Publicación de cartografía para la web

Juan Carlos Méndez
juan@gkudos.com

Especializacion en Geomática
Universidad Militar Nueva Granada

8. Arquitectura de aplicaciones Web para SIG

Objetivo

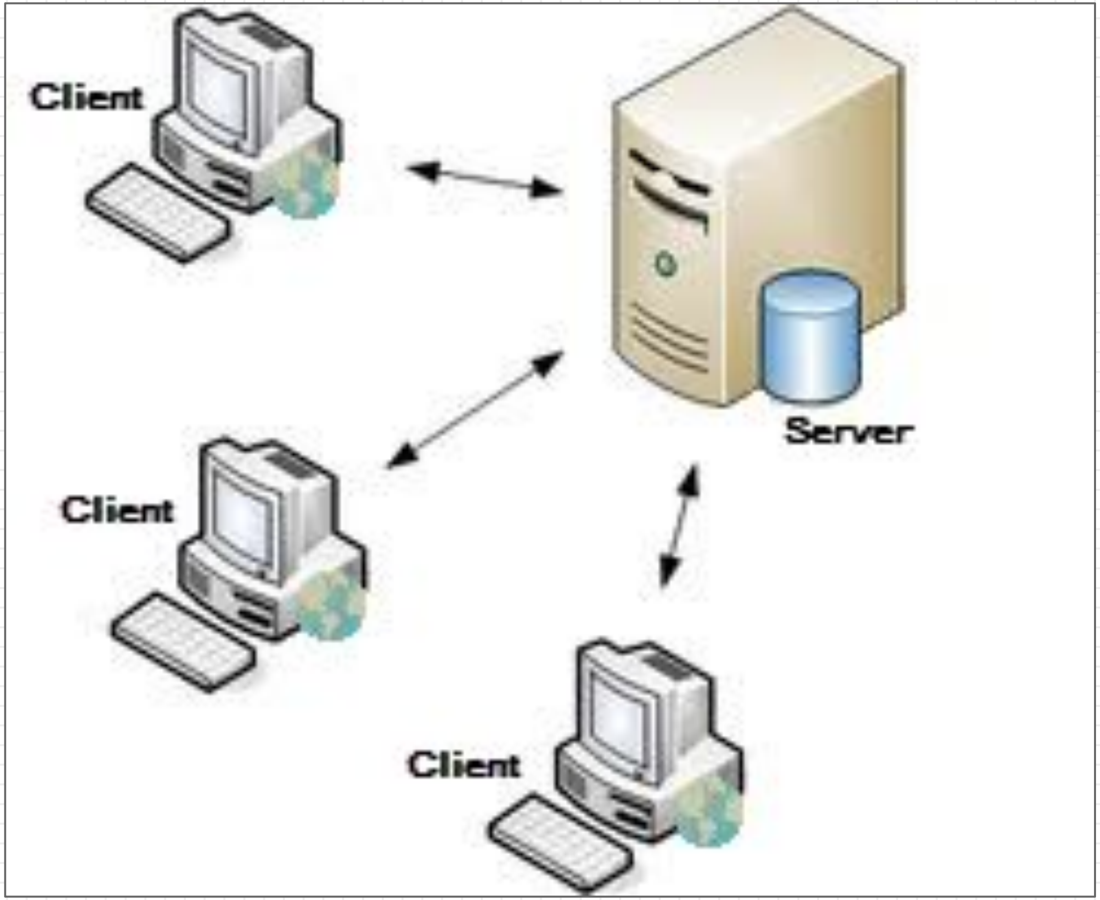
Conocer las generalidades sobre arquitecturas de software para la publicación de geoservicios y aplicaciones web para SIG

Arquitectura de Aplicaciones

Nota

En la siguiente presentación se incluyen imágenes tomadas de:

- ✘ ESRI.com
- ✘ Abdalla, R. (2016). Distributed GIS Technology. In Introduction to Geospatial Information and Communication Technology (GeoICT) (pp. 63–81). Springer International Publishing. https://doi.org/10.1007/978-3-319-33603-9_4
- ✘ Architecting the ArcGIS Platform: Best Practices https://assets.esri.com/content/dam/esrisites/en-us/media/pdf/architecting-the-arcgis-platform.pdf


Client
Server
Client
Client

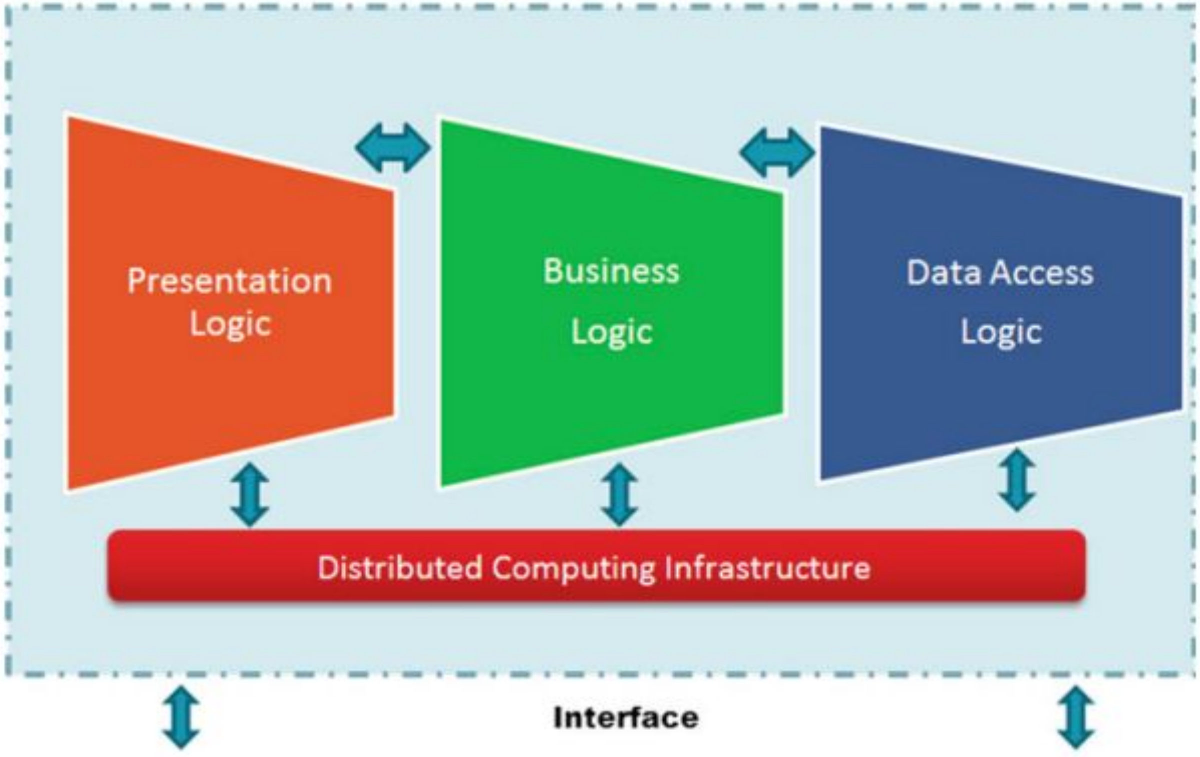


Fig. 4.3 Three-tier architecture

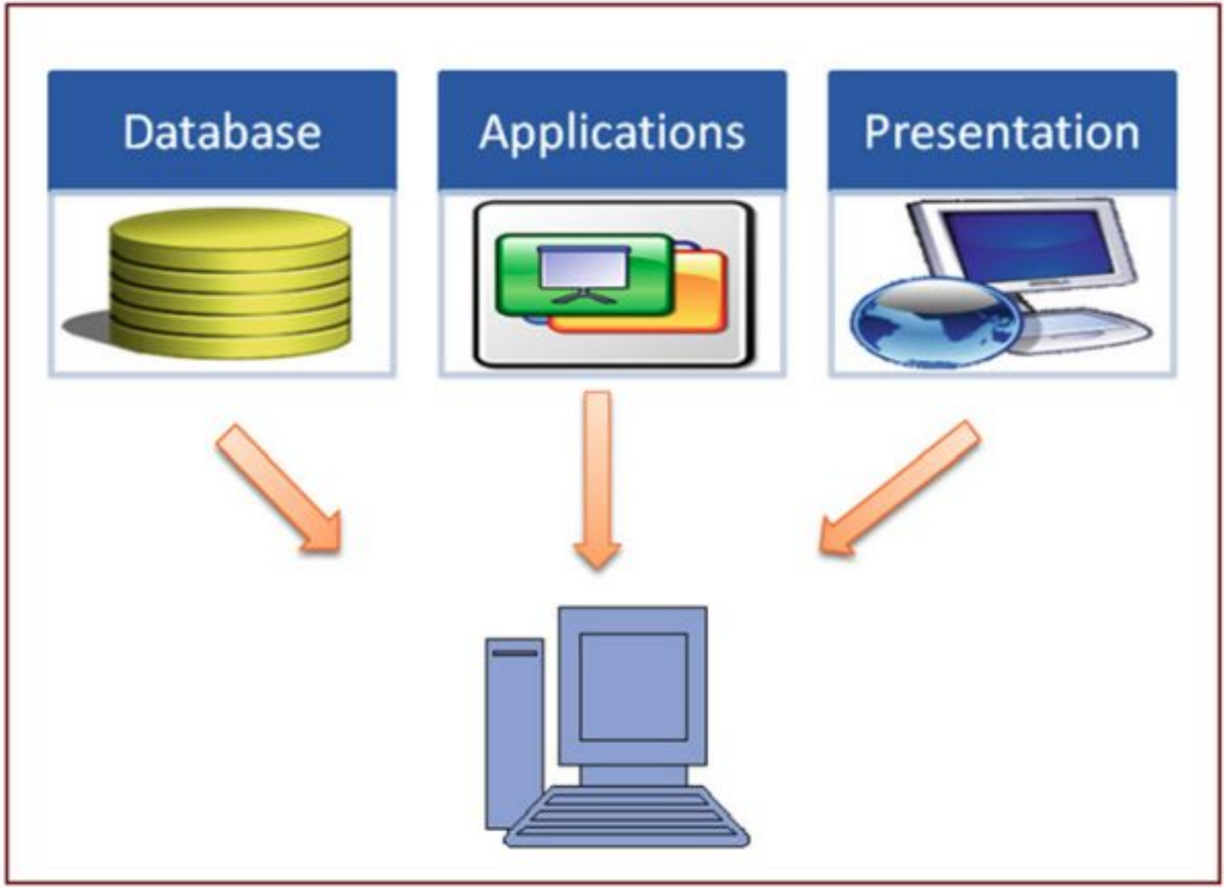


Fig. 4.1 One-tier architecture

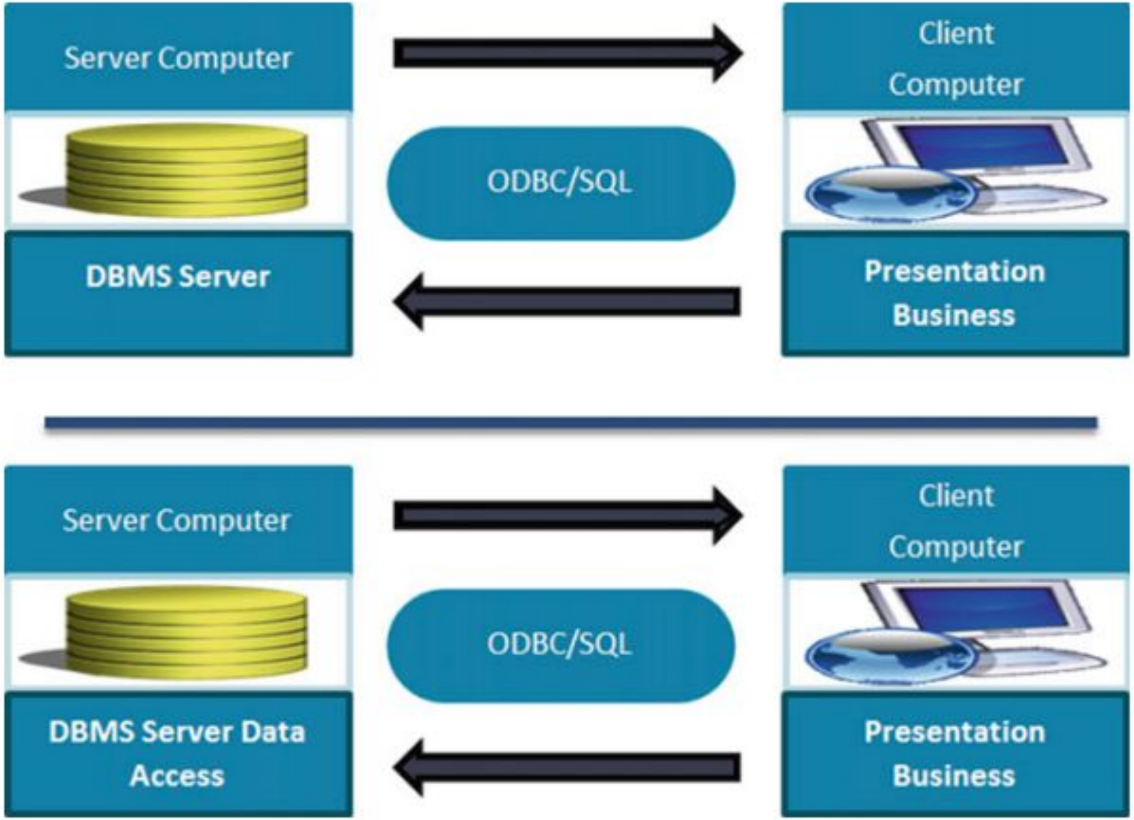


Fig. 4.2 Two-tiers architecture

Fig. 4.5 Sample diagram showing distributed GIS

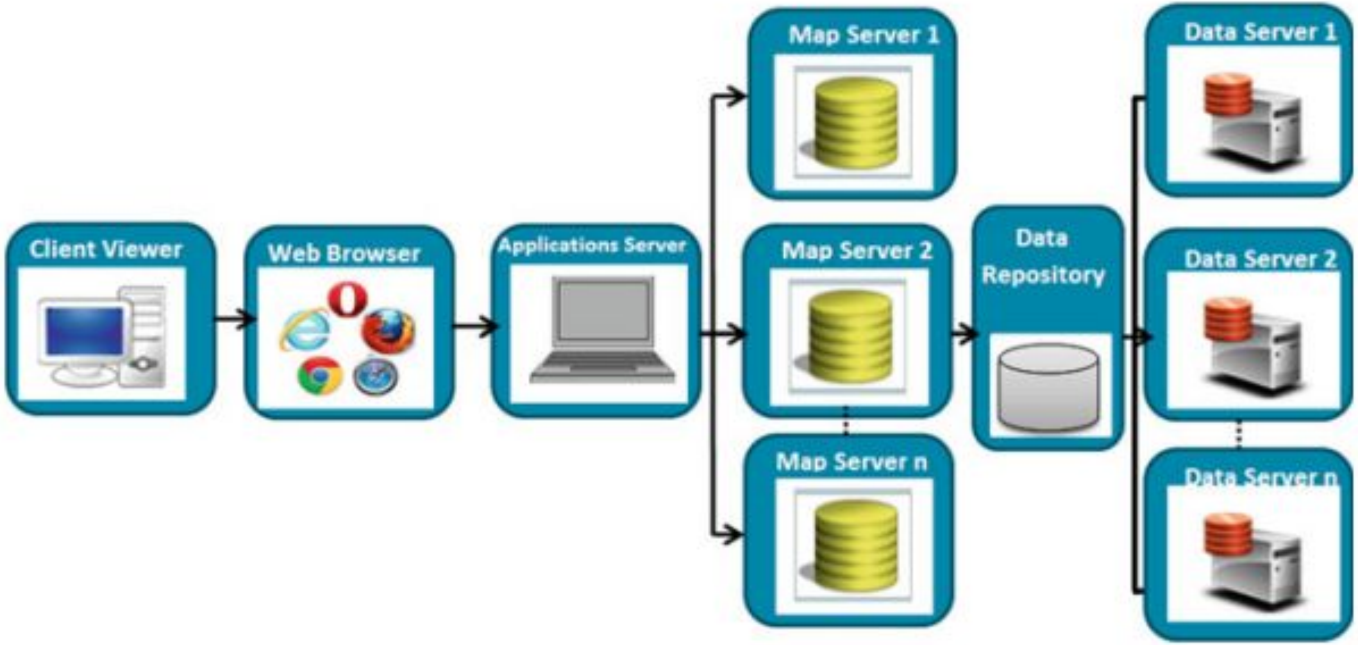


Fig. 4.7 Multiserver distributed GIS

Table 4.1 Comparison between the different computing architectures

	One tier	Two tier	Three tier
Performance	Good	Good	Excellent
Reliability	Medium	High	Highest
Expense	Low	Medium	High

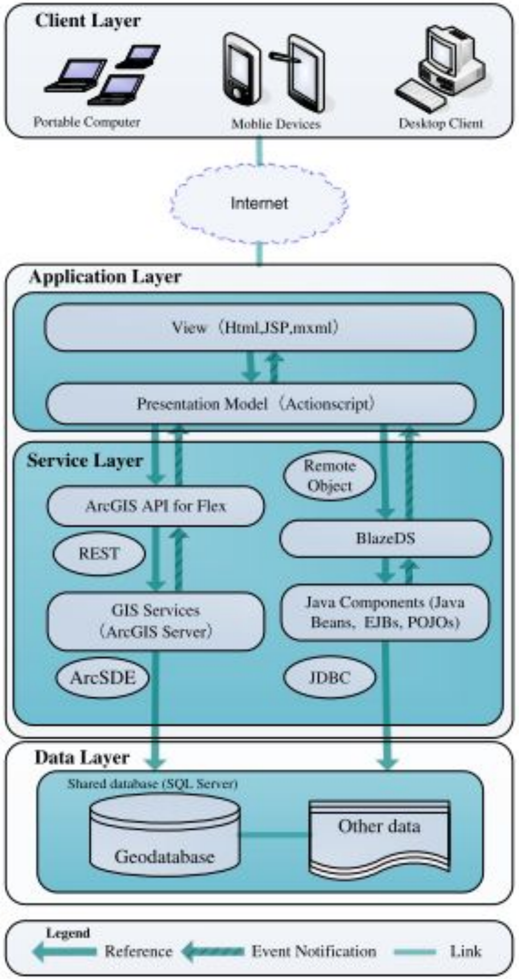
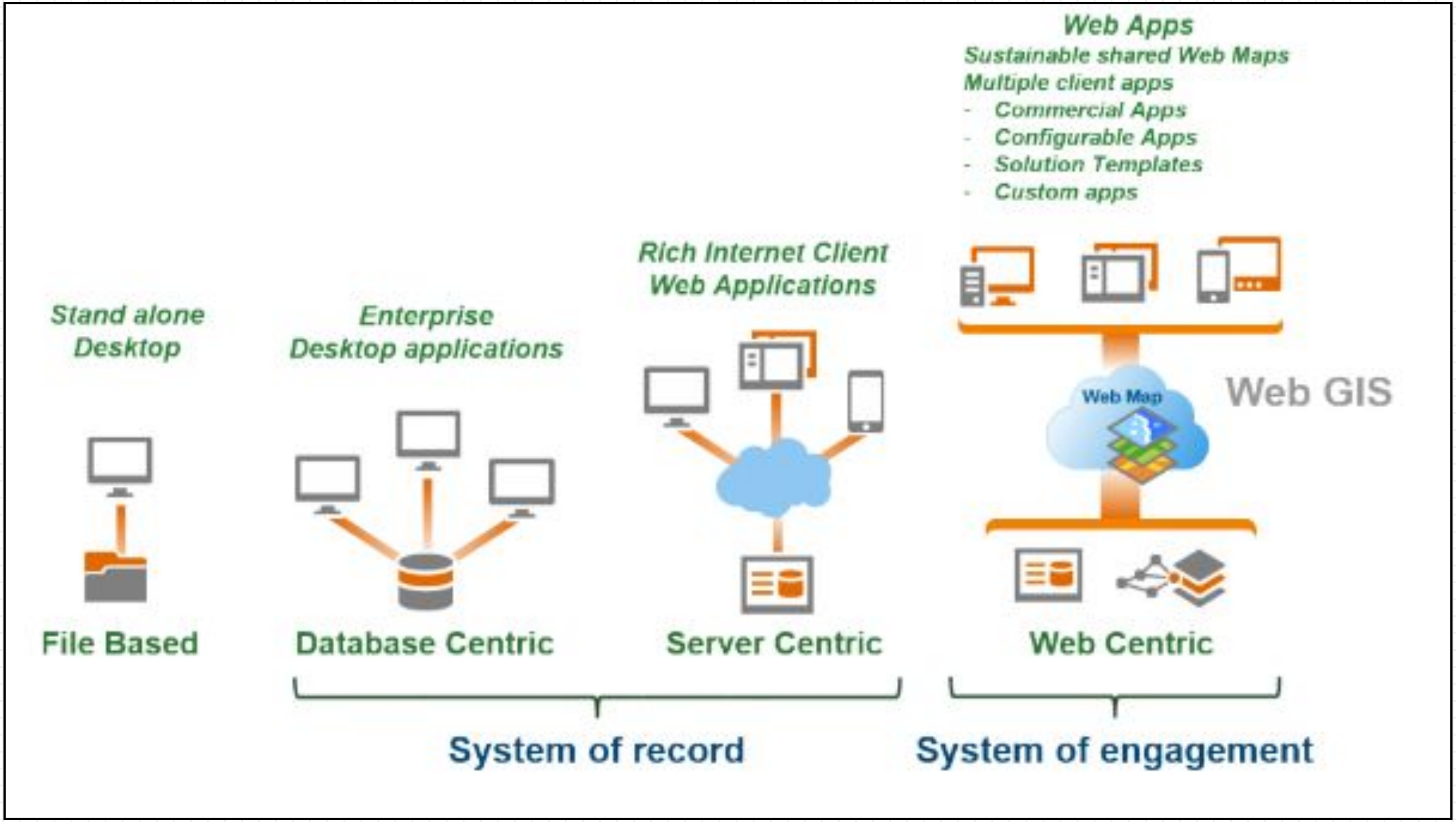
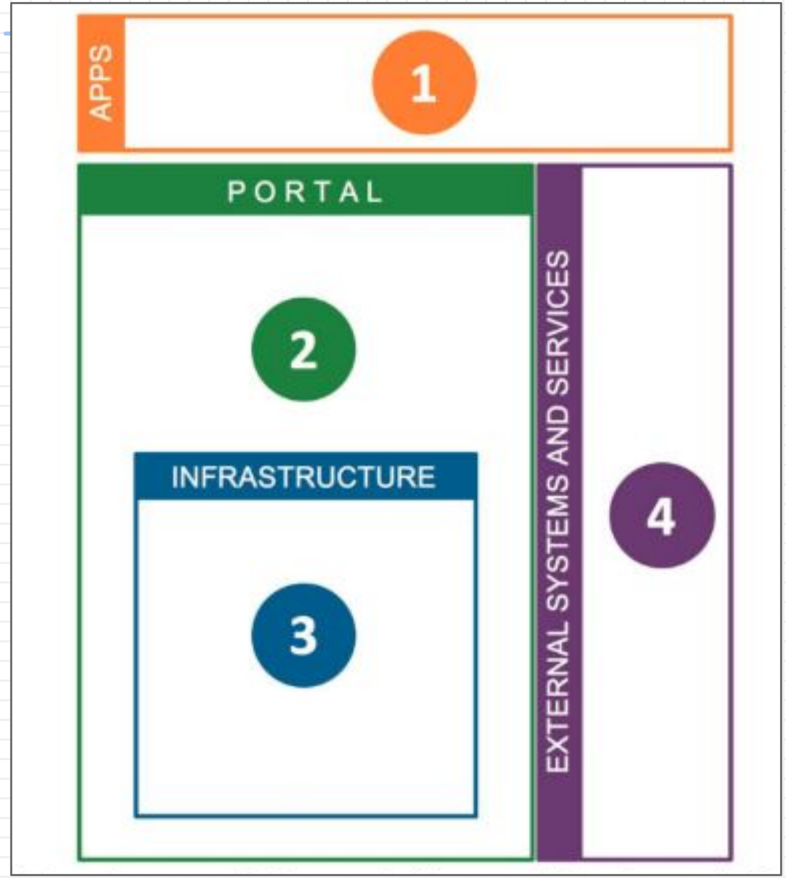


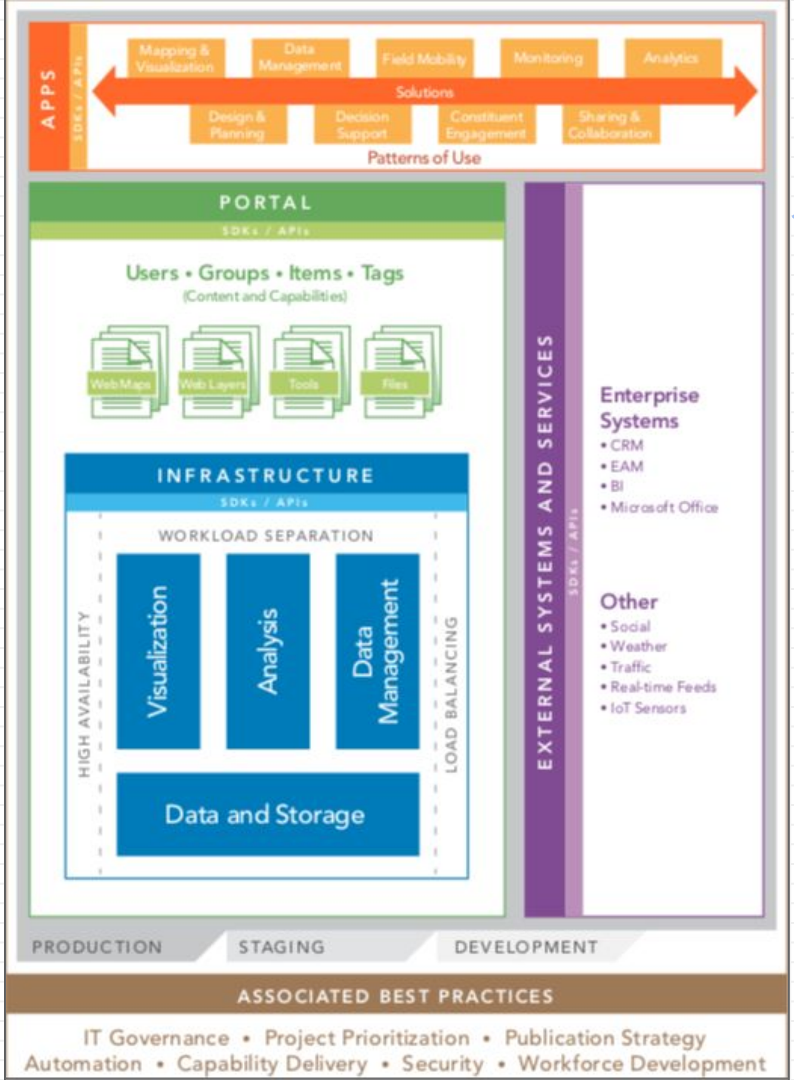
Fig. 3 Architecture of RGHIMS


Web Apps
Sustainable shared Web Maps
Multiple client apps
- Commercial Apps
- Configurable Apps
- Solution Templates
- Custom apps
Stand alone Desktop
Enterprise Desktop applications
Rich Internet Client Web Applications
Web Map
Web GIS
File Based
Database Centric
Server Centric
Web Centric
System of record
System of engagement

Architecting the ~~Arc~~GIS Platform:
Best Practices

Arquitectura Conceptual




APPS
SDKs / APIs
Mapping & Visualization
Data Management
Field Mobility
Monitoring
Analytics
Solutions
Design & Planning
Decision Support
Constituent Engagement
Sharing & Collaboration
Patterns of Use
PORTAL
SDKs / APIs
Users • Groups • Items • Tags
(Content and Capabilities)
Web Maps
Web Layers
Tools
Files
INFRASTRUCTURE
SDKs / APIs
WORKLOAD SEPARATION
HIGH AVAILABILITY
Visualization
Analysis
Data Management
LOAD BALANCING
Data and Storage
EXTERNAL SYSTEMS AND SERVICES
SDKs / APIs
Enterprise Systems
• CRM
• EAM
• BI
• Microsoft Office
Other
• Social
• Weather
• Traffic
• Real-time Feeds
• IoT Sensors
PRODUCTION
STAGING
DEVELOPMENT
ASSOCIATED BEST PRACTICES
IT Governance • Project Prioritization • Publication Strategy
Automation • Capability Delivery • Security • Workforce Development

Architecting the ~~Arc~~GIS Platform: Best Practices

There are **eighteen** best practice briefs associated with the ArcGIS Platform Conceptual Reference Architecture diagram.

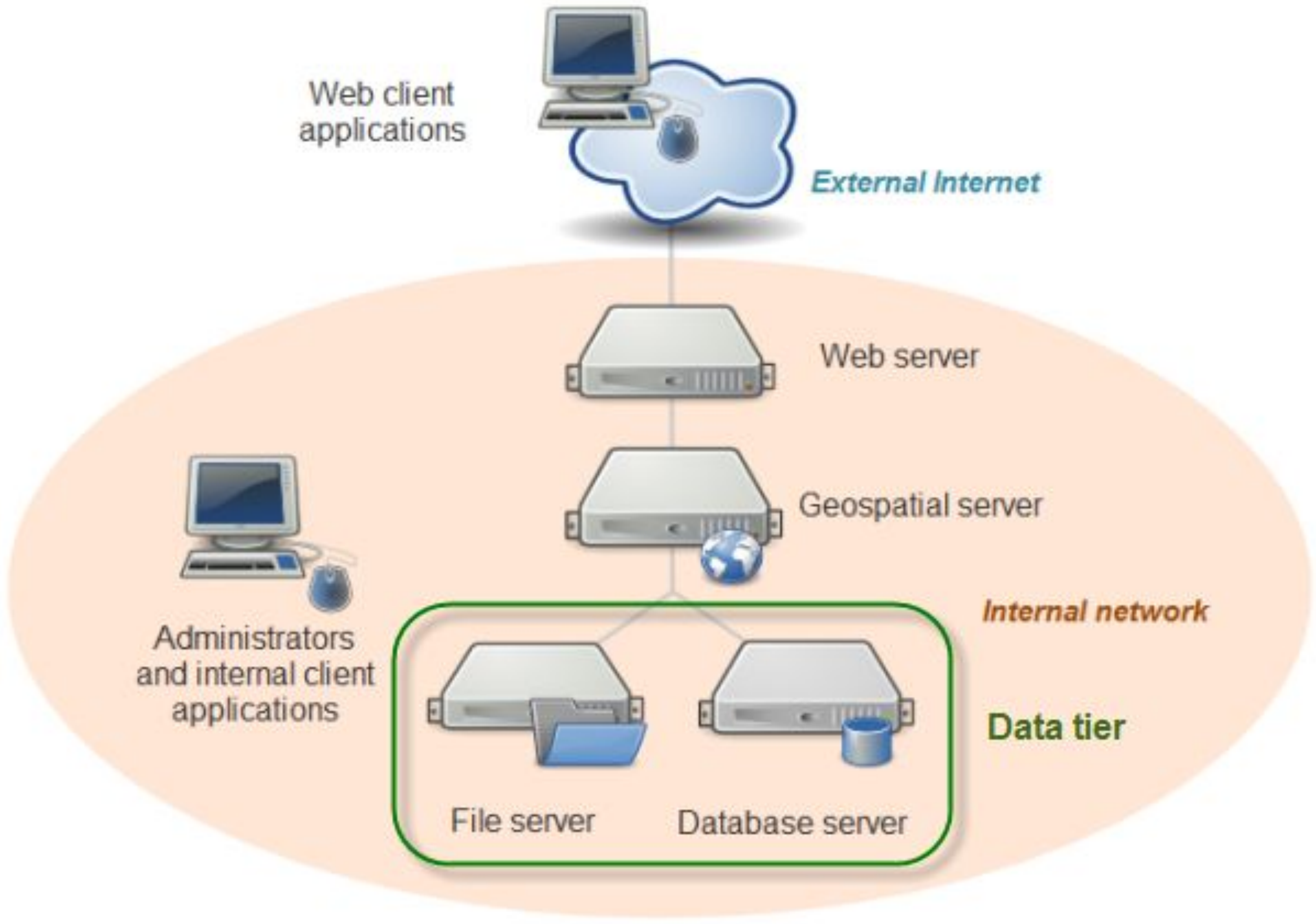
Eleven of these briefs—including *Automation, Distributed GIS, Enterprise Integration, Environment Isolation, High Availability, Infrastructure, Load Balancing, Publication Strategy, Real-time GIS Strategy, Security, and Workload Separation*—reference **technology practices** that provide high-level implementation guidelines based on **business needs**.

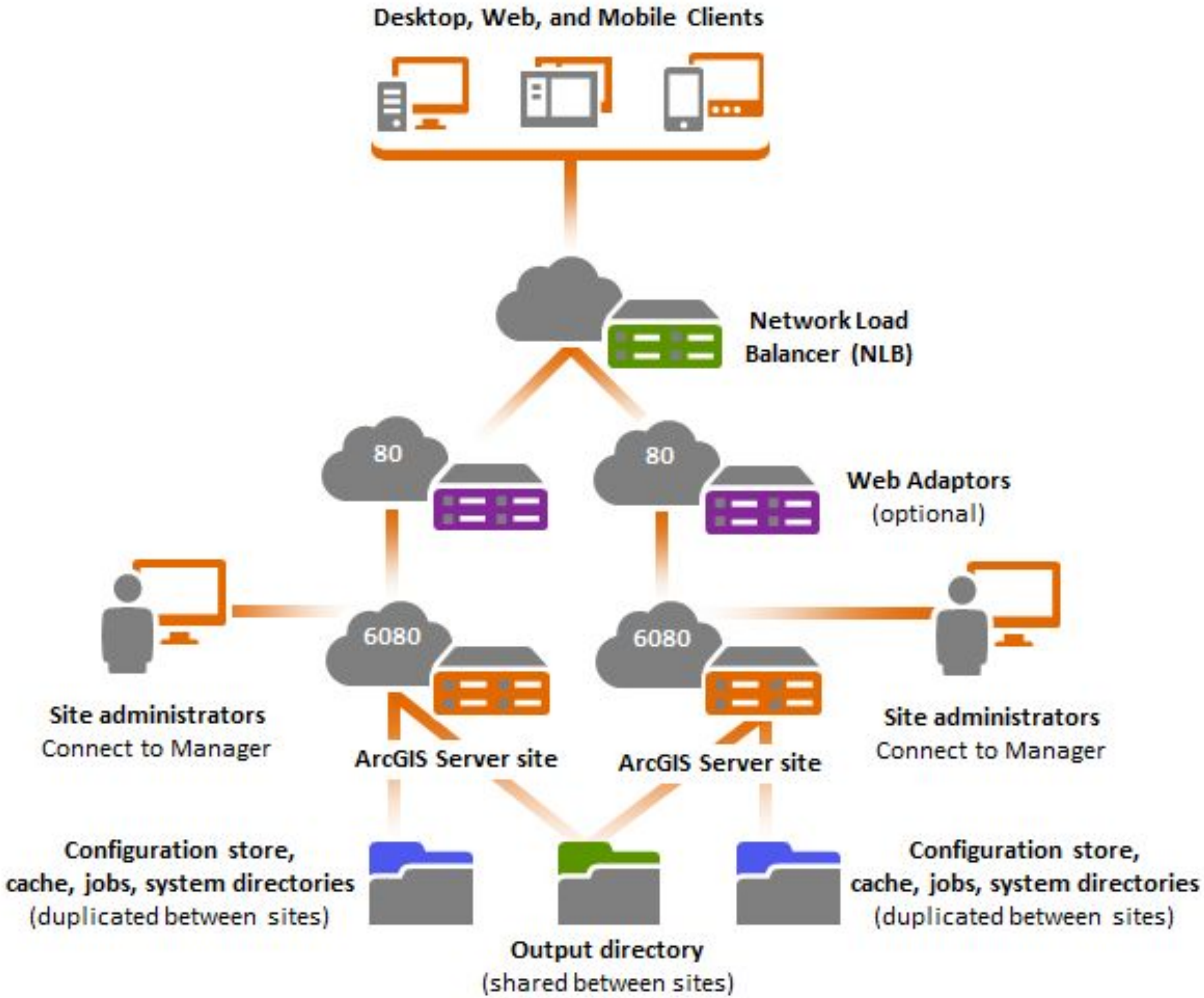
Architecting the ~~Arc~~GIS Platform: Best Practices

Following these best practices will help organizations meet requirements for **performance, security, and availability.** The best practice briefs for ***Application Implementation Strategy, Capability Delivery, Patterns of Use, Managing Identities, Project Prioritization, and Workforce Development*** focus on people and how they should interact with ArcGIS.

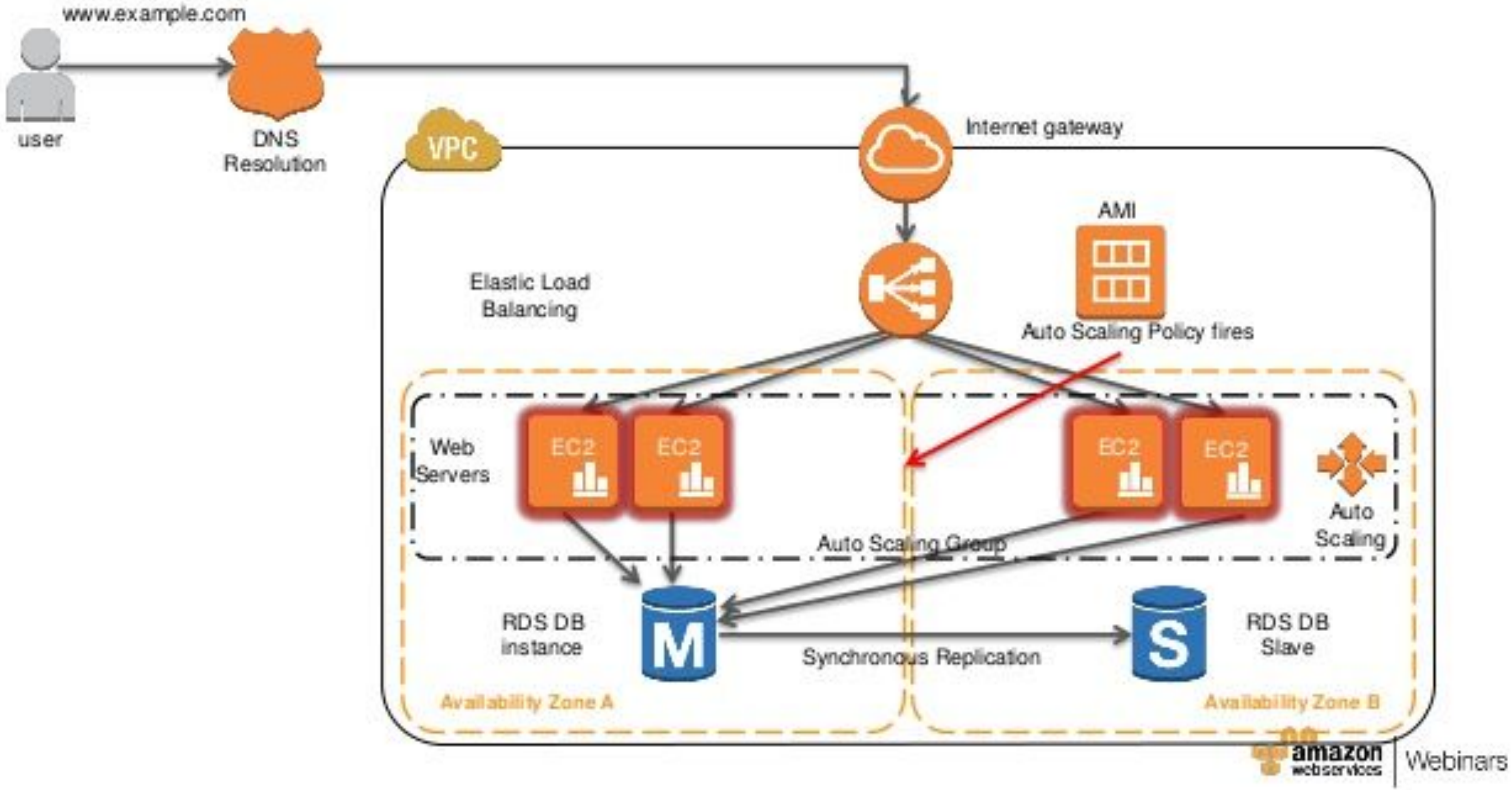
Architecting the ~~Arc~~GIS Platform: Best Practices

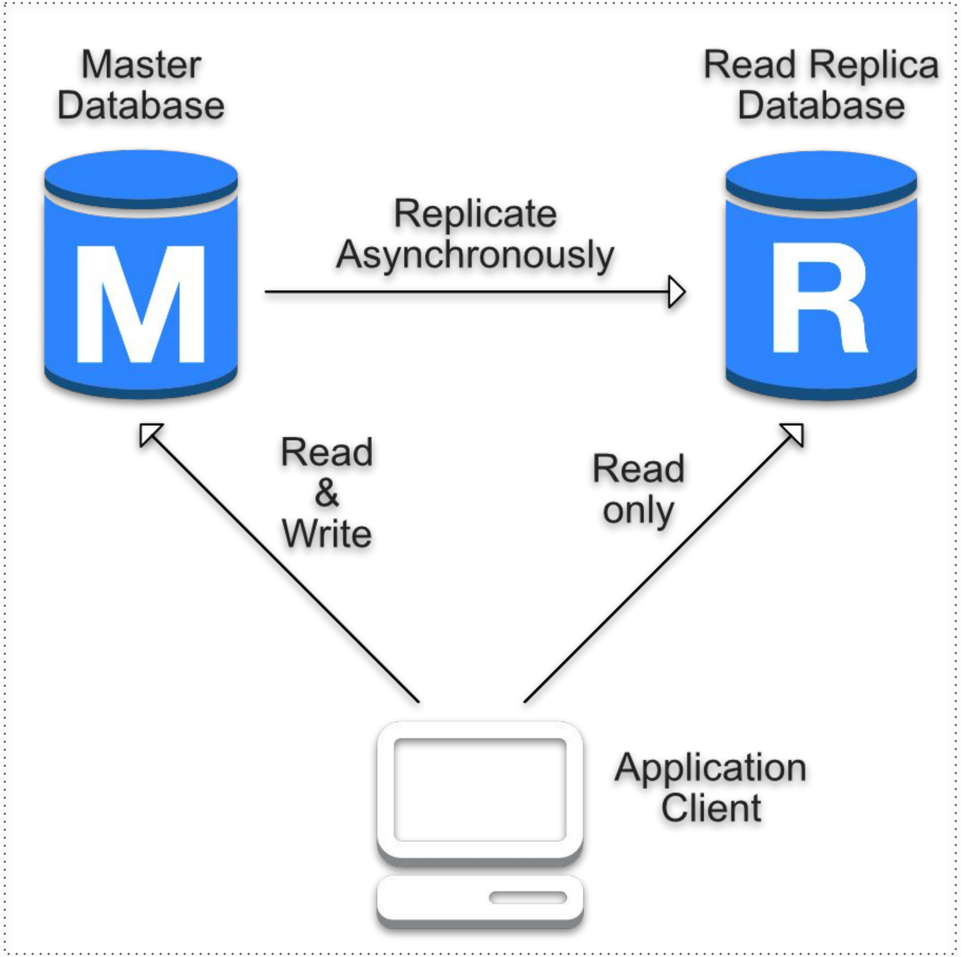
Finally, the
IT Governance brief offers a complementary process guideline that suggests ways to **minimize risk, improve quality, and increase productivity** around ArcGIS solutions.


Web client
applications
External Internet
Web server
Geospatial server
Administrators
and internal client
applications
Internal network
Data tier
File server
Database server



Desktop, Web, and Mobile Clients
Network Load Balancer (NLB)
80
80
Web Adaptors (optional)
6080
6080
Site administrators
Connect to Manager
ArcGIS Server site
ArcGIS Server site
Site administrators
Connect to Manager
Configuration store, cache, jobs, system directories (duplicated between sites)
Configuration store, cache, jobs, system directories (duplicated between sites)
Output directory (shared between sites)


www.example.com
user
DNS Resolution
VPC
Internet gateway
AMI
Elastic Load Balancing
Auto Scaling Policy fires
Web Servers
EC2
EC2
EC2
EC2
Auto Scaling
Auto Scaling Group
RDS DB instance
M
Synchronous Replication
S
RDS DB Slave
Availability Zone A
Availability Zone B
amazon webservices
Webinars


Master
Database
Read Replica
Database
Replicate
Asynchronously
M
R
Read
&
Write
Read
only
Application
Client

Discusión

Implementación de Geoservicios

- Experiencias?
- Software libre? Propietario?
- Retos?
- Lecciones aprendidas?
- Procesamiento?
- Desempeño?
- Disponibilidad?
- Calidad del Servicio?

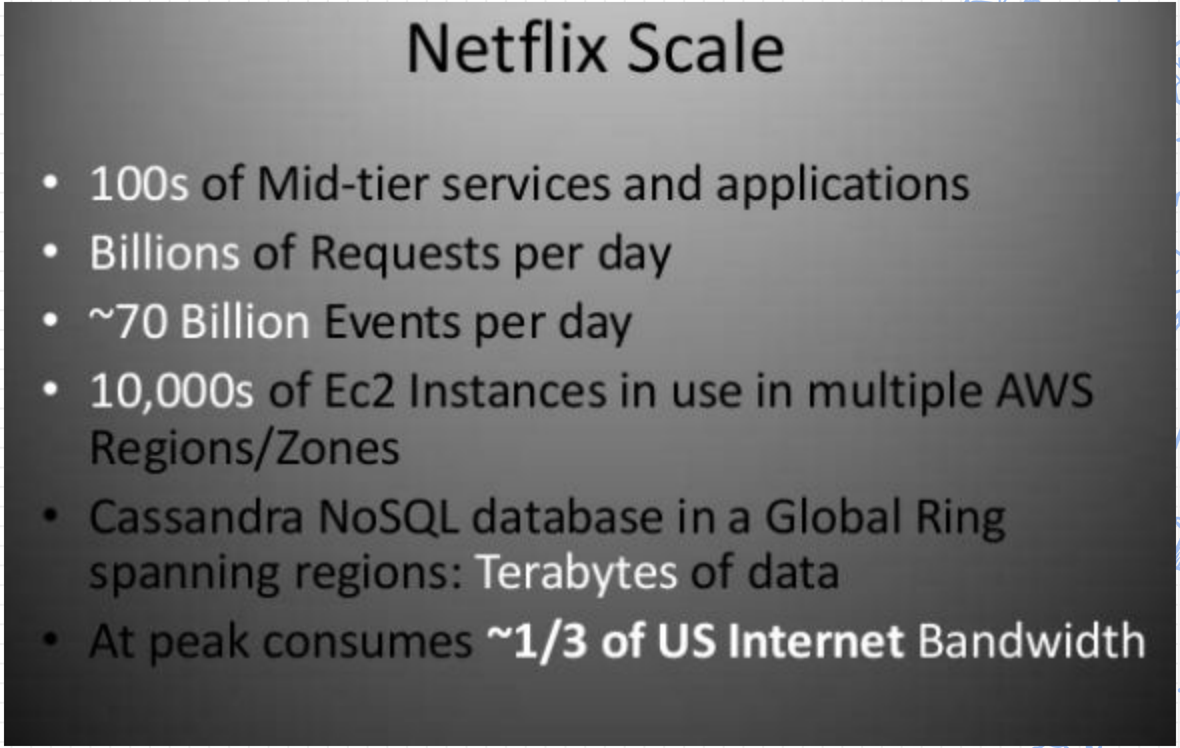
Aplicaciones a Gran Escala

- ✘ Gran escala?
- ✘ 10? 100? 1000? Usuarios
- ✘ TBs?

Aplicaciones a Gran Escala

Netflix

[Web Scale Applications using NeflixOSS Cloud Platform]



Aplicaciones a Gran Escala

- ✘ AWS re:Invent 2016: How Mapbox Uses the AWS Edge to Deliver Fast Maps for Mobile, Cars, and Web Users Worldwide (CTD304) https://www.slideshare.net/AmazonWebServices/aws-reinvent-2016-how-mapbox-uses-the-aws-edge-to-deliver-fast-maps-for-mobile-cars-and-web-users-worldwide-ctd304
- ✘ Carto: Inside - Out https://www.slideshare.net/xurxosanz/cartodb-inside-out

Aplicaciones a Gran Escala

Uber

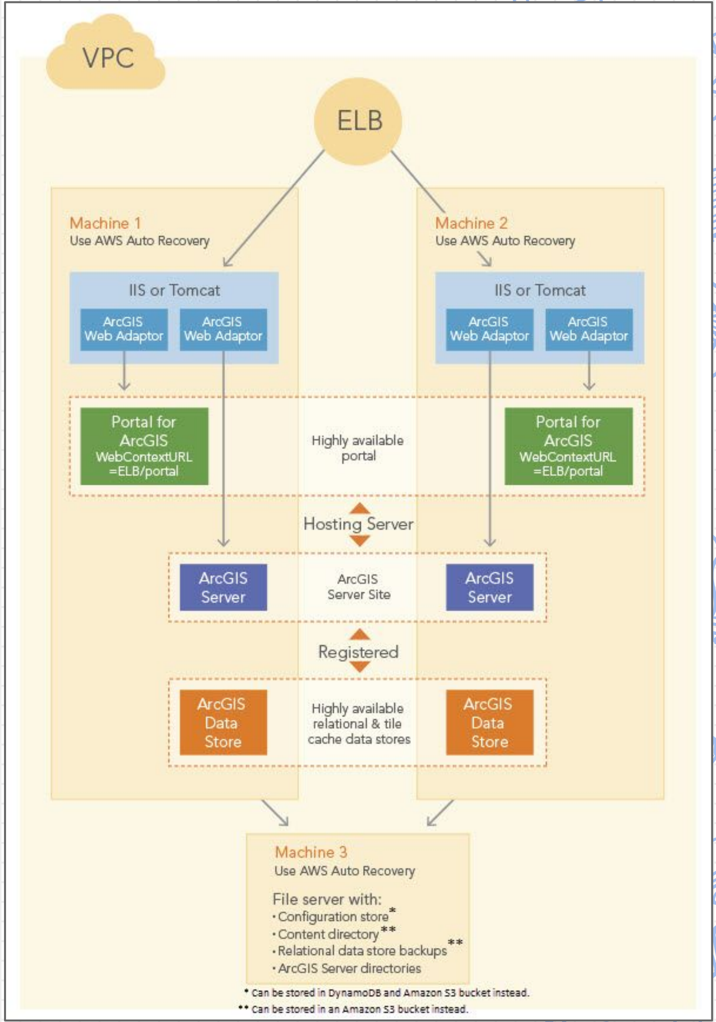
- ✘ How We Built Uber Engineering’s Highest Query per Second Service Using Go
- ✘ https://eng.uber.com/go-geofence/

Tecnologías Relacionadas

- ✘ Cloud Computing?
- ✘ Big Data?

Implementación de Geoservicios - Cloud

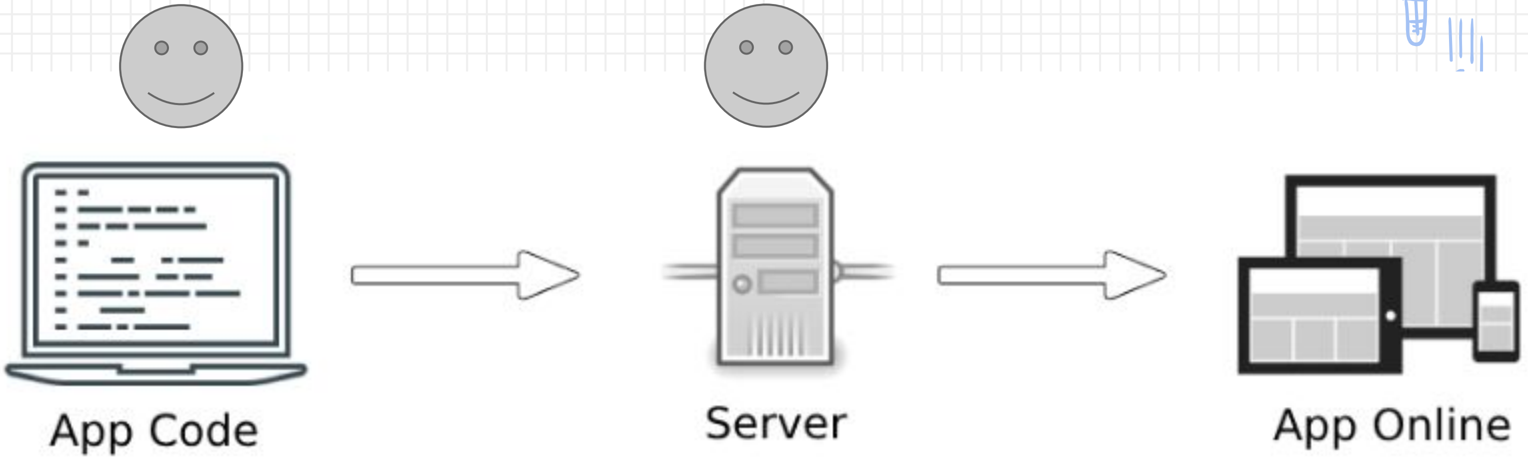
- ✘ [ArcGIS Enterprise architectures on Amazon Web Services]()



Implementación de Geoservicios - Cloud - Serverless GIS

Implementación de Geoservicios - Cloud - Serverless GIS

Forma tradicional



Simple traditional development process.

Forma “serverless”

Implementación de Geoservicios - Cloud

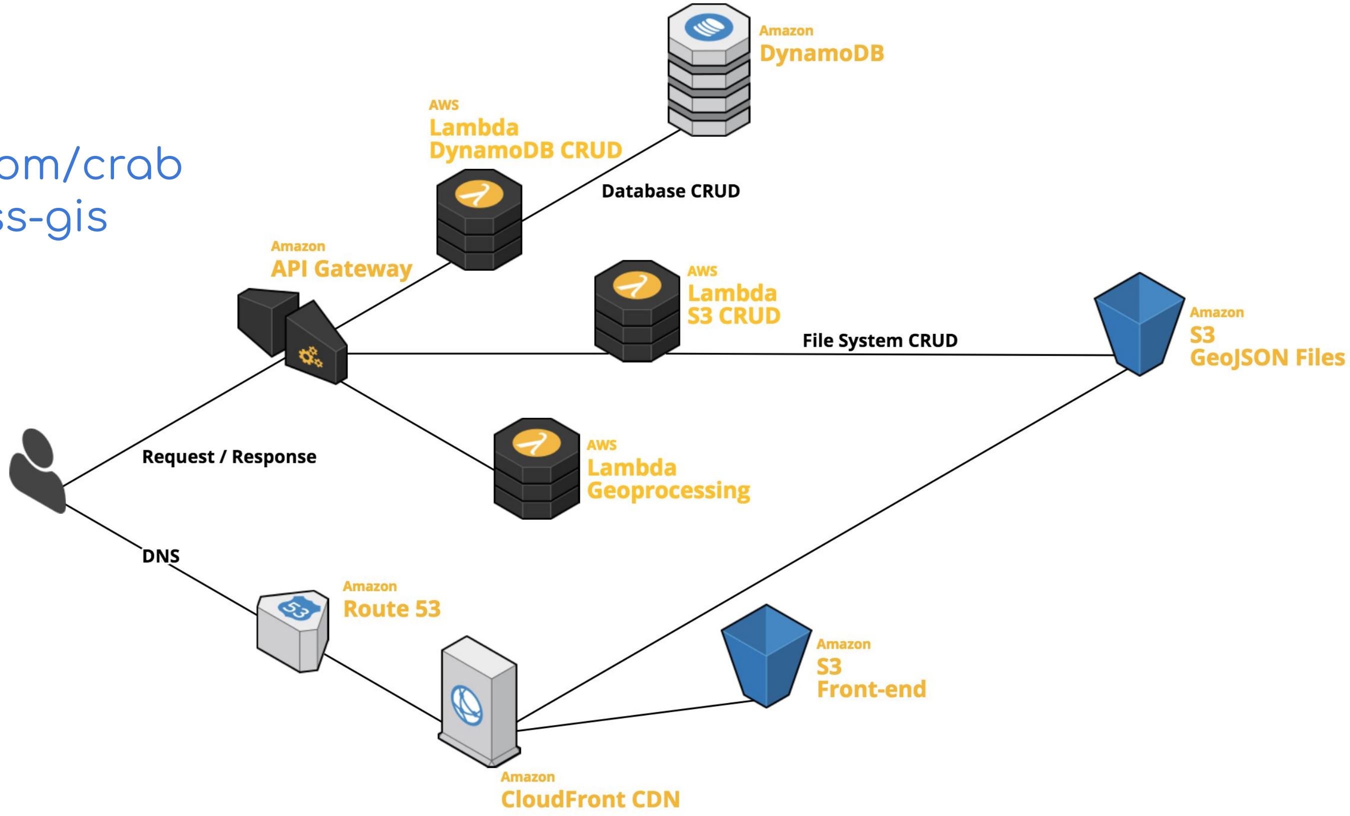
Serverless GIS

[Combining the power of AWS Lambda and Rasterio]

Implementación de Geoservicios - Cloud

Serverless GIS

https://github.com/crabcanon/serverless-gis



Serverless

[Serverlessspatial](#)

[MapServerless AWS Lambda Layer](#)

Consumo de información de distintos orígenes de datos geográficos

Aplicaciones

- Viqueira, José R. R., et al. “A Sensor Observation Service Based on OGC Specifications for a Meteorological SDI in Galicia.” Lecture Notes in Computer Science Advances in Conceptual Modeling -□□ Applications and Challenges, 2010, pp. 43–52., doi:10.1007/978-3-642-16385-2_6.

Aplicaciones

- The MeteoSIX project, founded by the Galician regional government, aims at the development of a Spatial Data Infrastructure (SDI) and a new SDI based Geo web site to enable an **integrated access to meteorological data** for a wide variety of users with different skills. Such data has to be **available through the internet using OGC** and OpenNDAP standards.

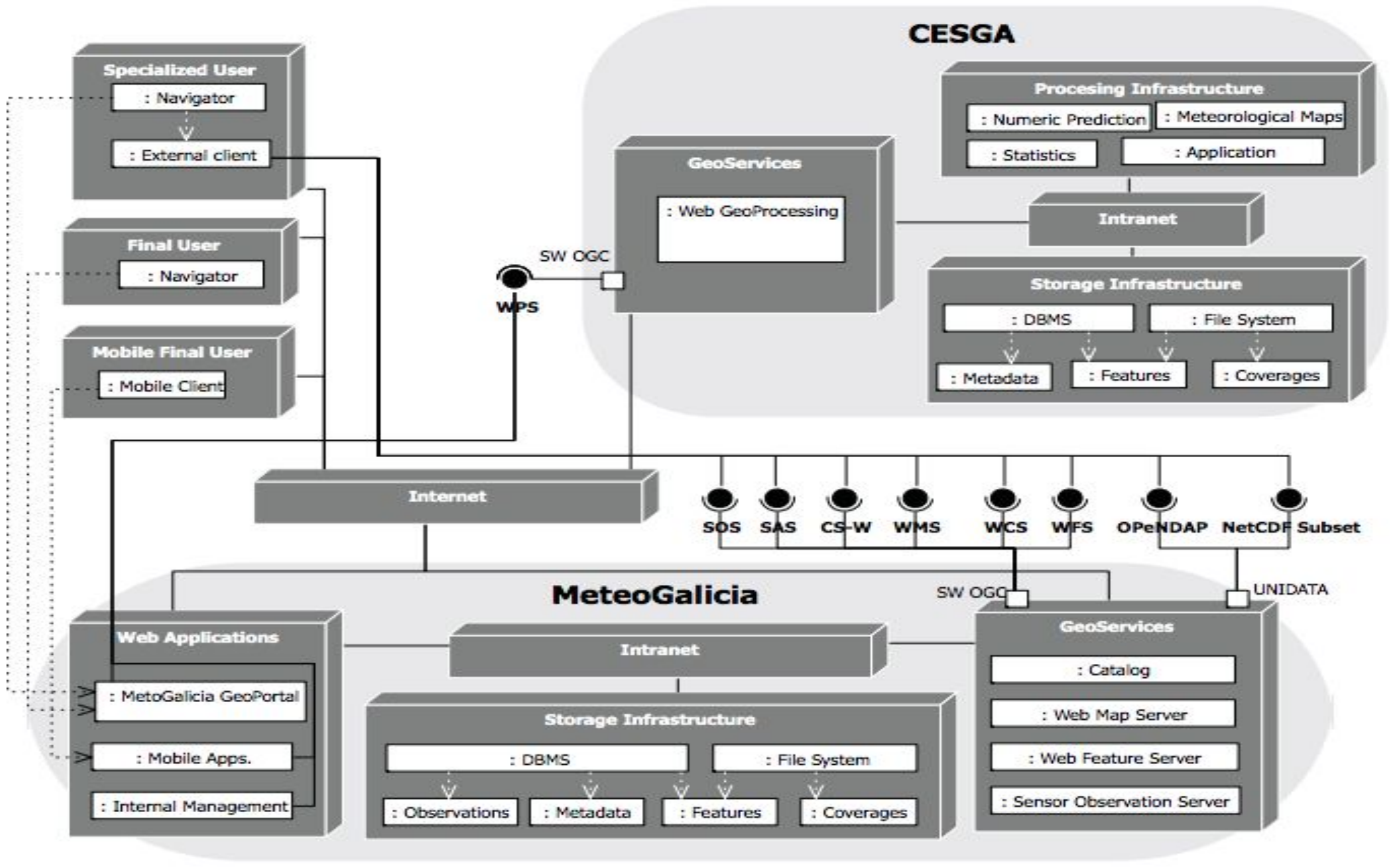


Fig. 1. Component Deployment for the MetoSIX Project

Aplicación

Akıncı, H., & Erdoğan, S. (2013). Designing a flood forecasting and inundation-mapping system integrated with spatial data infrastructures for Turkey. Natural Hazards, 71(1), 895–911. https://doi.org/10.1007/s11069-013-0939-9

Aplicación

The main purpose of this study was to determine the technical architecture of the FFS intended to be developed in Turkey and to design a flood forecasting and inundation-mapping system integrated with spatial data infrastructure (SDI). Because SDIs provide interoperability among the institutions by enabling collective use of data and services, this enables decision makers to take correct and rapid decisions regarding the forecasting

Table 1 Necessary data for FFIMS (Erdoğan 2011)

Dataset	Provider	Data structure	Scale	Coverage
Location of meteorological stations	TSMS, GDSHW, GDRE	Vector	25,000	Spatial and attribute data
Precipitation, temperature, evaporation, etc.	TSMS, GDSHW, GDRE	Text	–	Excel file
Soil moisture	GDSHW, TSMS	Text	–	Excel file
Location of stream-gauging stations	GDSHW, GDRE	Vector	25,000	Spatial and attribute data
River and reservoir levels, stream-flow, discharge, historical gauging data	GDSHW, GDRE	Text	–	Excel file
River cross sections	GDSHW, GDRE	Vector	1,000 2,000	Spatial and attribute data
Artificial facilities (dams, dikes, etc.) in basins	GDSHW	Vector	1,000 2,000	Spatial and attribute data
Basin boundaries	GDSHW	Vector	25,000	Spatial and attribute data
River network	GDSHW	Vector	25,000	Spatial and attribute data
Topographical maps and DEM	GCM	Vector raster	25,000	Spatial and attribute data
Land cover/use	MoEU	Vector	25,000	Spatial and attribute data
Soil type	GDAR	Vector	25,000	Spatial and attribute data
Basin geology	GDMRE	Vector	25,000	Spatial and attribute data
Satellite imageries	TURKSAT	Raster	5,000 25,000	Spatial data
Aerial photographs	GCM	Raster	5,000 25,000	Spatial data
Cadastral maps	GDLRC	Vector	1,000 5,000	Spatial and attribute data

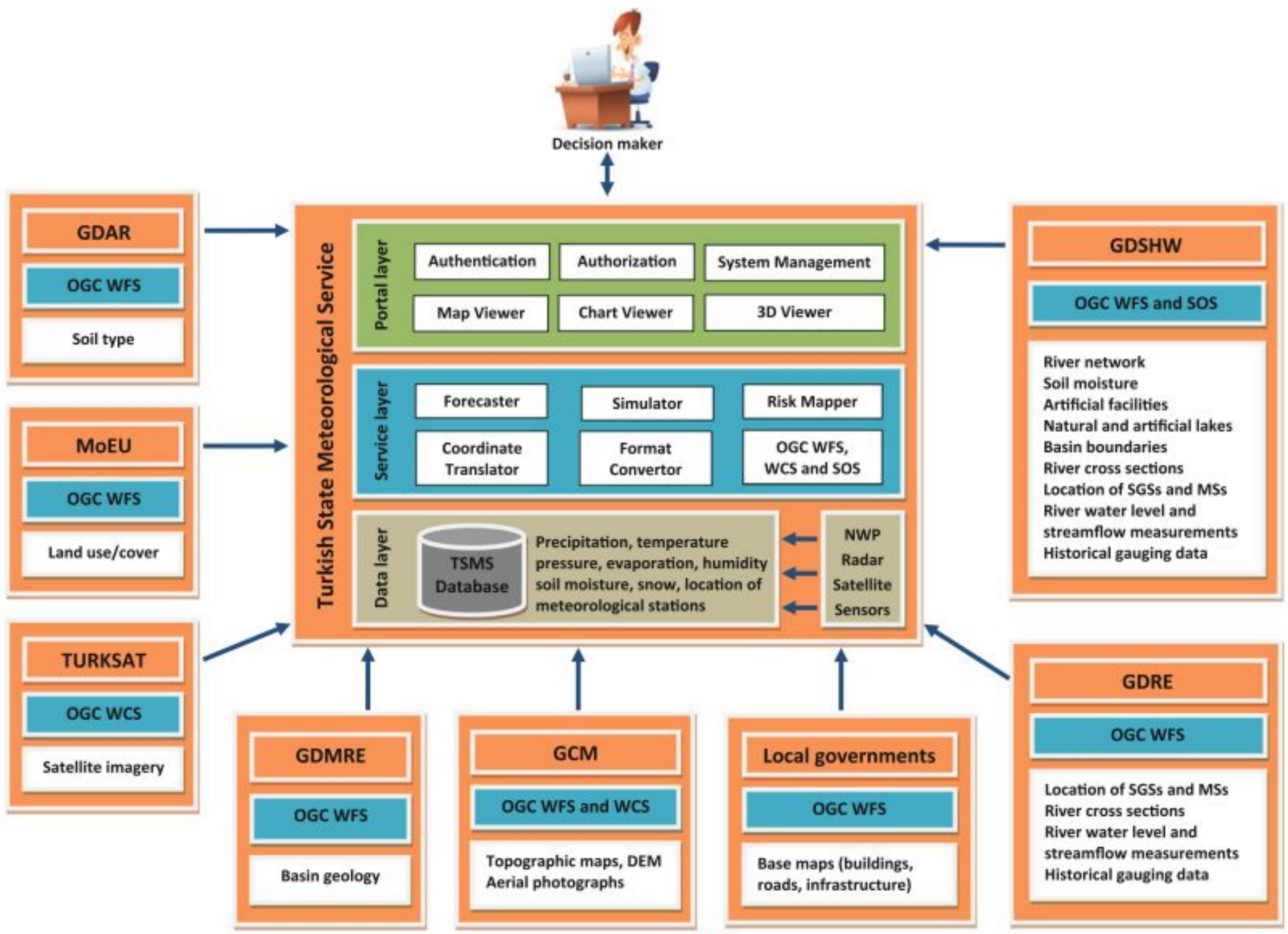


Fig. 1 Architecture suggested for FFIMS

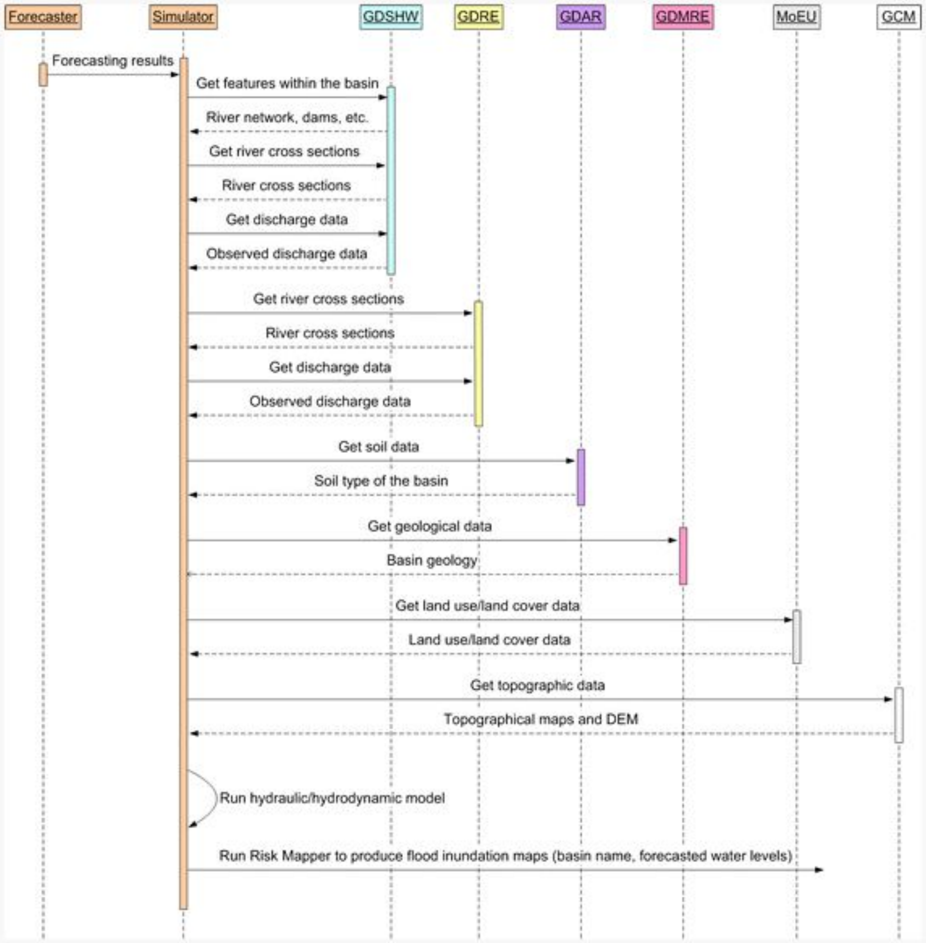


Fig. 3

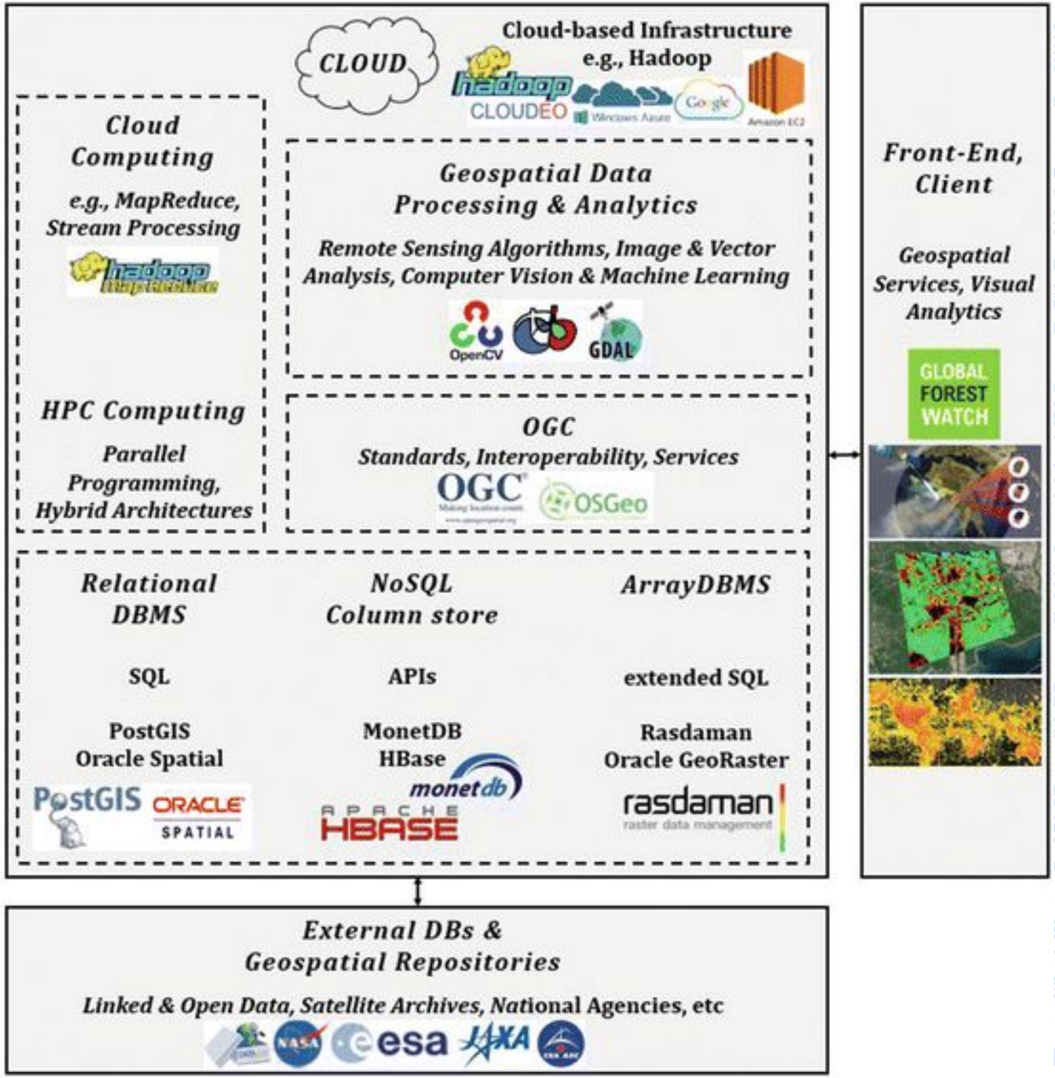
UML sequence diagram of the workflow realized by the Simulator

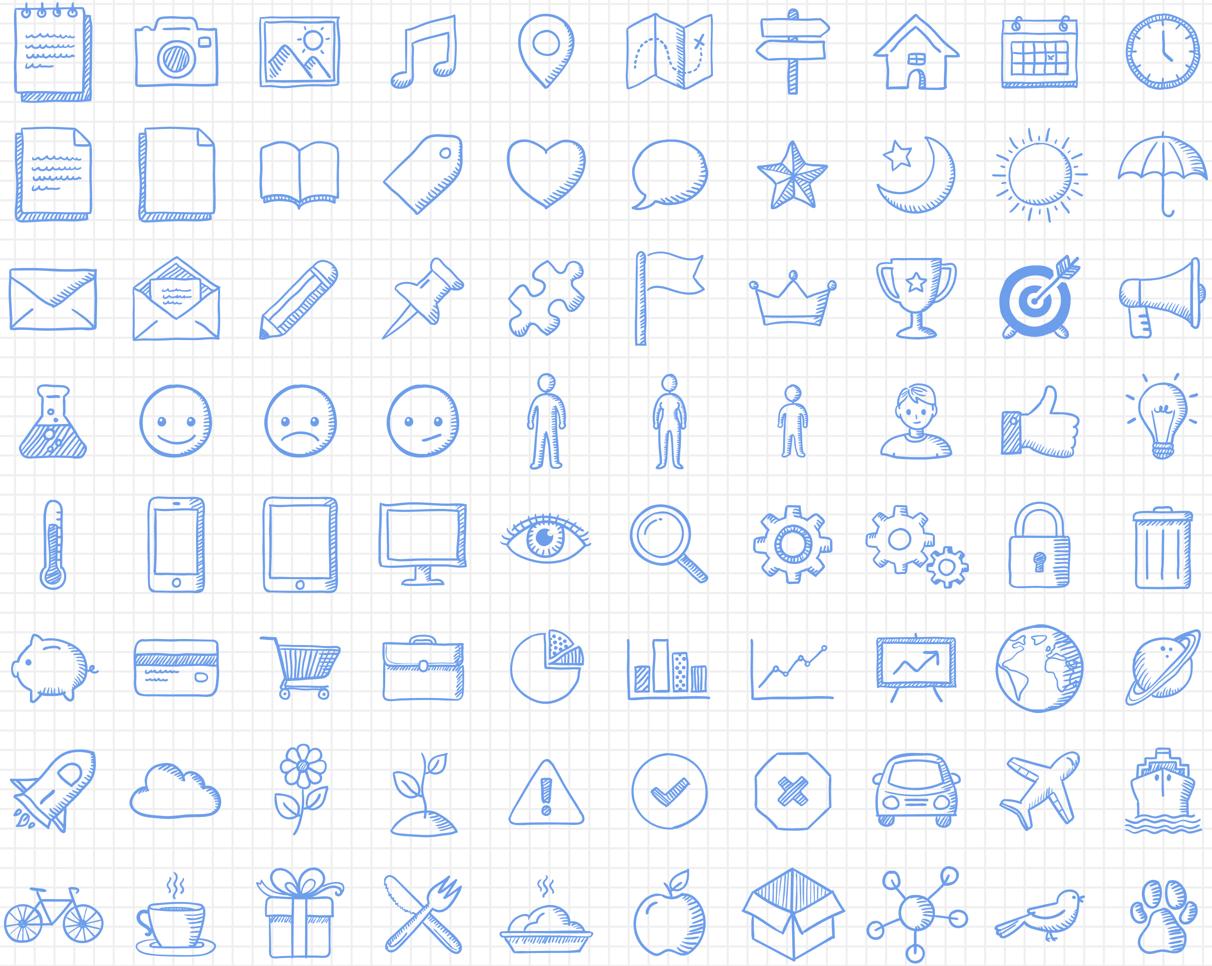
Aplicación

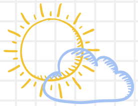
Karmas, A., Tzotsos, A., & Karantzalos, K. (2016). Geospatial Big Data for Environmental and Agricultural Applications. In Big Data Concepts, Theories, and Applications (pp. 353–390). Springer International Publishing. https://doi.org/10.1007/978-3-319-27763-9_10

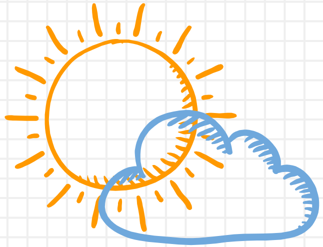
Aplicación

Fig. 10.1
The current dominating architecture and technology for geospatial big data and analytics









Gracias