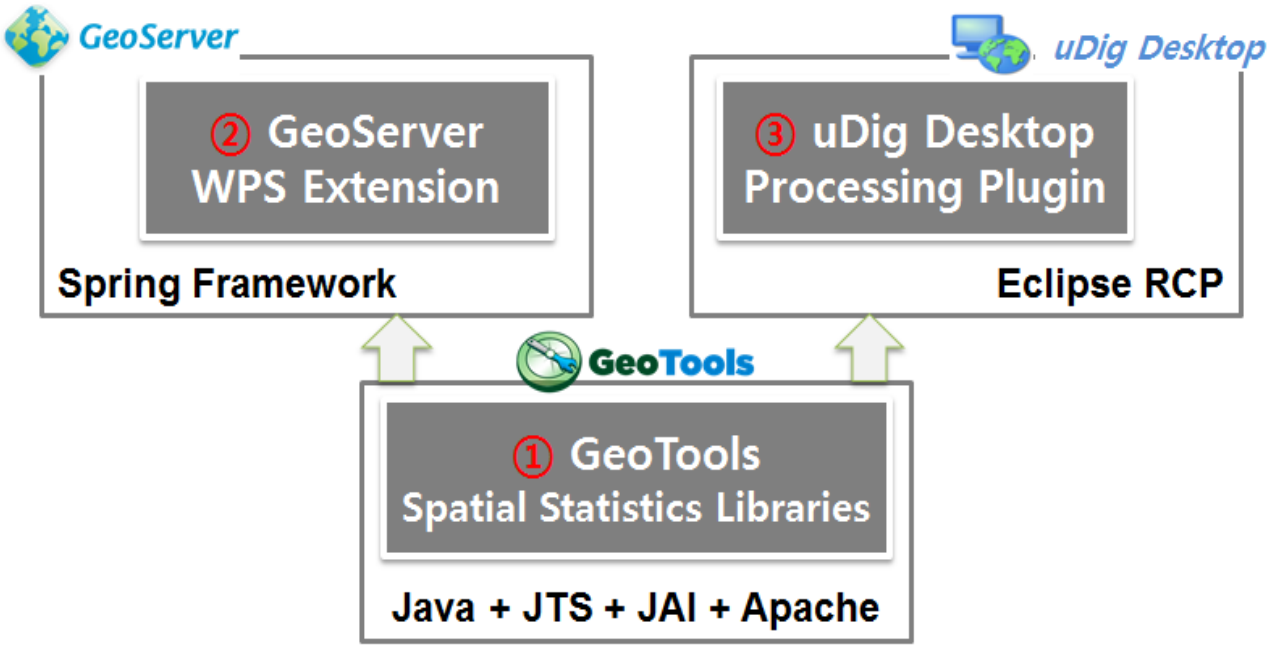


UN Open GIS INITIATIVE – SPIRAL 3
Geo Analysis functions

UN Open GIS INITIATIVE

* Screenshot: Use-Cases of Geo-Analysis functions

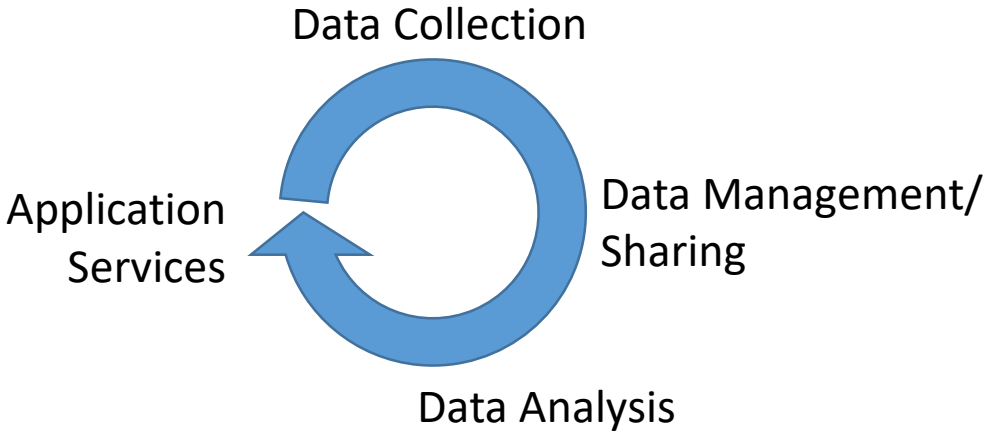
UN Open GIS INITIATIVE – SPIRAL 3
Geo Analysis



UN Open GIS INITIATIVE – SPIRAL 4
Geo Analysis

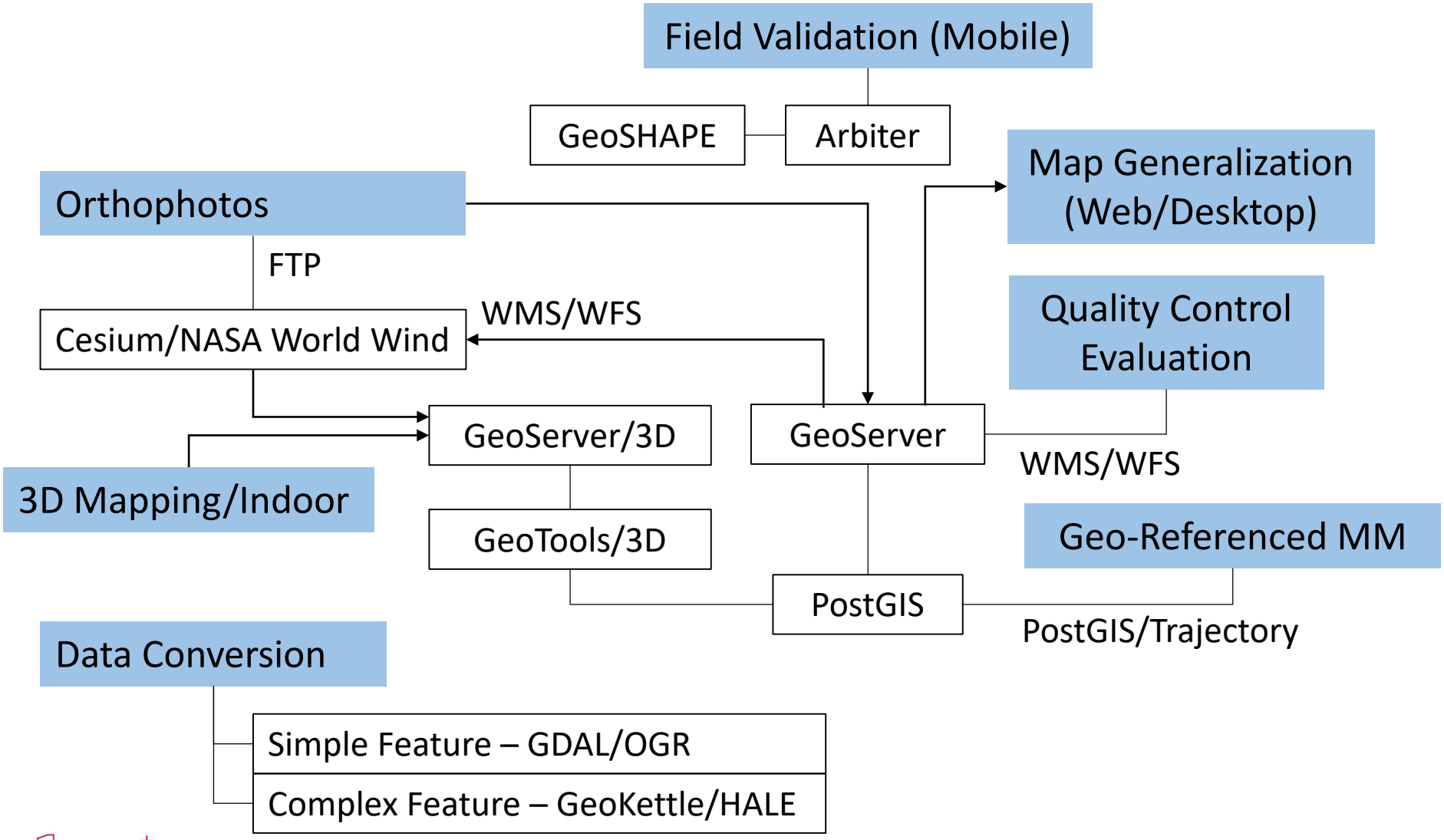
- **Goal**

Aims at developing solutions for geospatial data collections as the first step of the lifecycle of geospatial information.



- **Scope**
  - Data Conversion from Legacy DB to DB for GeoSHAPE/EXCHANGE
  - Quality Control and Field Validations
  - Map Generation from UAV to MAGO3D (live 3D map solution)
  - Geo-referenced Multimedia Data Collection
  - 3D and Indoor Mapping
  - Map Generalization

UN Open GIS INITIATIVE – SPIRAL 4
Geo Analysis



http://unopengis.org