MIDAD Location Concept

High Level Concept of Operations and Requirements for Detailed Study

Objectives

- Provide an ICAO sub-regional activity in accordance with the ICAO Global Air Navigation Plan – GANP (4th Edition)

- Ensure a collaborative approach

- Support SWIM implementation

- Provide scalability for MIDAD States

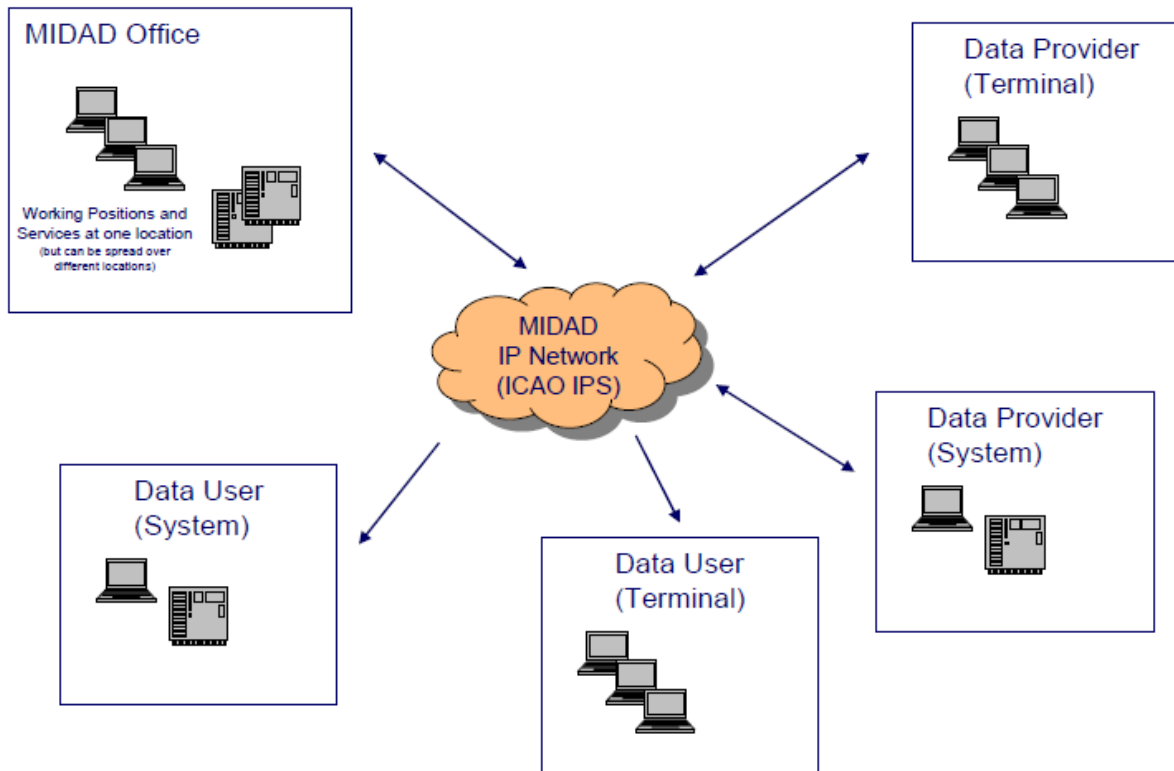- Connect existing systems to MIDAD and allow for growth

Possible Topologies

- Different topologies for the ICAO regional database were presented in MIDAD SG*/1 - WP9:
  - Central Solution
  - Replicated Solution
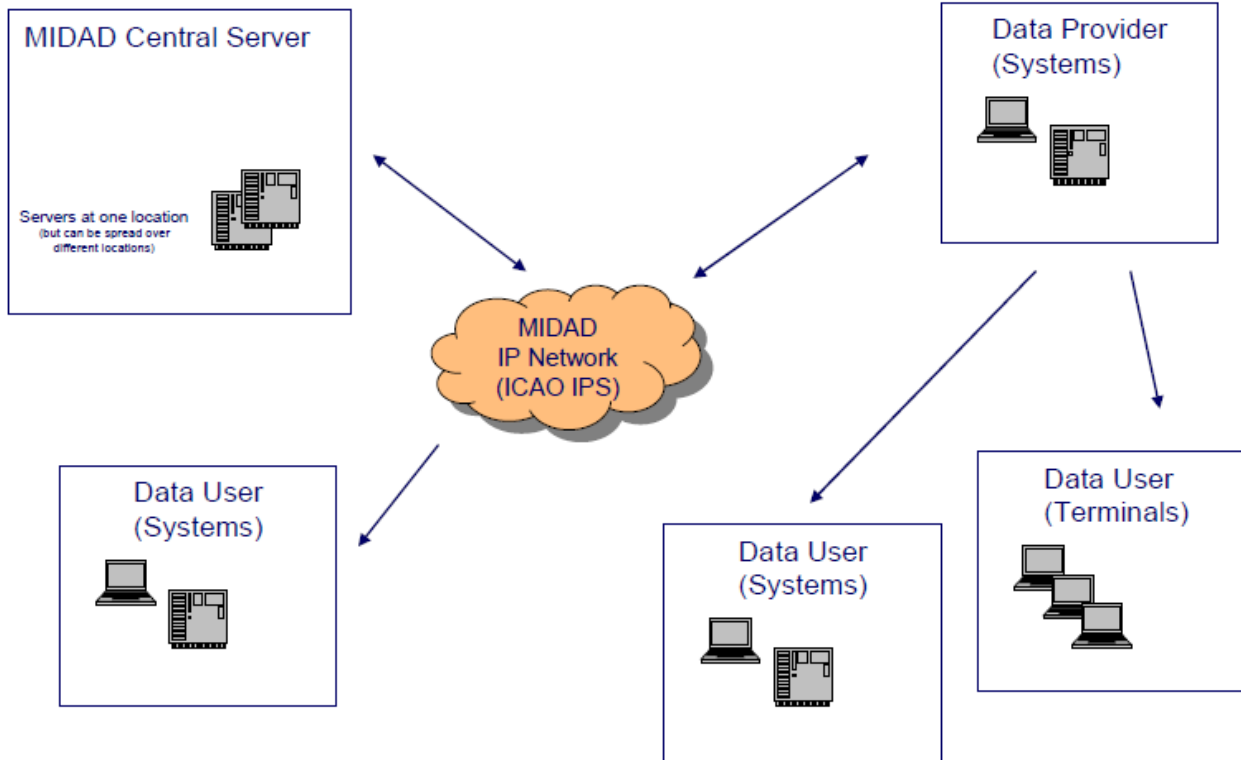 - Distributed Solution

Source: MIDAD SG*/1 - WP9

Central Solution

- Requires a responsible legal entity which manages the day to day operation of the central site in sense of:
    - Operation of the system;
    - Staffing;
    - IT infrastructure.
- Redundant operation and system required for contingency
- Might have more than one site

Source: MIDAD SG*/1 - WP9

Replicated Solution

- Multiple copies of the same central database are maintained and replicated to different sites
- Replication ensures consistency between redundant resources, such as data, software or hardware components
- Can become complicated when it increases in size and magnitude.
- It establishes considerably bigger expenses and complexity compared to a central solution (without redundancy)
- A responsible legal entity which manages the central server is needed

Distributed Solution

- A collection of multiple, logically interrelated databases distributed over a computer network.

- Portions of the database are stored on multiple computers within a network.

- A centralized distributed database management system manages the database as if it were all stored on the same computer

MIDANPIRG / 13, April 2012

- MIDANPIRG /13 agreed that:
  - …
  - depending on the identified user requirements and operational needs, the chosen topology could be a combination of different technical solutions (central, replicated and distributed). This would depend also on the kind of data to be processed and exchanged, i.e.: NOTAMs, static data, eTOD, etc. However, it was highlighted that, from a strategic and operational point of view, the chosen topology should include a central database, which might be in one location or replicated in 2 or more locations/servers;

MIDAD Stakeholder

MIDAD will provide services to the following stakeholders:

- Civil Aviation Authorities
- Military Aviation Authorities
- Air Navigation Service Providers
- All military and civil airspace users (Airline operators, Pilots etc.)
- Aerodromes
- Data houses and data integrators
- Airspace and Network Planning and Coordination Organisations
- Air Traffic Flow Management Units

High Level User Requirements

- In a Service Oriented Architecture MIDAD shall provide information services to SWIM-enabled applications in the area of:

  - Aerodrome Operations like Runway Sequencing, Surface Operations, Aerodrome Collaborative Decision Making,

  - Digital Air Traffic Management, Free-Route and Network Operations,

  - Flight Planning, Flow Management and Trajectory Management,

  - Continuous Descent Operations, Continuous Climb Operations and Trajectory Based Operations,

  - and others.

MIDAD Data Scope
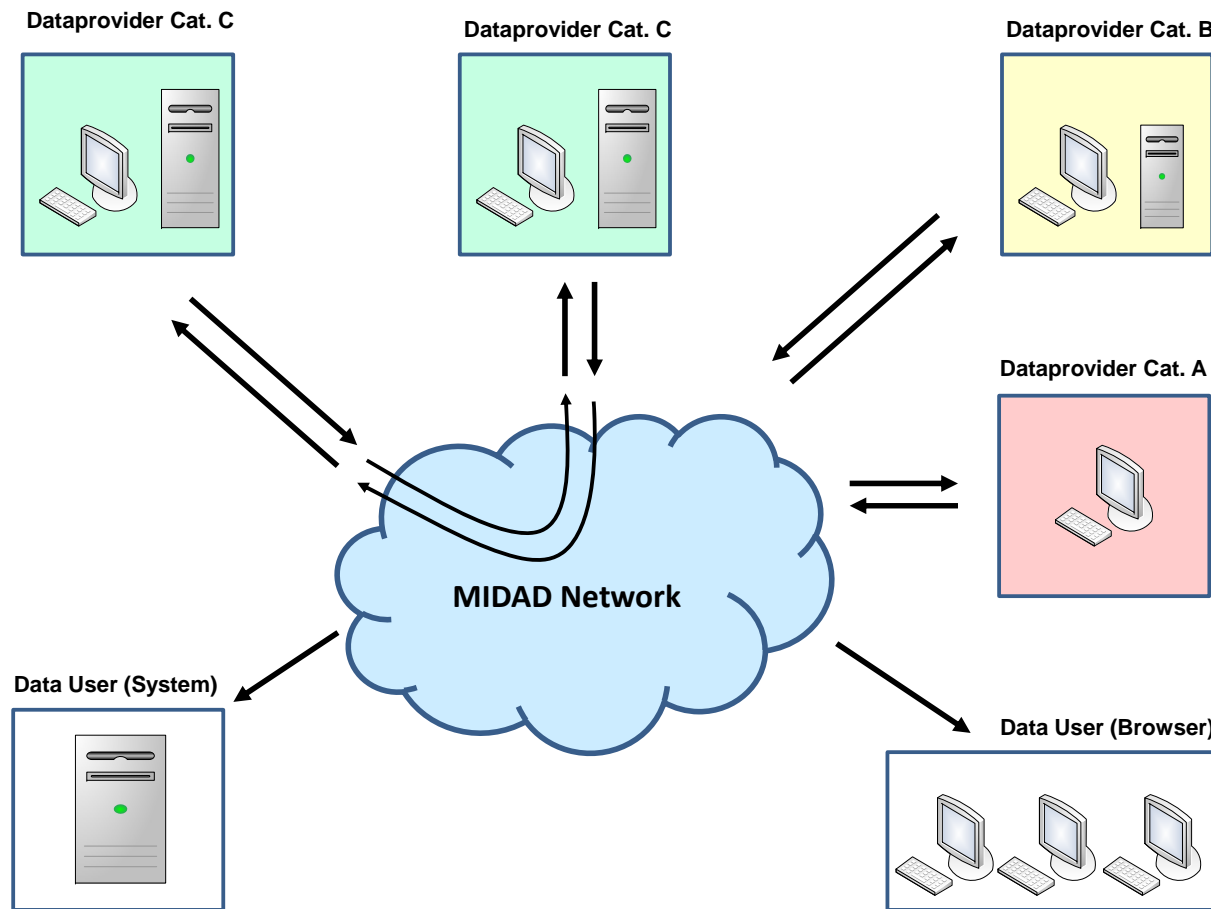(in Accordance with ICAO AIS-AIM SG)

- Aerodromes
- Airspace
- Instrument Flight Procedures
- NAVAIDS and Navigation Systems
- ATS Routes and fixes
- Weather
- Regulatory / Government
- Obstacles (outside AD)
- Geography (Terrain, Hydrography, Culture)

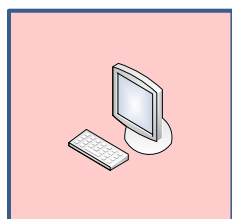# Proposed High Level Concept of Operations

- MIDAD is a web-based Solution with replicated data bases:
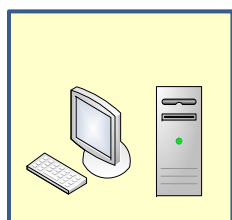
Data Providers

- Category A State
    - will update its State data directly with a web -service
    - will view the information in MIDAD and make use of it for its need.
    - cost effective but has to rely on dependable network connection with MIDAD.
    - no data server hardware/software exists in the State.

- Category B State
    - will keep a complete set of the data at State's location
    - has network connection with MIDAD and any change of State's data is dynamically updated in MIDAD server and vice versa.
    - by keeping a copy of the data, the State can handle any network failures for considerable period of time.
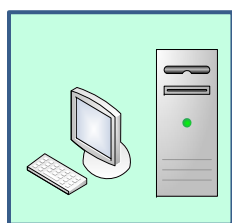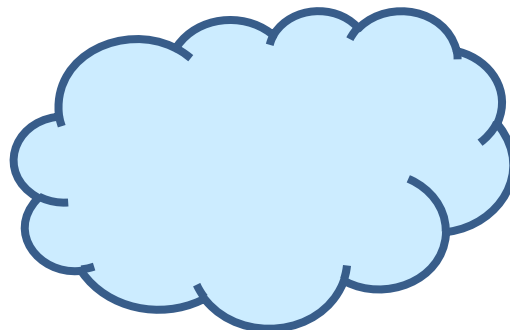
- Category C State
    - will keep a complete copy of the data, own State and MIDAD
    - will provide fall back services to the MIDAD system
    - data is synchronized with other available Category C systems so that they all remain up to date with latest

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Web-based Services

- The heart of MIDAD are web-based services including
  - Data storage and server capacity distributed at category C data providers
  - Registry and catalogue services
  - Services to receive and validate data from data providers
  - Services to provide (raw and formatted) data based on requests from the information consumer (request-response pattern) or by pushing it to information consumers (publish-subscribe pattern)
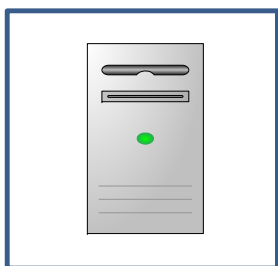
Data Users

- ## Browser based
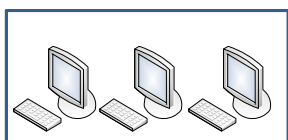
  - Users (States, service providers, etc.) who will only view the information in MIDAD and make use of them for their need. This category is cost effective but has to rely on dependable network connection with MIDAD (B2C)

- ## System based

  - Applications will consume information by accessing MIDAD information services. (B2B)

Advantages of the Proposed Location Concept

- The database is replicated if there are at least two Category C States

- No need for the States to change their existing Systems-vendor when transitioning to MIDAD.

- The proposed concept of operation represents the best amicable solution taking all interests of states in the region into account and to develop an ICAO sub-regional activity in accordance with the ICAO Global Air Navigation Plan – GANP