From routine to extreme: flexible services oriented architectures for rapid public health information delivery

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Decision Making

- Decision making depends upon the *timely* availability of *accurate information*

  - The sooner information is in the hands of emergency responders, the more complete a picture of the situation is available

  - Rapidly developing situations are characterized by data of variable accuracy and currency

  - From a decision-making standpoint, information is more useful than data

Interoperable Components

- Information delivery resources usable for routine operation *may* be deployed in emergencies *if* designed for *interoperability* and *flexibility*.
  - Interoperability contributes to flexibility through minimization of development around custom interfaces
  - If systems are built of components with standard interfaces, those components are more easily combined to meet new challenges and needs

Pre-positioned Data

- *Data collection and management does not happen quickly* - certainly not quickly enough to respond to emergency situations if the infrastructure and existing data are not already in place

- Adoption of open interoperability standards maximizes the degree to which existing data sources may be used and reused
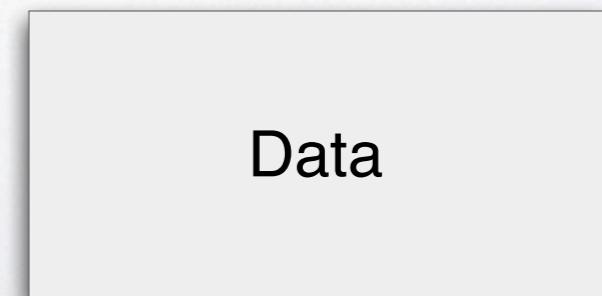
Services Oriented Architecture

- Components
  - Data Collections (databases, files, images)
  - Data Services (interfaces to data collections)
  - Processing and Analysis Services (products derived from data published as data services)
  - Applications (human interfaces providing *information* to decision makers

- Connected to each other with *service interfaces*

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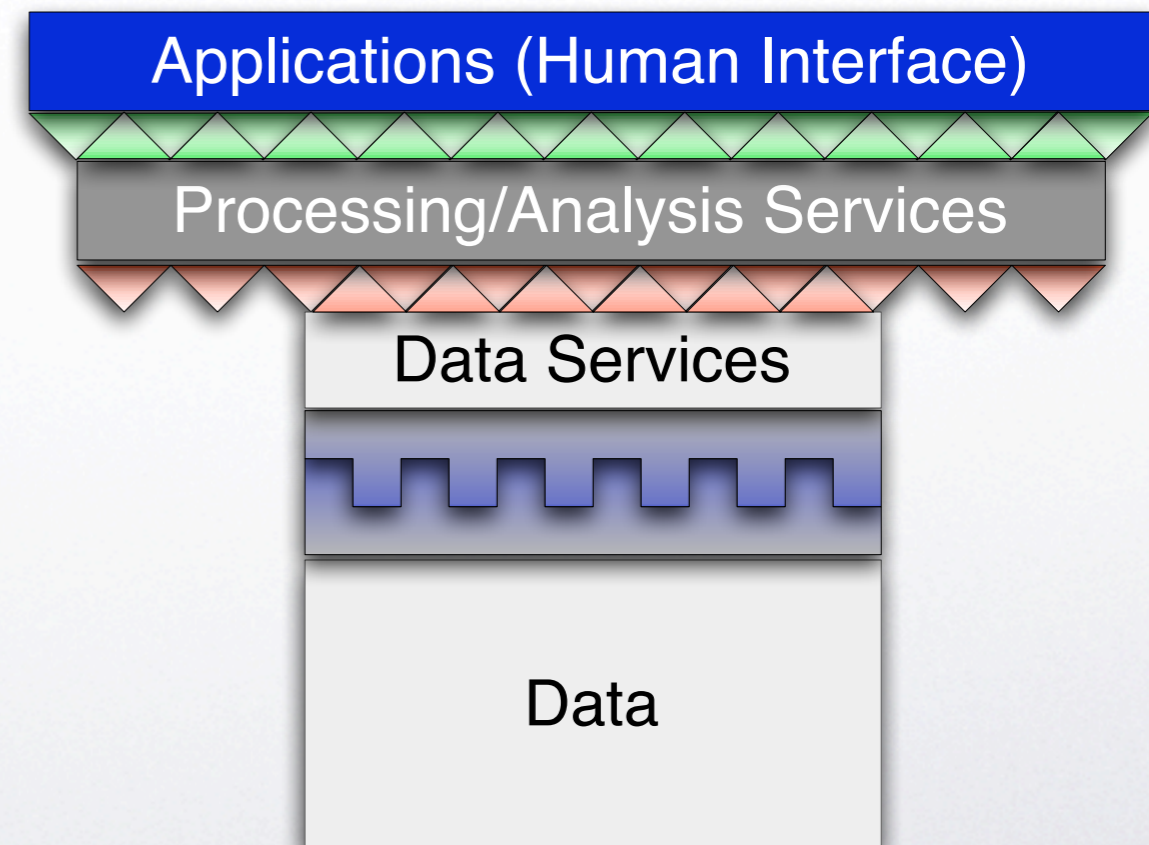
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Data

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| Processing/Analysis Services |
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| Data |

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Applications (Human Interface)
Processing/Analysis Services
Data Services
Data

EDAC

UNM

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Common Service Interfaces

- Web - HTTP, HTTPS, FTP, SFTP
    - Simple Object Access Protocol (SOAP) - XML based messaging and remote procedure calls
    - Representational State Transformation (REST) - Simple URL-based request/response

- Open Geospatial Consortium (OGC)
    - Web Map Services (WMS) - map images
    - Web Feature Services (WFS) - Points, Lines, and Polygons with associated attributes
    - Web Coverage Services (WCS) - Geospatial data (raster and other) as data
    - Many others ...

Examples

- ## NASA PHAiRS Project
  Delivering dust forecast and other remote sensing data to existing public health decision support systems

- ## NM DOH EPHT Implementation
  Developing the operational Environmental Public Health Tracking System for the state of New Mexico that also participates in the national EPHT network

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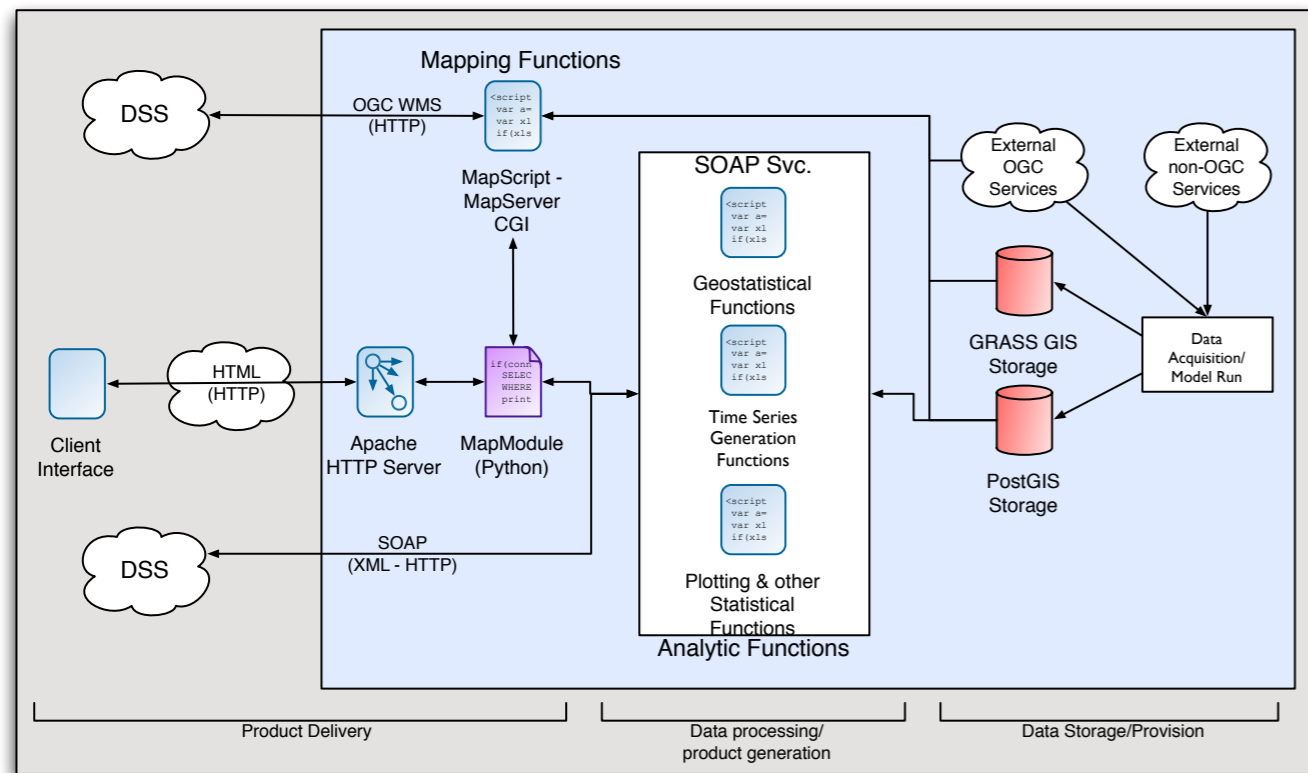
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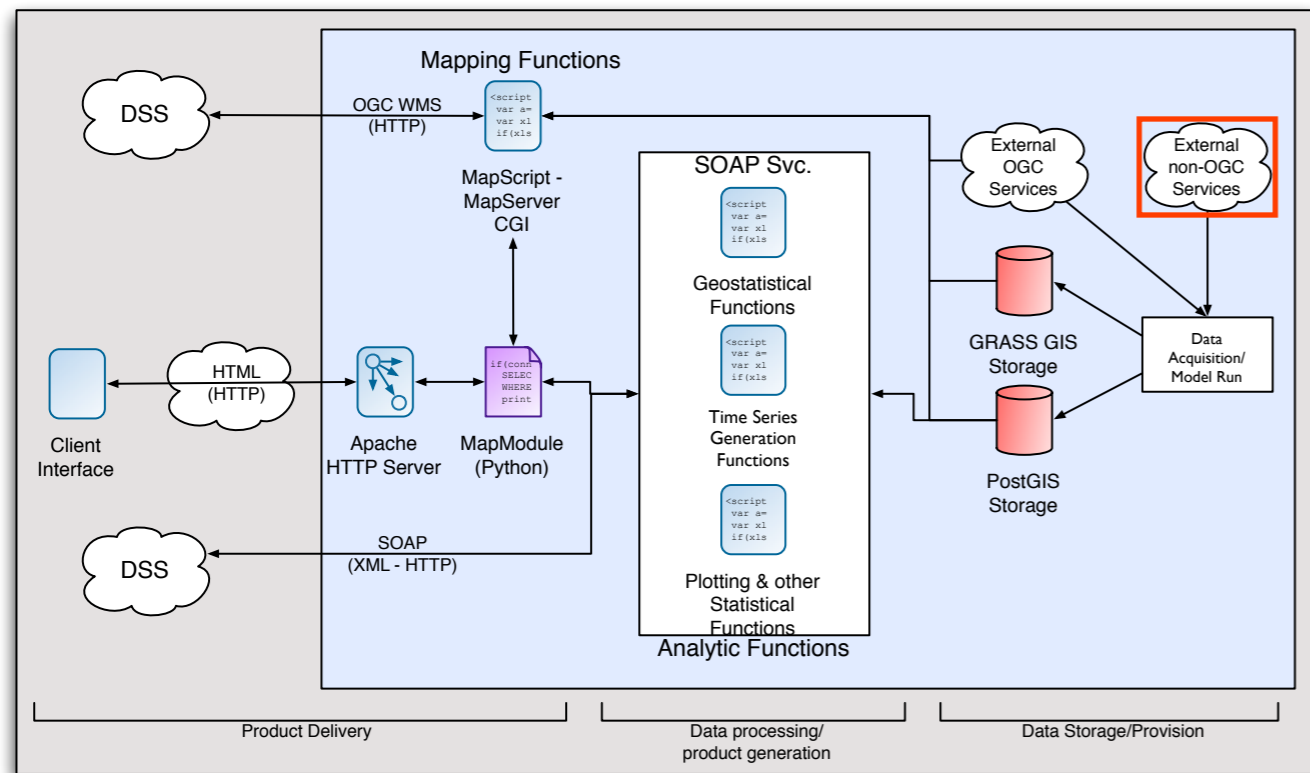
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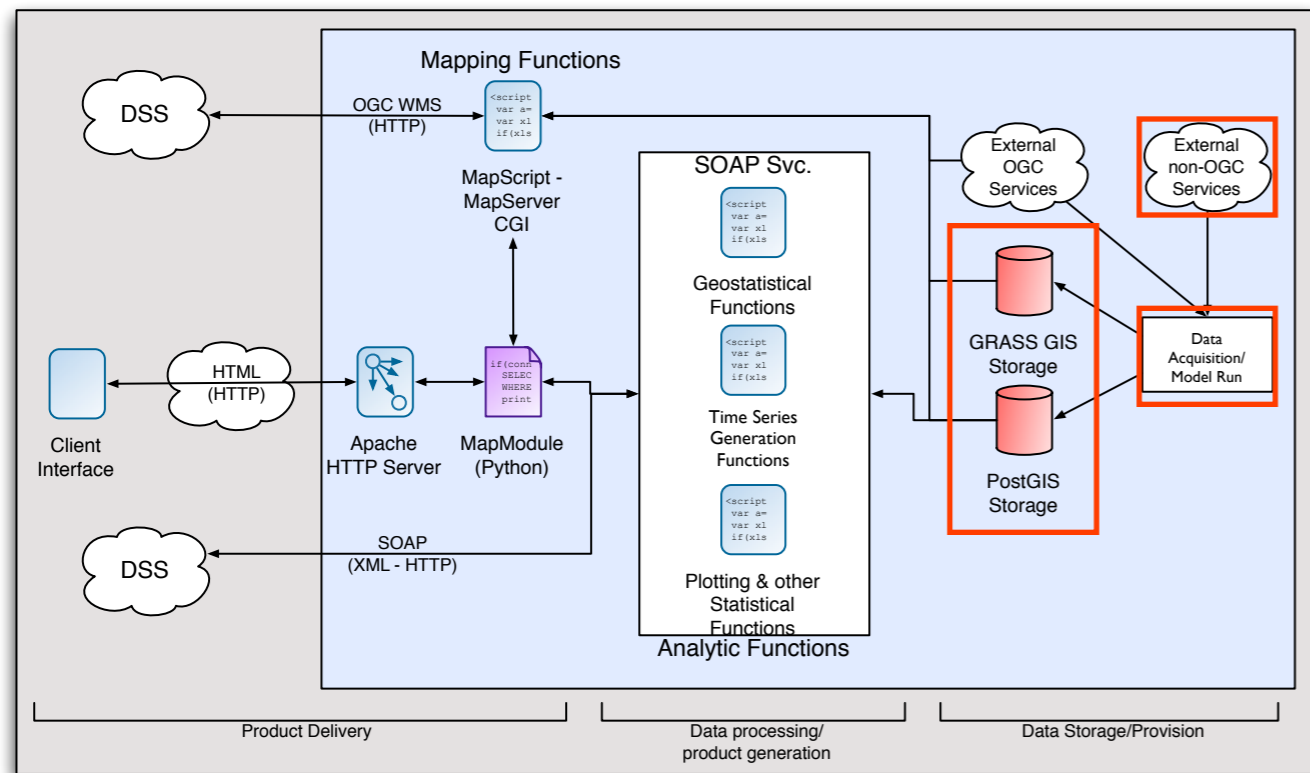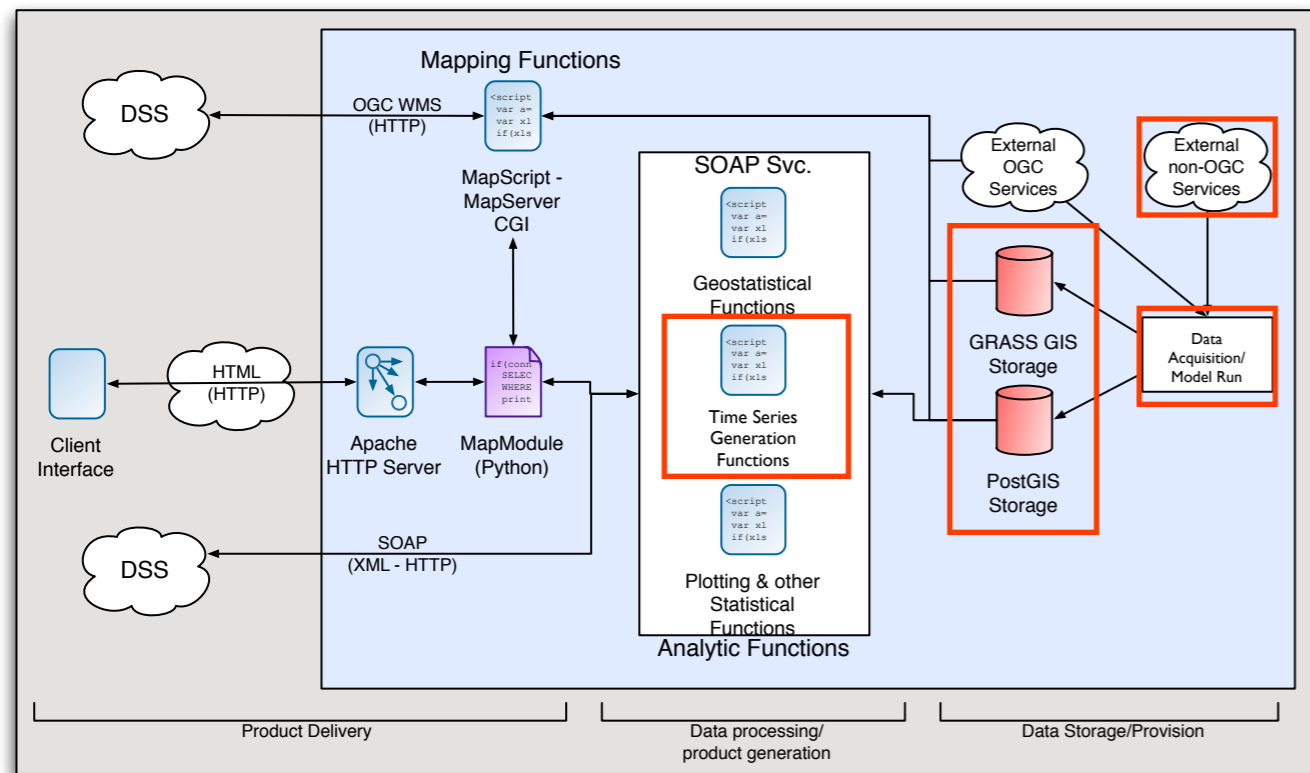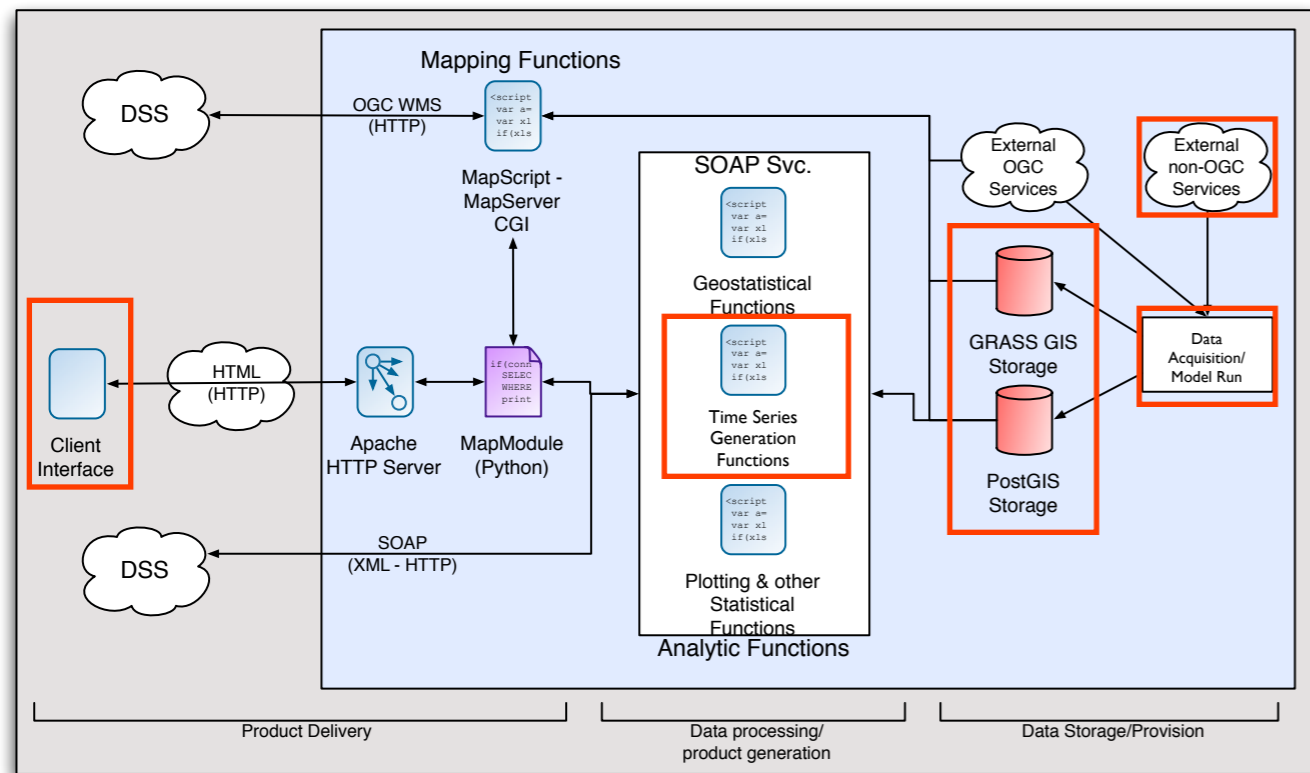
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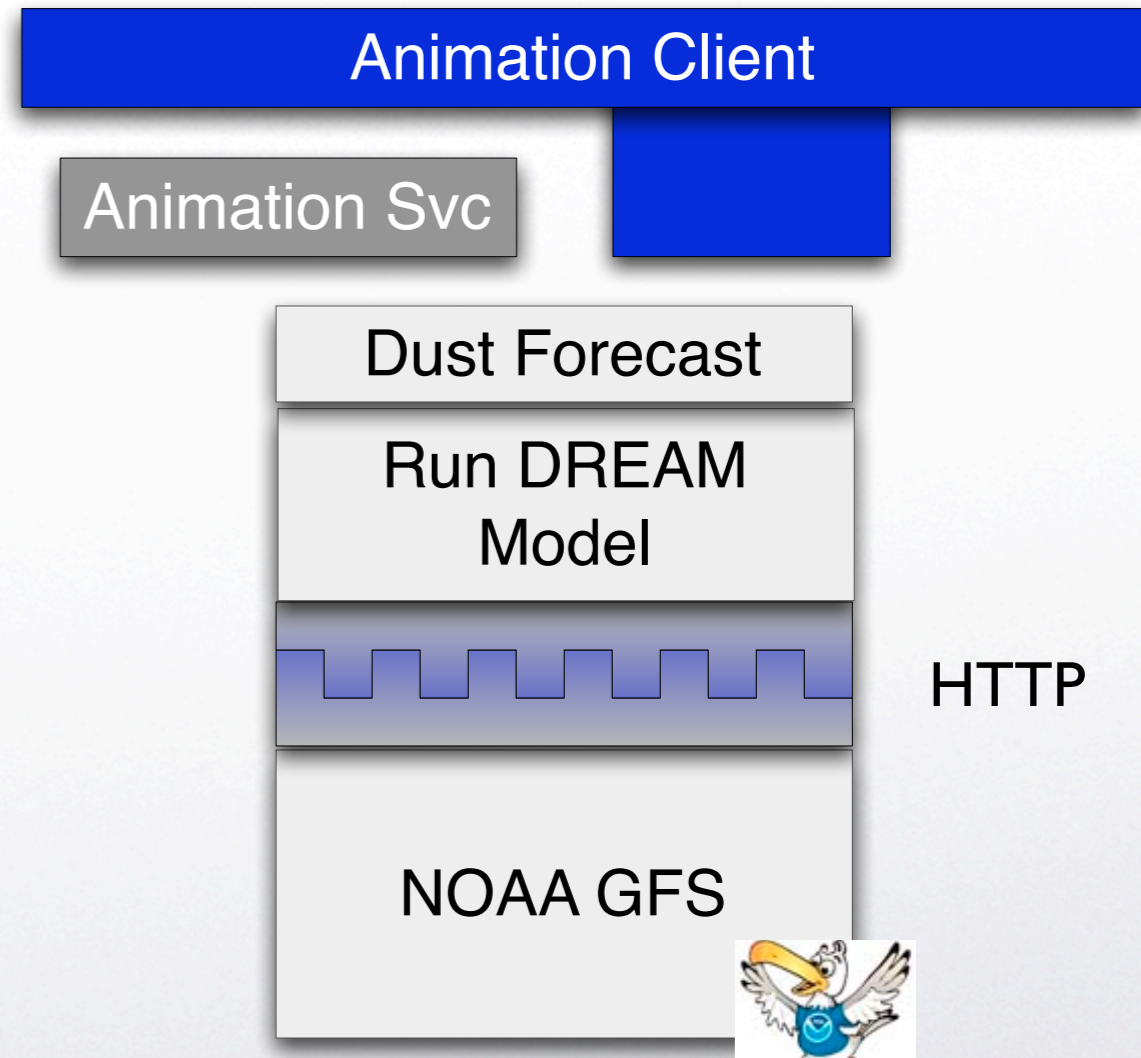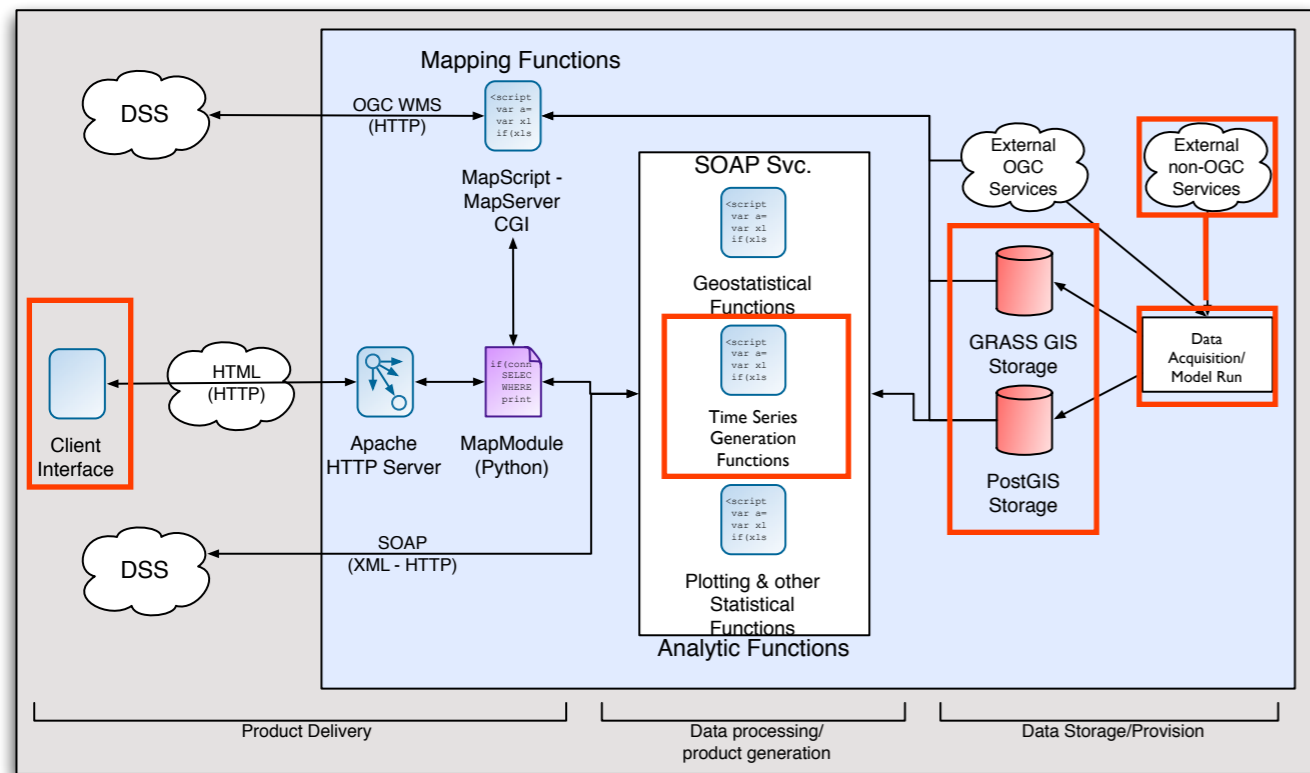
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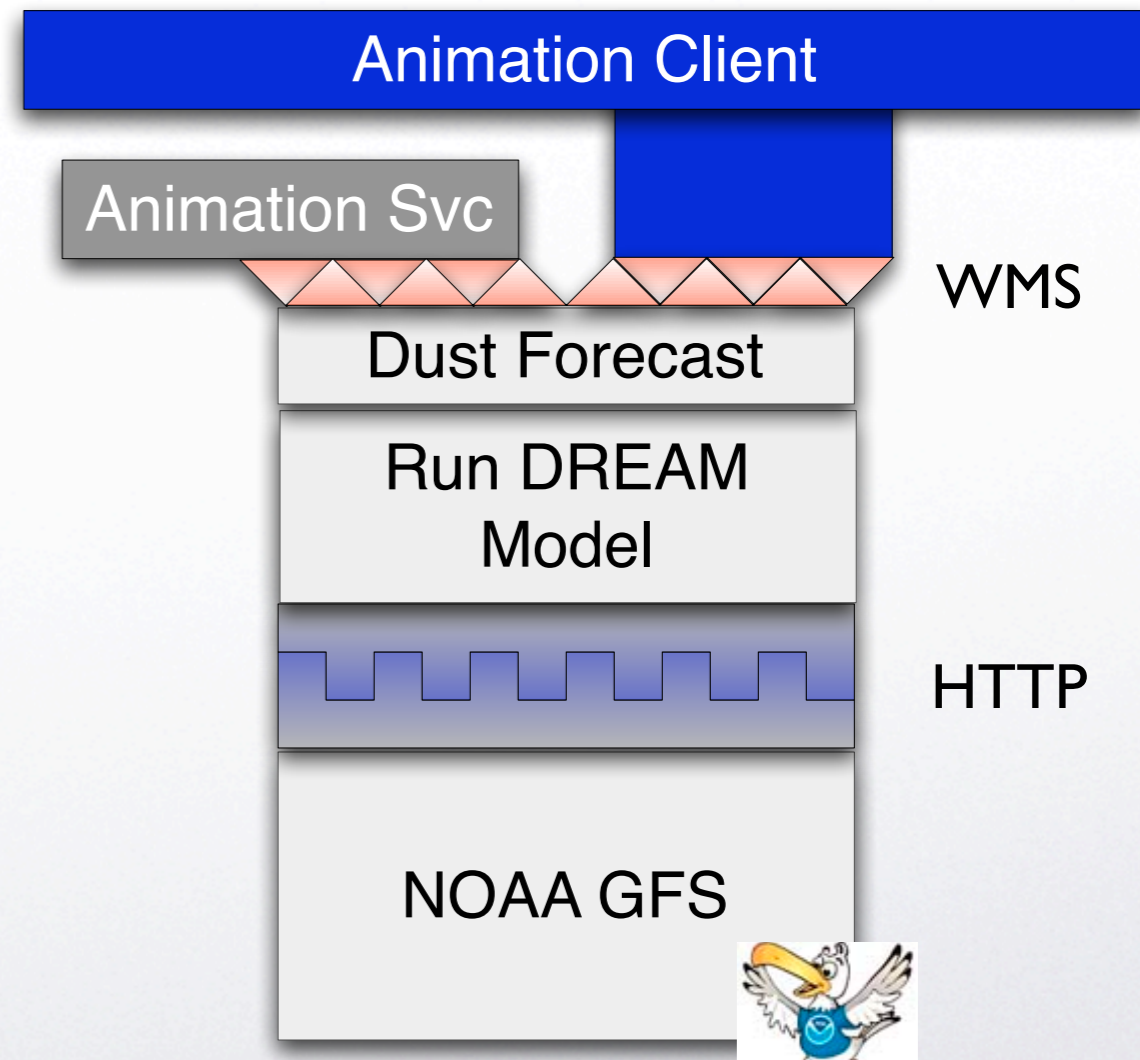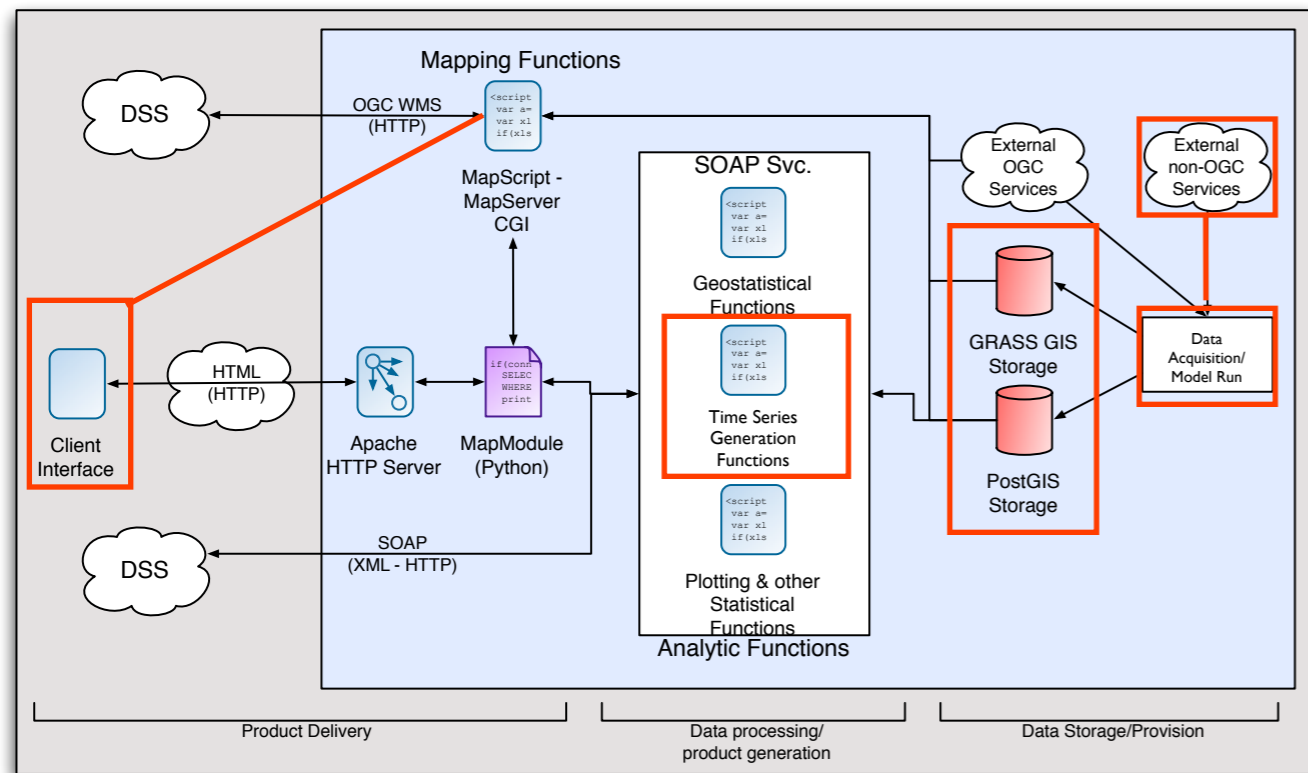
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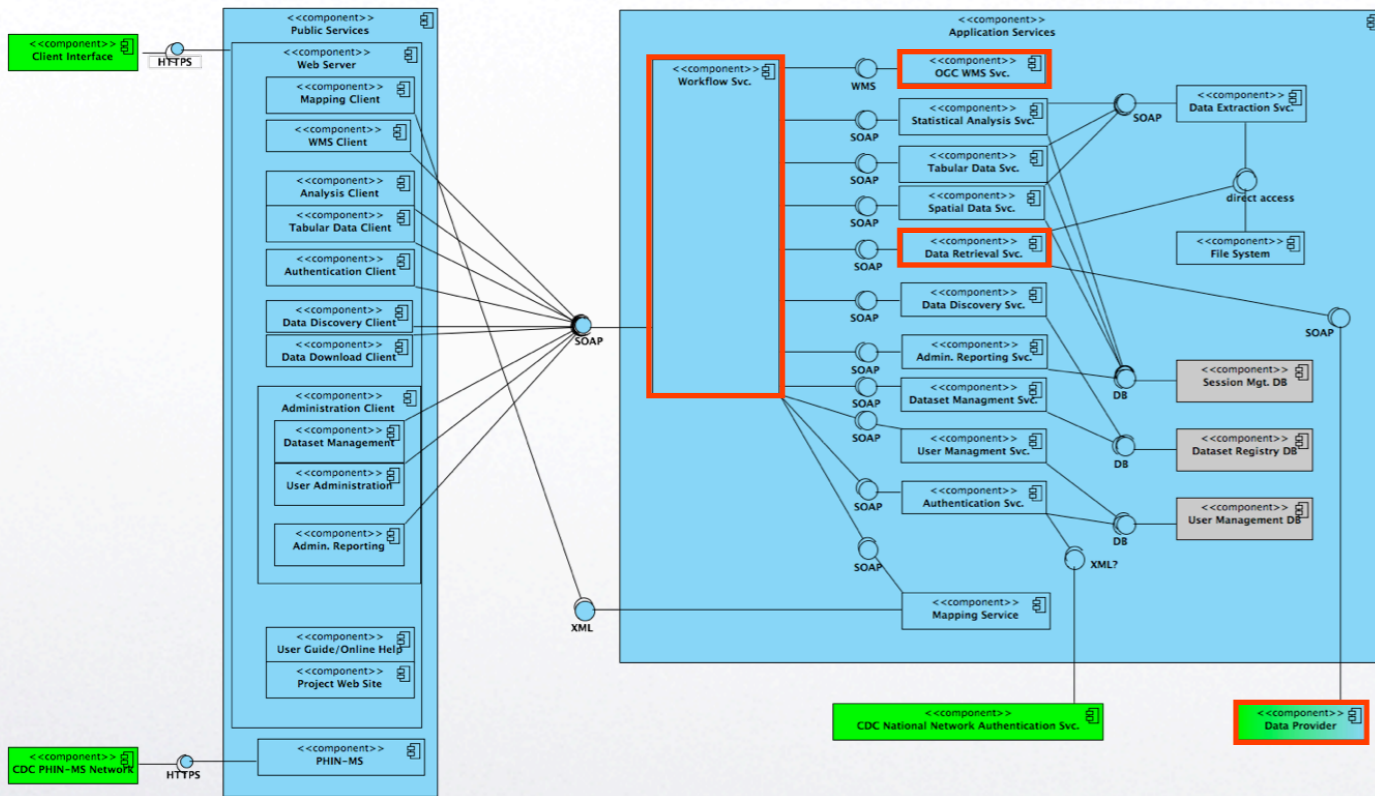
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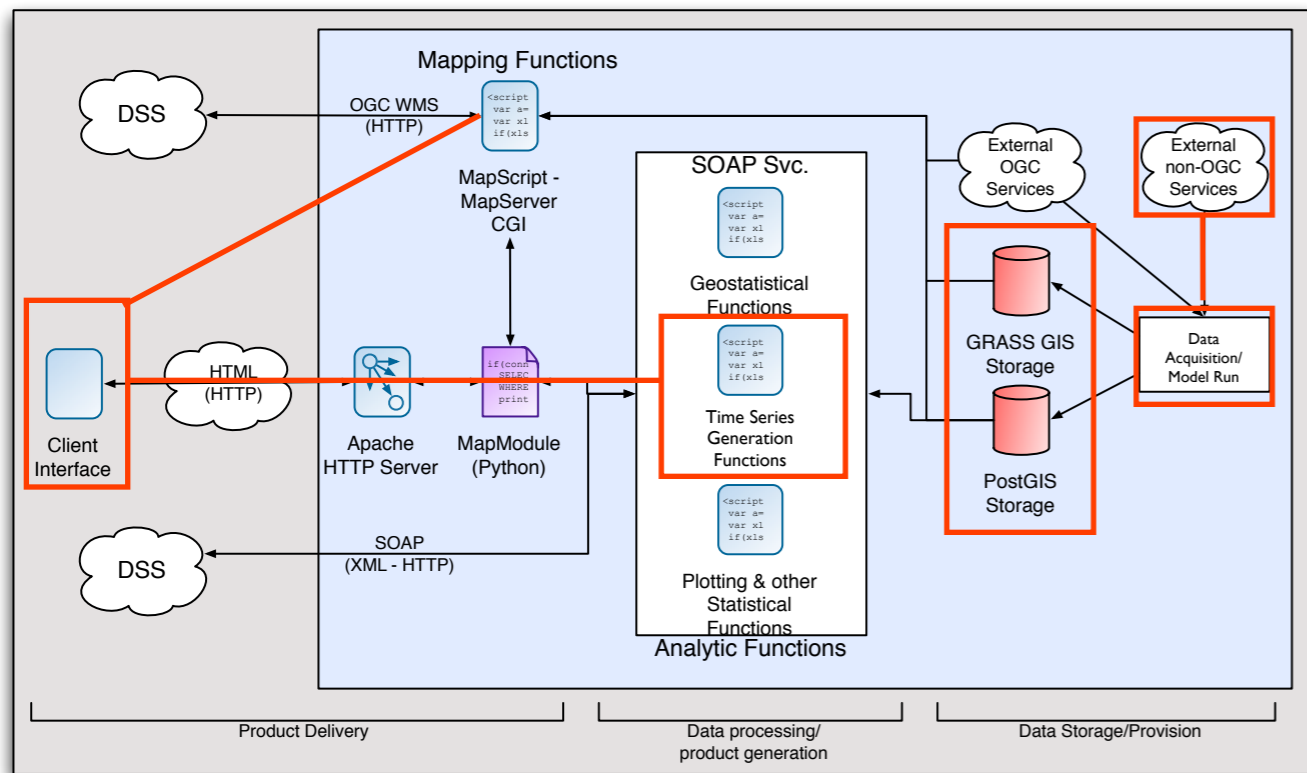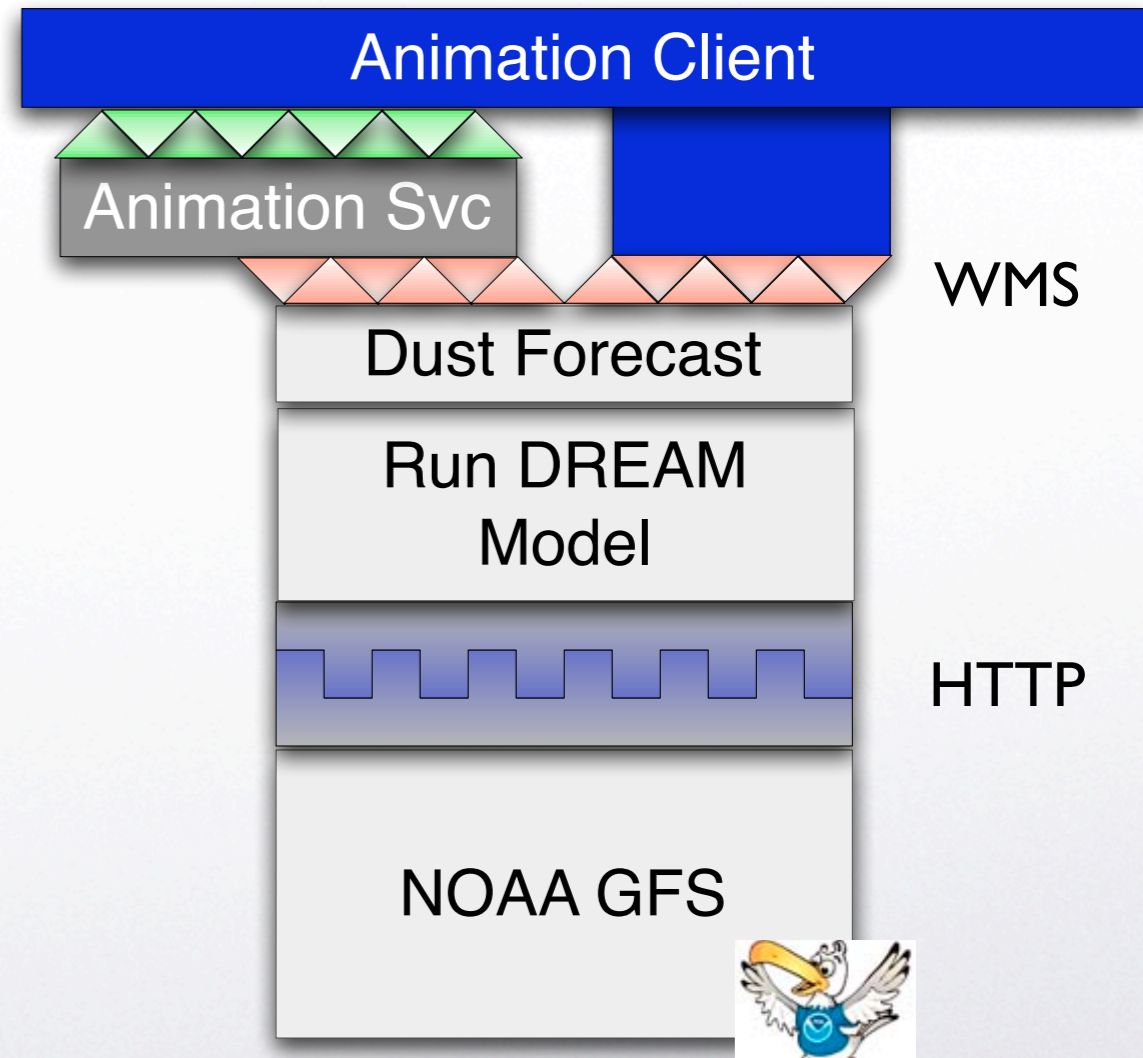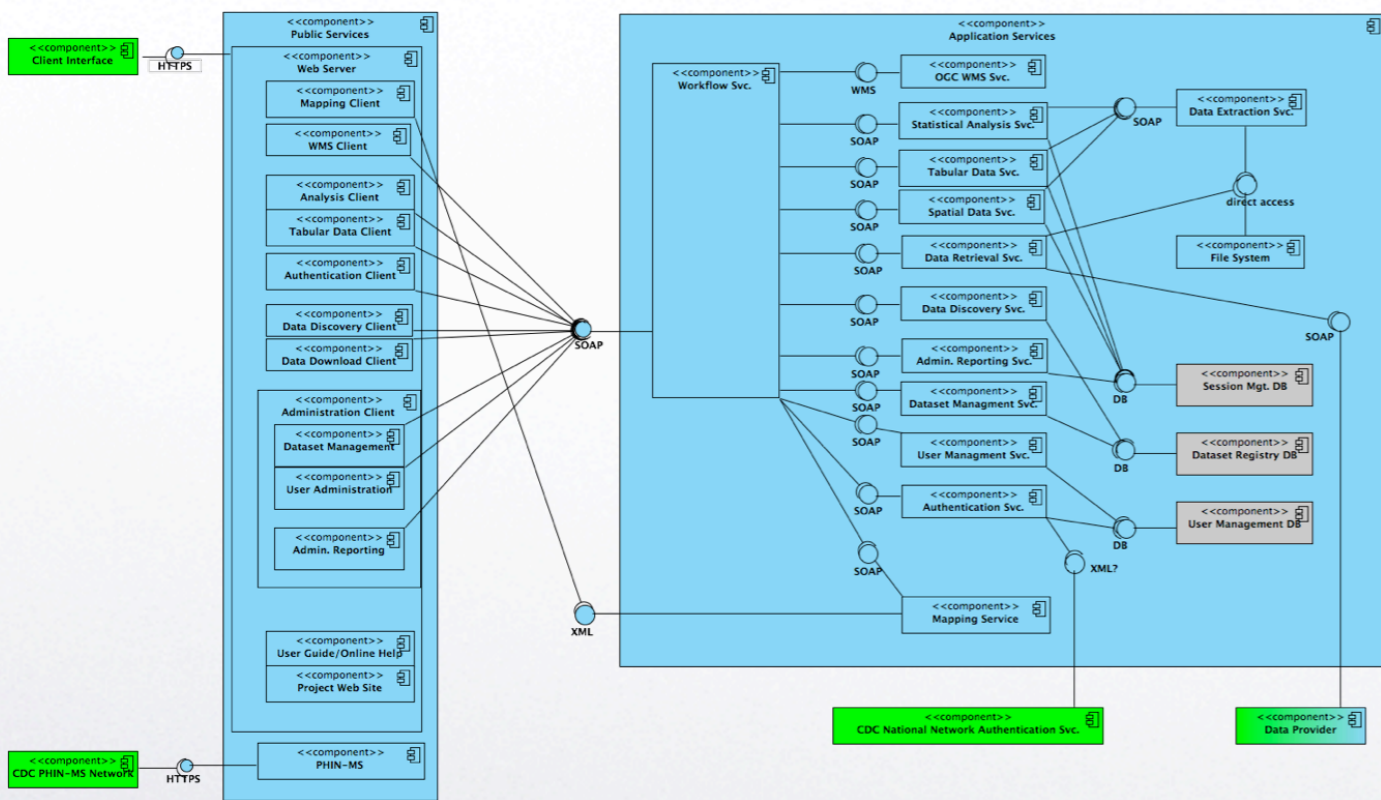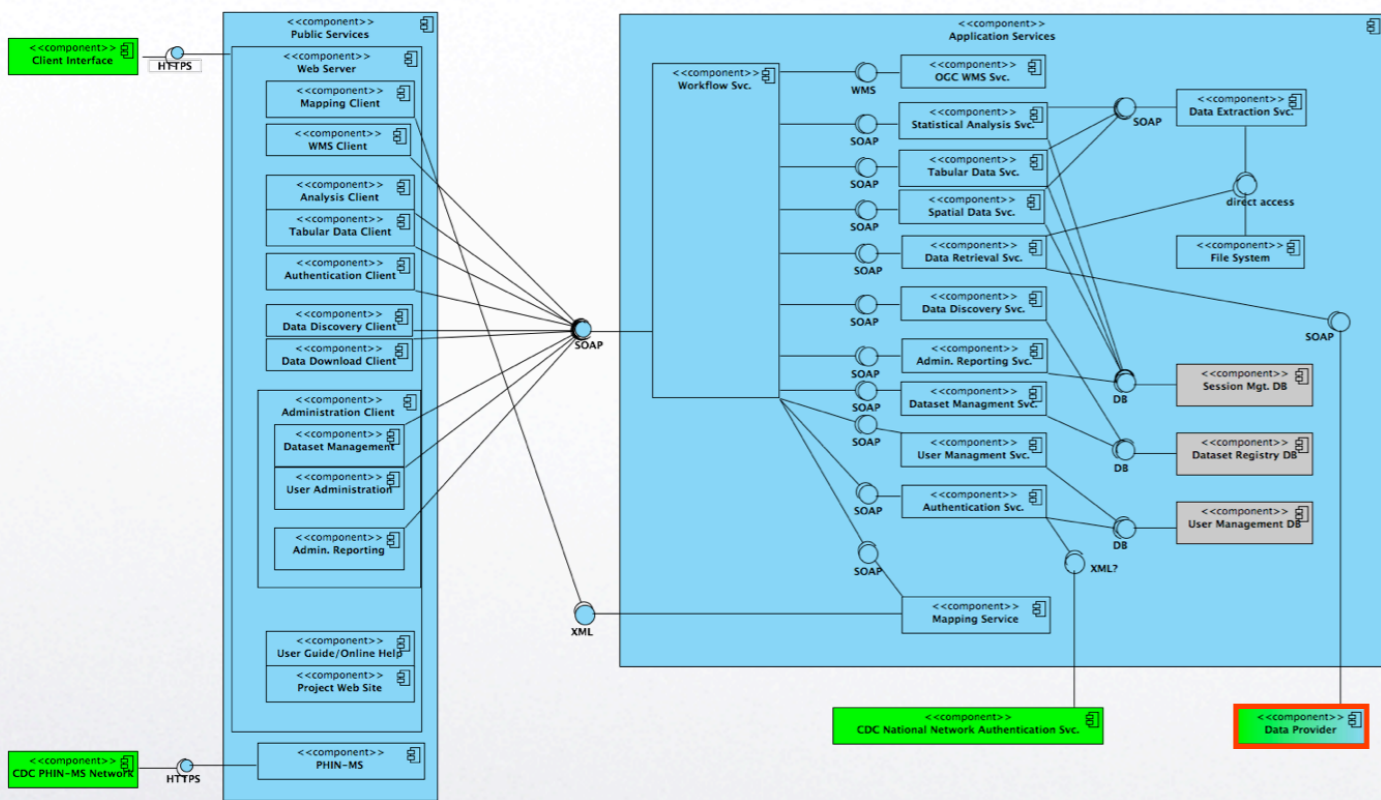
NM EPHT

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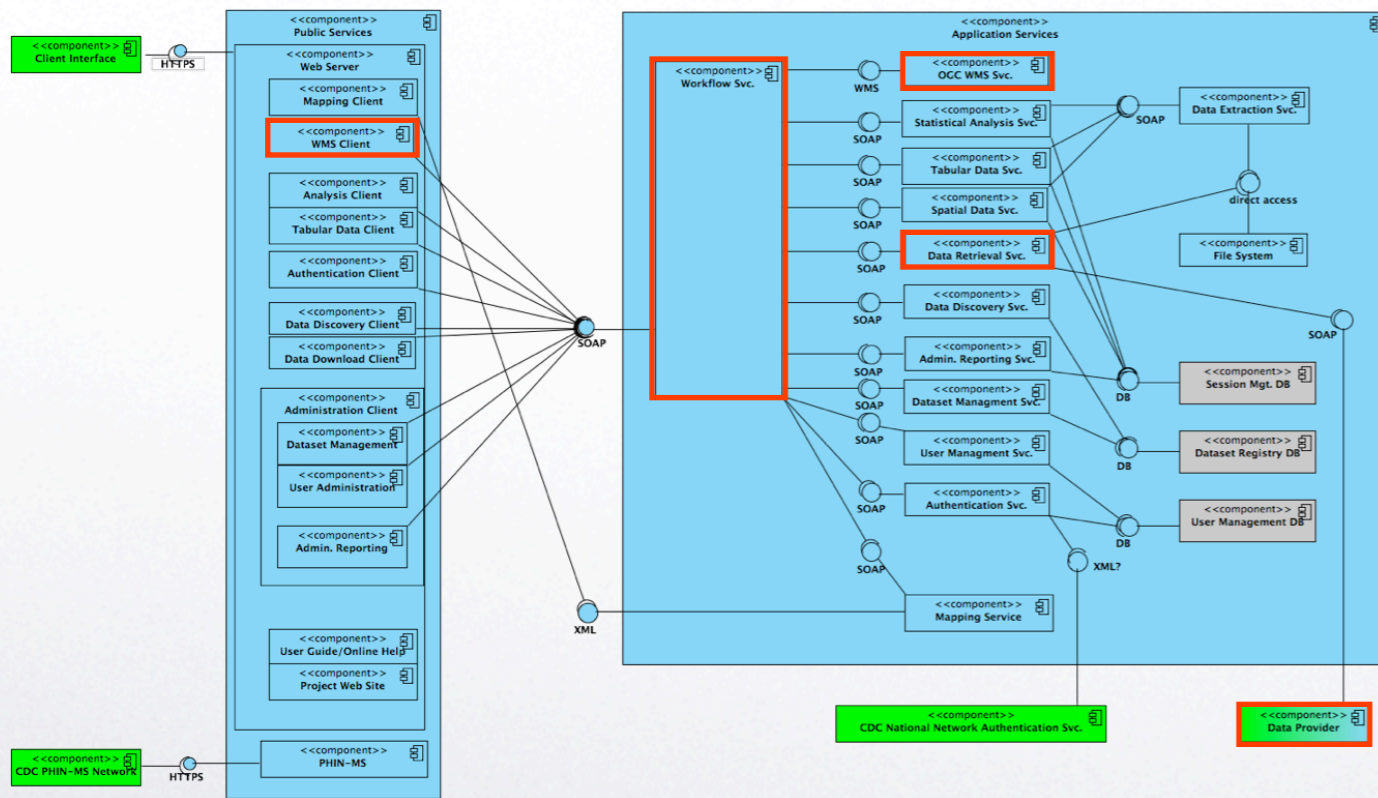

NM Vital Records
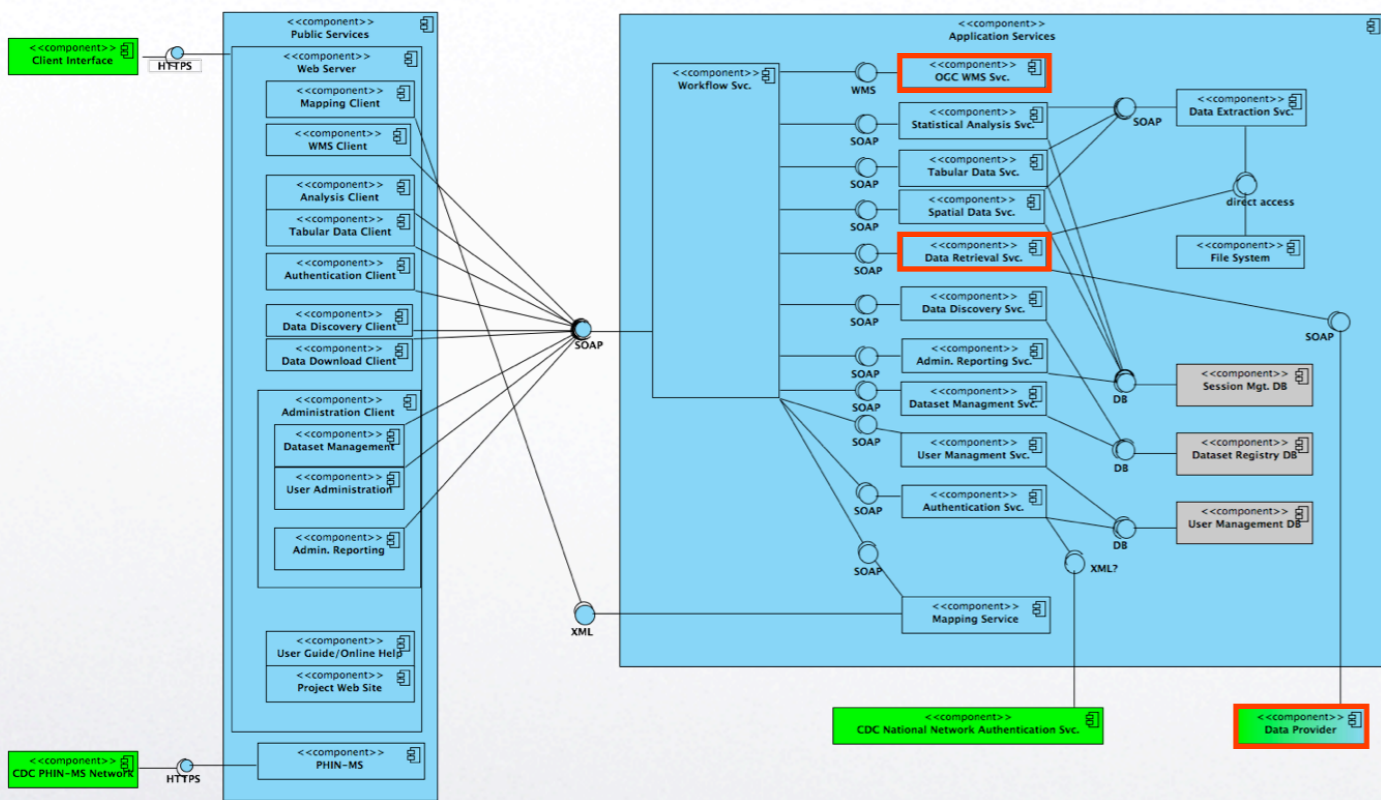
NM EPHT

WMS Map Svc.

Data Retrieval Svc.

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WMS Client

Worflow Svc.

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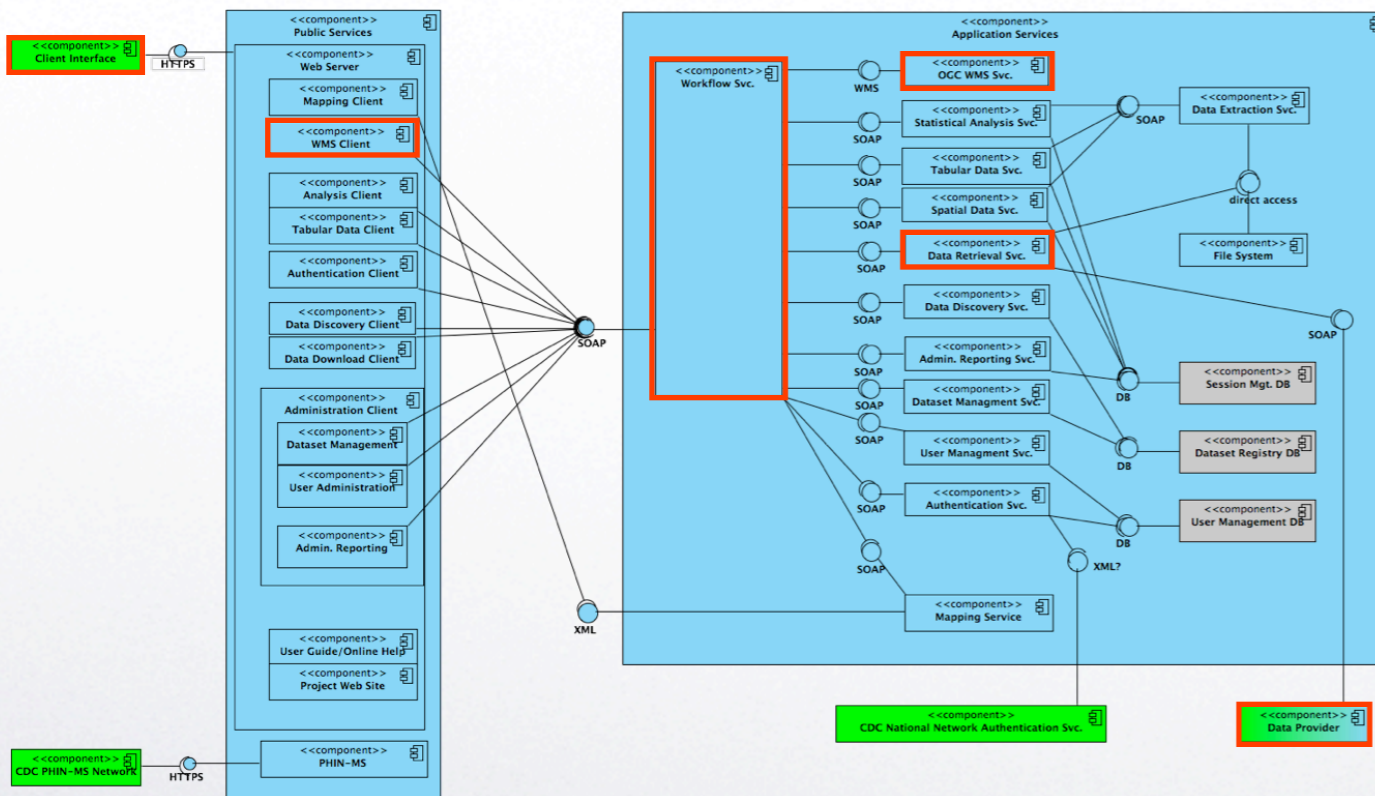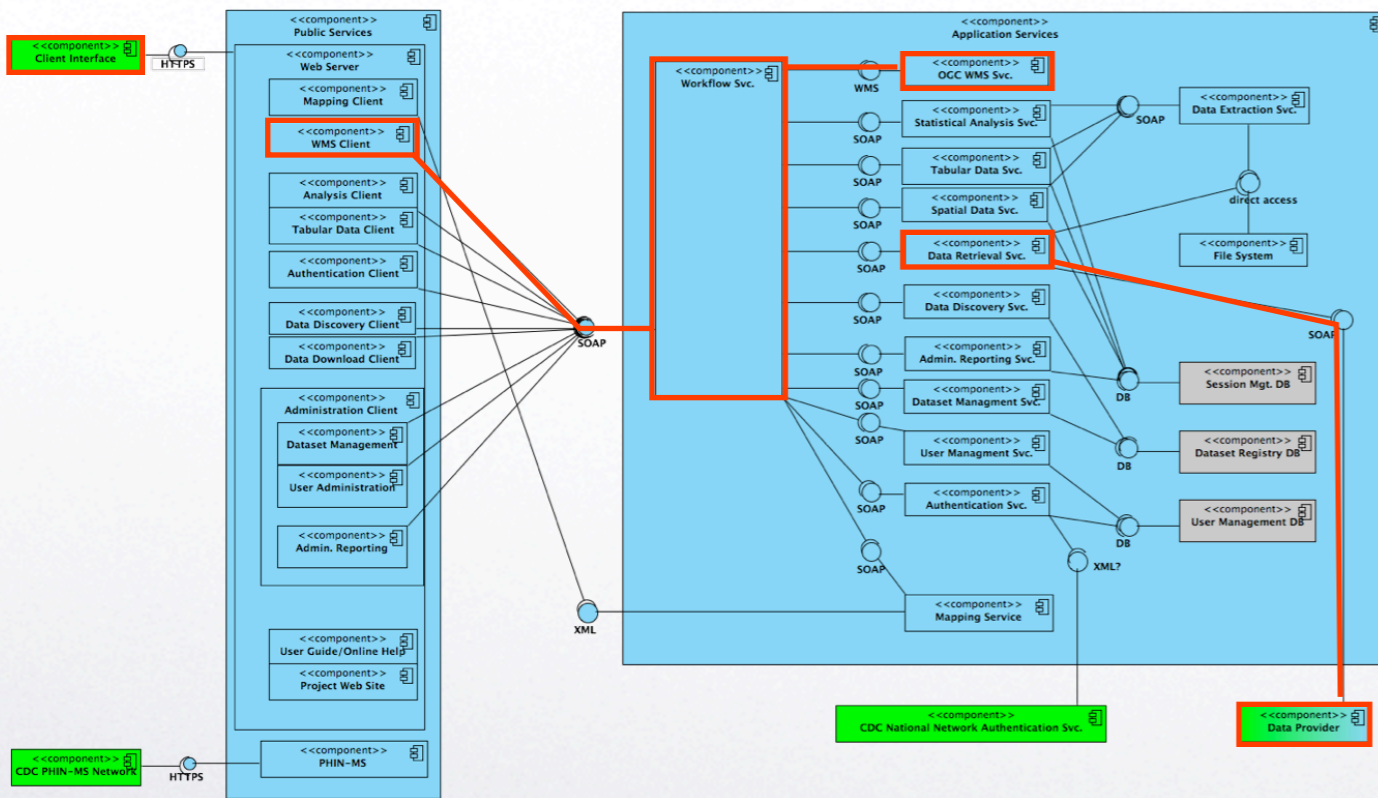
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User Browser
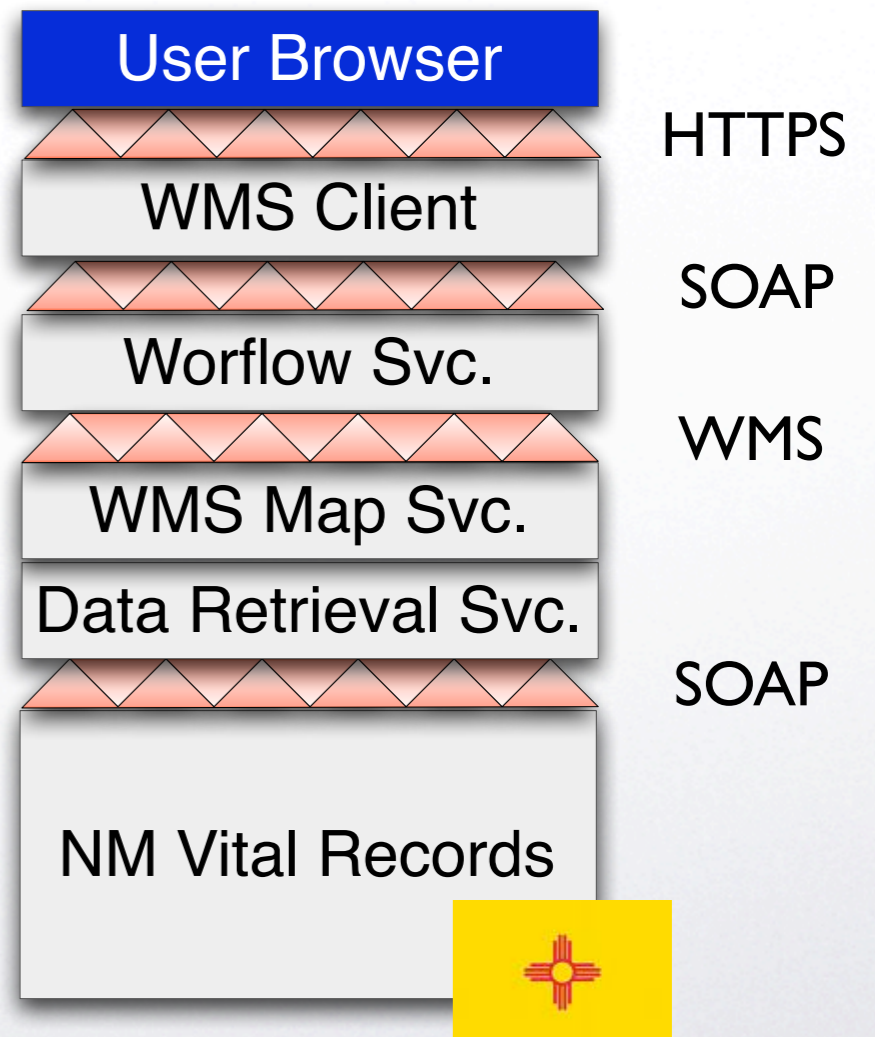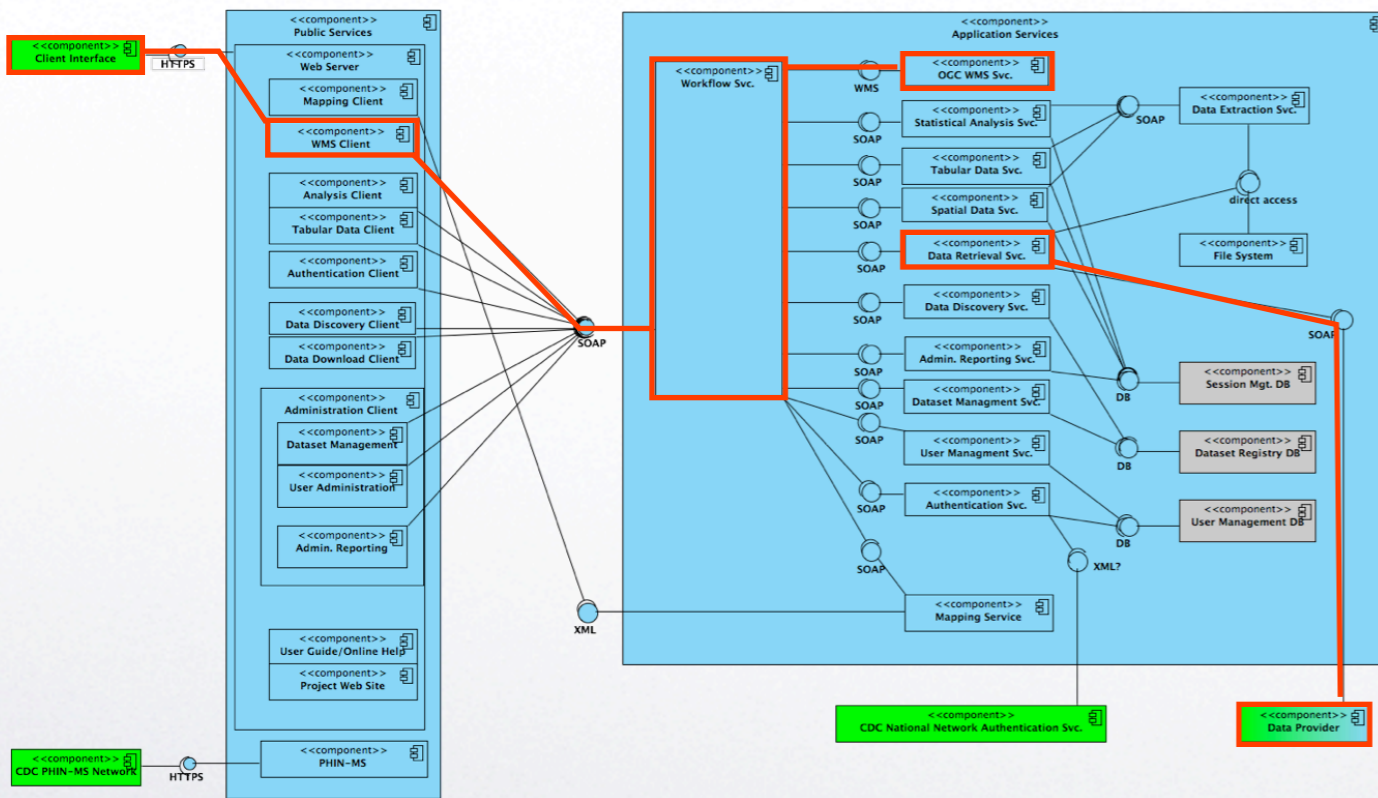
HTTPS

WMS Client

SOAP

Worflow Svc.

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SOAP

NM Vital Records

Key Questions

- Who will need access to information?

- What information will be needed?

- How will the information be delivered?

- What are the sources of that information?

- What are the *minimum* required restrictions on the distribution of data/information?

What can be done ahead of time to speed the delivery of information?

Resources

- SOAP Specification:
W3C - http://www.w3.org/2000/xp/Group/

- REST Information:
Wikipedia - http://en.wikipedia.org/wiki/
Representational_State_Transfer

- OGC Specifications:
Specifications Page - http://
www.opengeospatial.org/standards

Acknowledgements & Contact Information

- The PHAiRS Project has been funded by NASA through their REASoN program

- The NM EPHT Implementation project has been funded by CDC through the NM Dept. of Health

- For additional information, contact Karl Benedict (kbene@edac.unm.edu, 505-277-3622 x234)

Additional Examples

- Developmental RGIS Imagery Viewer
  http://rgis.unm.edu/mapper/index.html

- HEALTHmap Global Disease Alert Map
  http://www.healthmap.org/