



Government  
of Canada

Gouvernement  
du Canada

# WOUDC Technology Infrastructure

**Tom Kralidis**  
**Senior Systems Scientist**  
**Data Management**  
**Monitoring Data Services**  
**Meteorological Service of Canada**

**WMO Meeting of the Expert Team on World Data Centres**  
**Kjeller, Norway**  
**04 October 2017**

**Canada** 

# Interoperability

*Operator: "What number are you calling?"*  
*Smart: "I'm calling Control, Operator..."*  
*Operator: "You have dialed incorrectly. Give me your name and address and your dime will be refunded."*  
*Smart: "Operator, I'm calling from my shoe!"*  
*Operator: "What is the number of your shoe?"*  
*Smart: "It's an unlisted shoe, Operator!"*



**Interoperability ensures that two or more “endpoints” can communicate via standard interfaces by passing messages across some medium.**



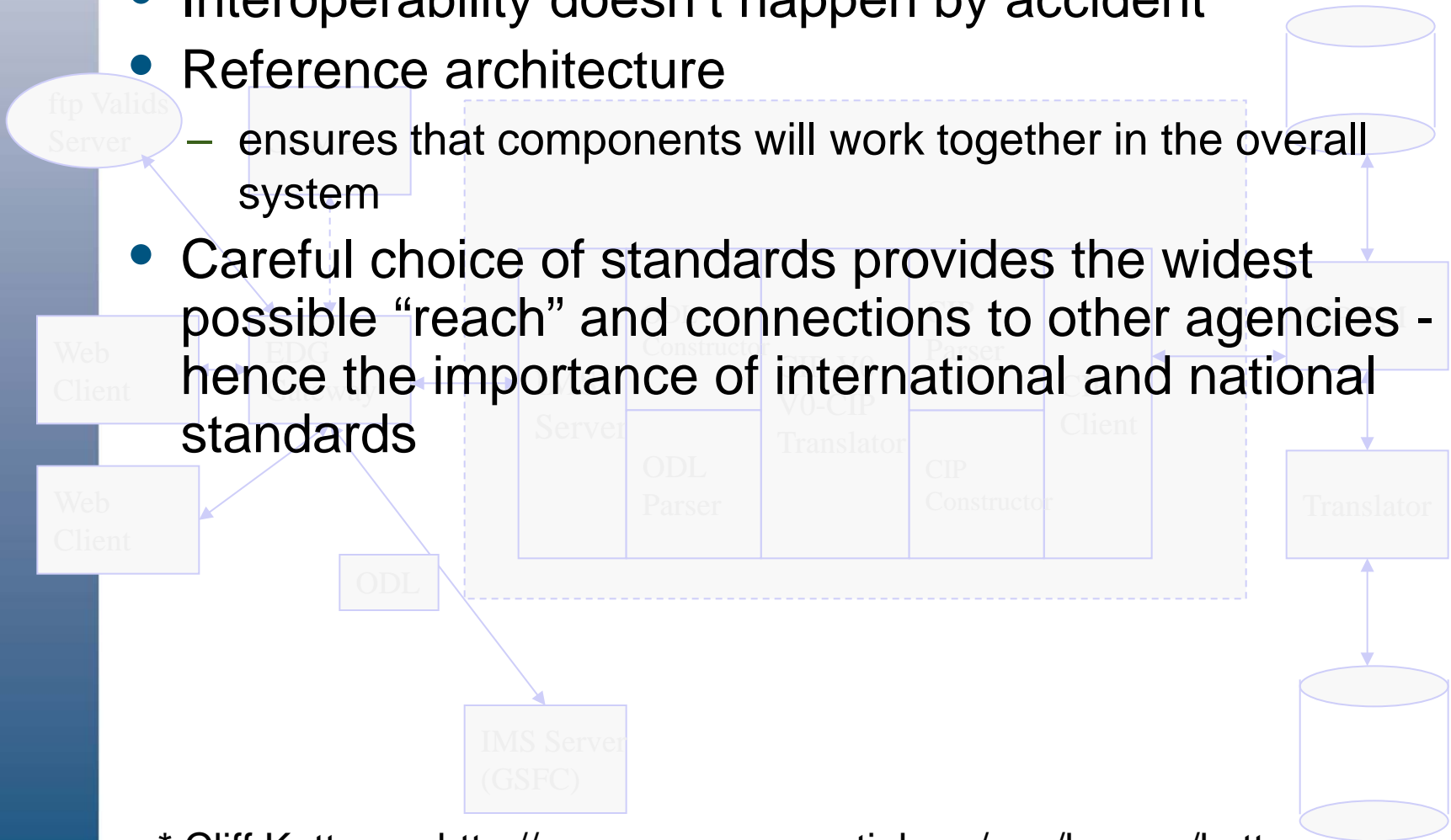
# Standards

---

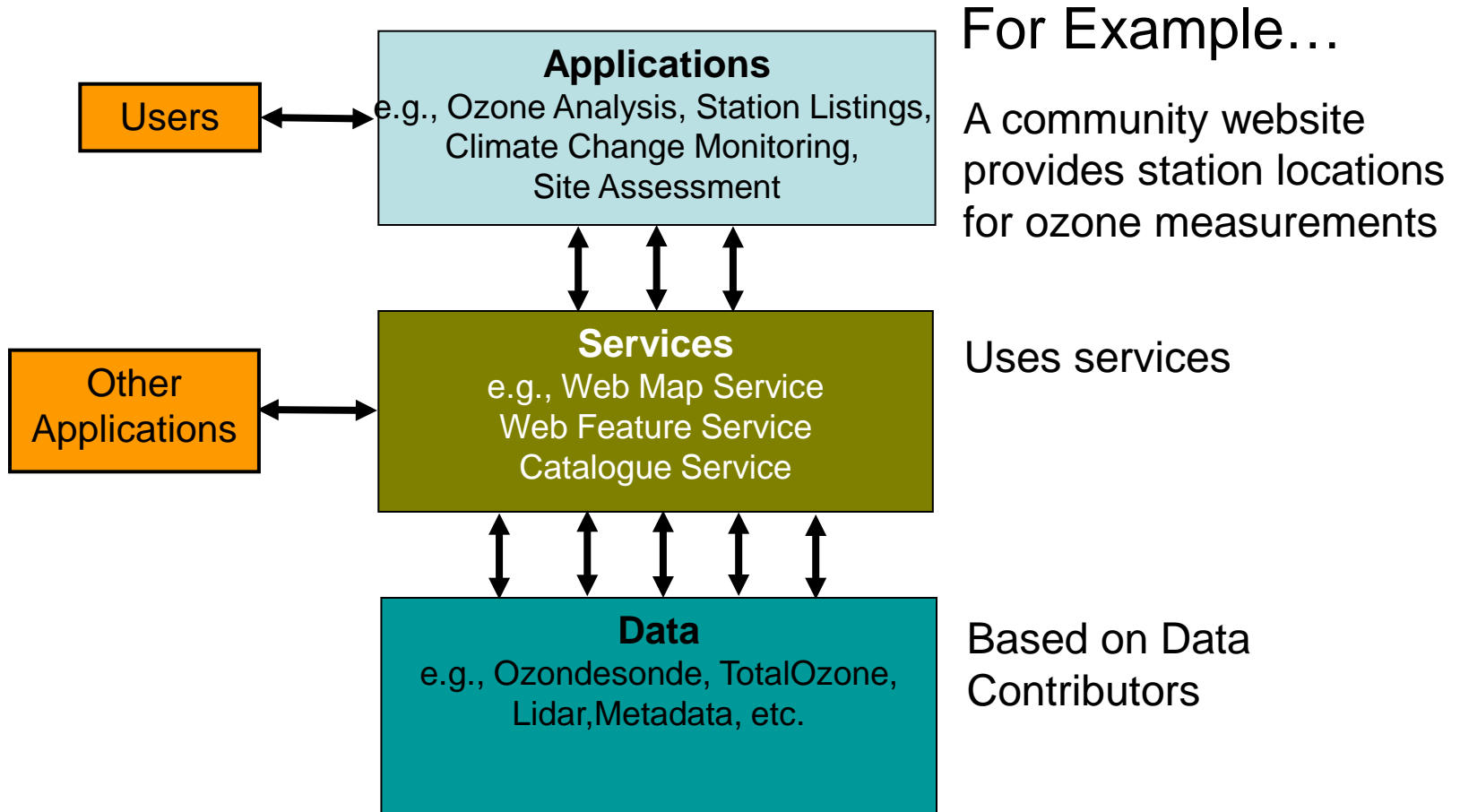
- Standards (formal, defacto, community) enable interoperability
  - Reuse
  - Common
  - Plug and Play
- WOUDC adheres to open standards which enable interoperability (discovery, access, visualization). Standards play an important role in [World Meteorological Organization interoperability](#) as part of the [WMO Information System](#) and are supported by numerous off the shelf open source or commercial tools
- WIS DCPC compatible

# Putting it all Together

- Interoperability doesn't happen by accident \*
- Reference architecture
  - ensures that components will work together in the overall system
- Careful choice of standards provides the widest possible “reach” and connections to other agencies - hence the importance of international and national standards

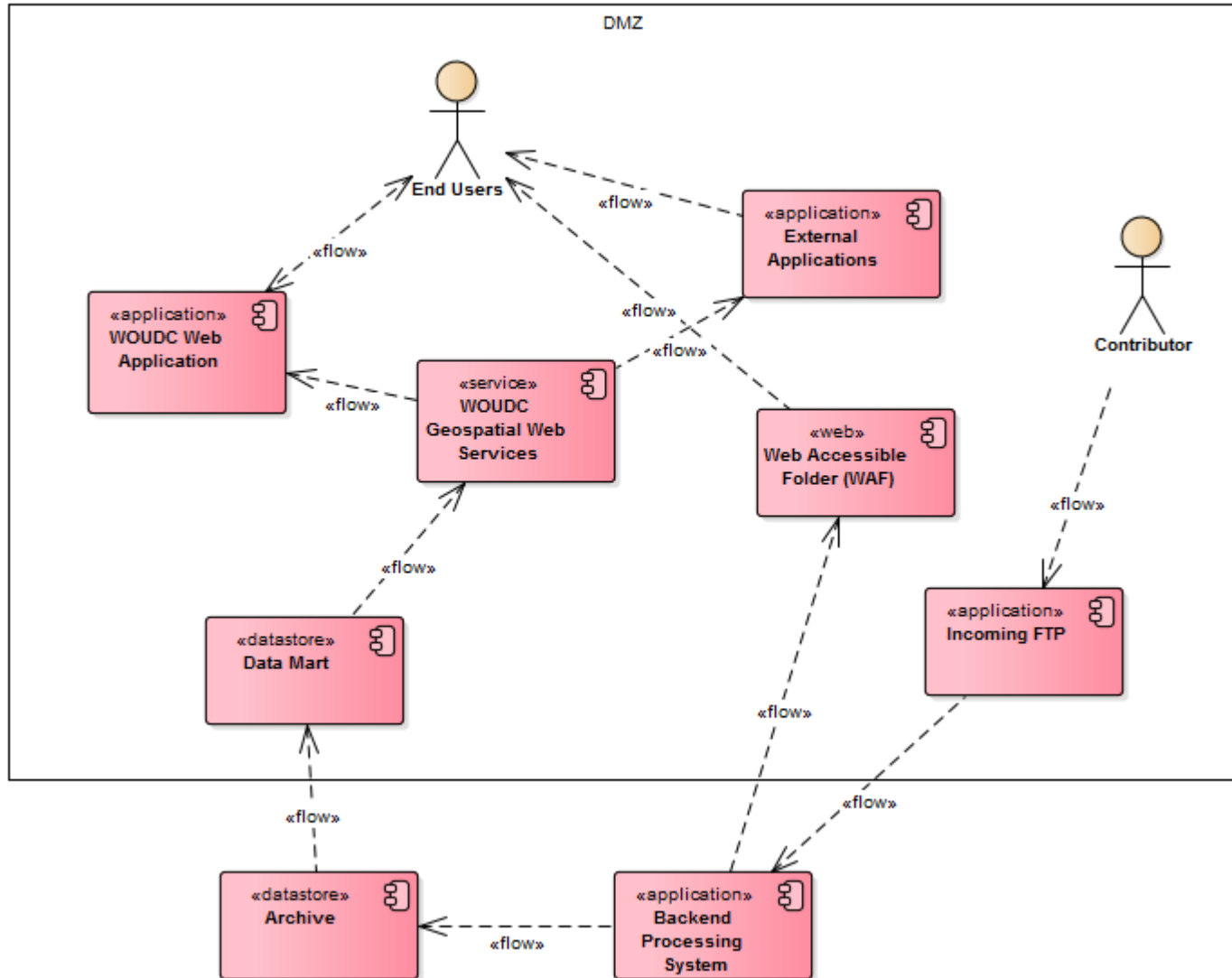


# 3 Tiered Architecture Design Pattern



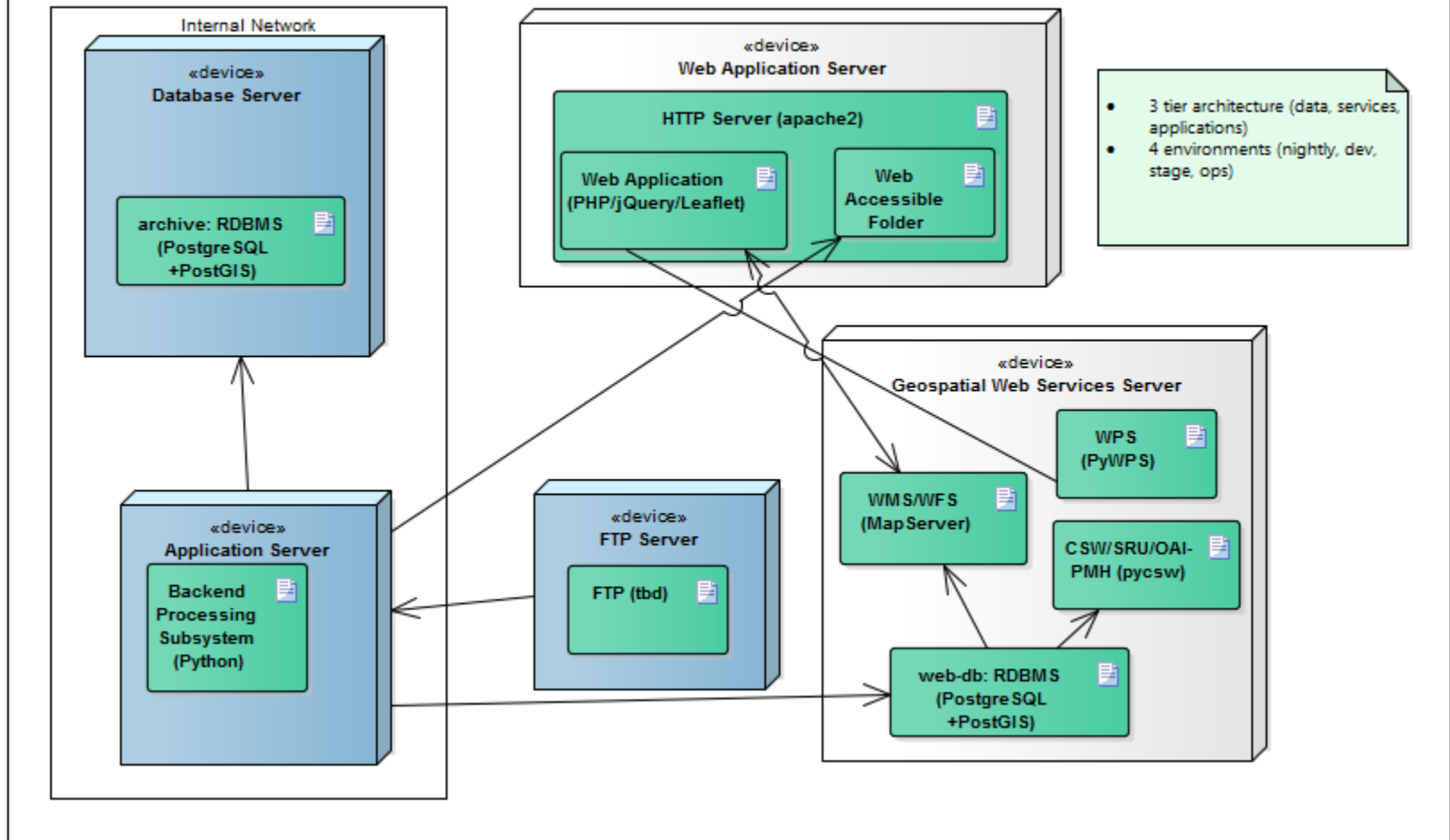
# System Architecture

cmp woudc.architecture.system

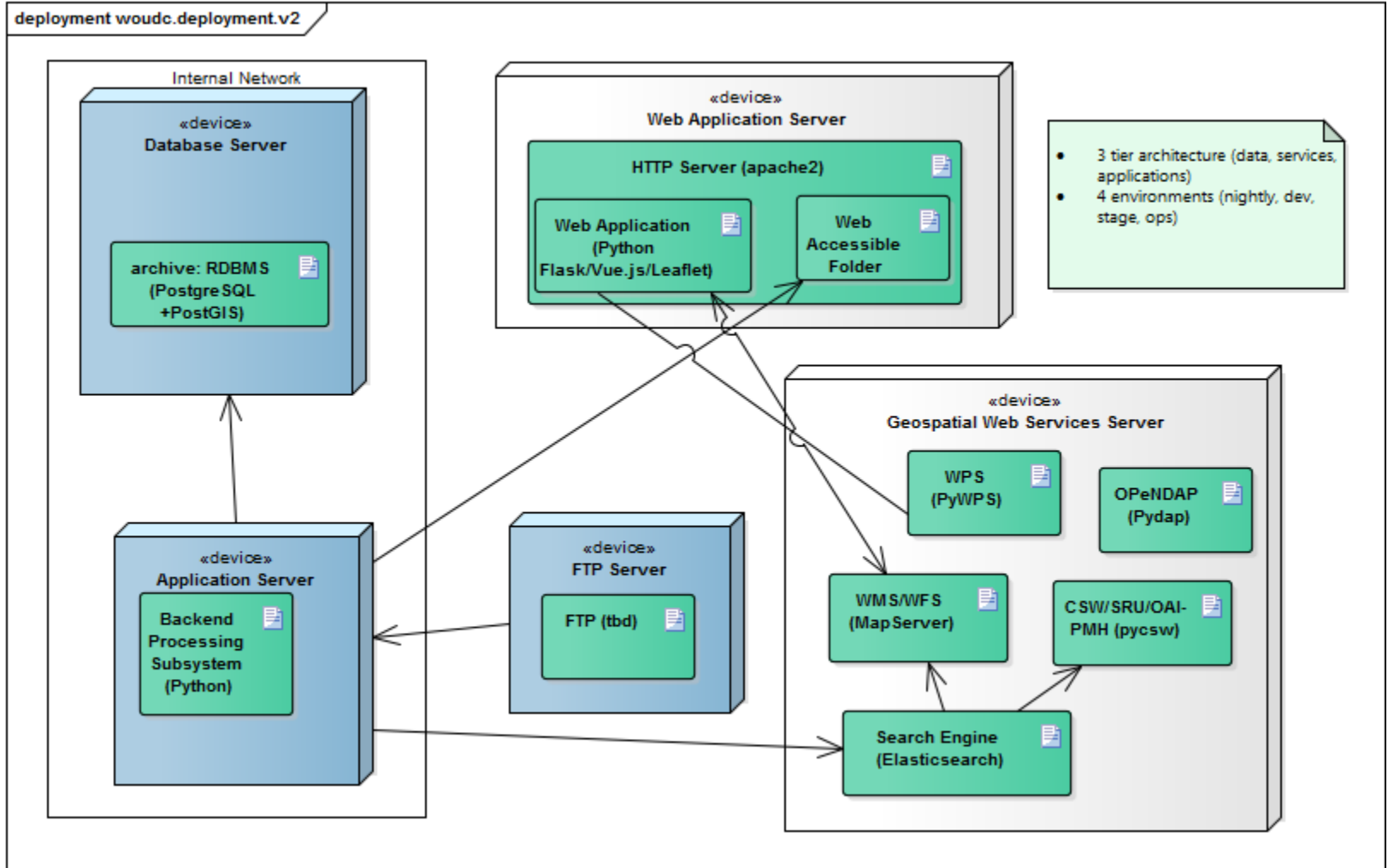


# Deployment

deployment woudc.deployment.v1



# Deployment (Future)





# Data / Standards / Technology Matrix

	Service / Interface	Format / Encoding	Software
Discovery Metadata	OGC CSW SRU OAI-PMH OpenSearch	ISO 19115 WMO Core Metadata Profile	pycsw
Station/ Instrument Metadata	OGC WMS OGC WFS	Maps WIGOS CSV KML OGC GML Maps	MapServer
Observations	OGC WMS OGC WFS	CSV KML Shapefiles GeoJSON	MapServer
Processing (Format Transformation, Data Validation)	OGC WPS	WPS, ISO 19115 (Data Quality)	PyWPS

# Environment

---

- Servers: Ubuntu
- Software Management
  - GitHub/GitLab
    - Source Code, Issue Tracker, Wiki
  - Debian package management
  - Nightly, dev, stage, ops
  - Testing (Unit, Integration, Functional, Vulnerability)
- System/Service Monitoring

# Future Work

---

- Automated Processing/Notification
- Annual contributor validation
- Documentation/Guidebook
  - <http://guide.woudc.org>
- NetCDF output
- OPeNDAP
- Eubrewnet data search integration
- non-standard data format translation services
- Search improvements
  - Performance (Elasticsearch)
  - Added filtering (by country, map update)
- Collaborative Tools
  - <https://github.com/woudc/woudc>