

Kingdom of Morocco  
Ministry of Equipment and Water

Directorate General of Meteorology  
(DGM)

**Morocco's experience in AWS  
data management**

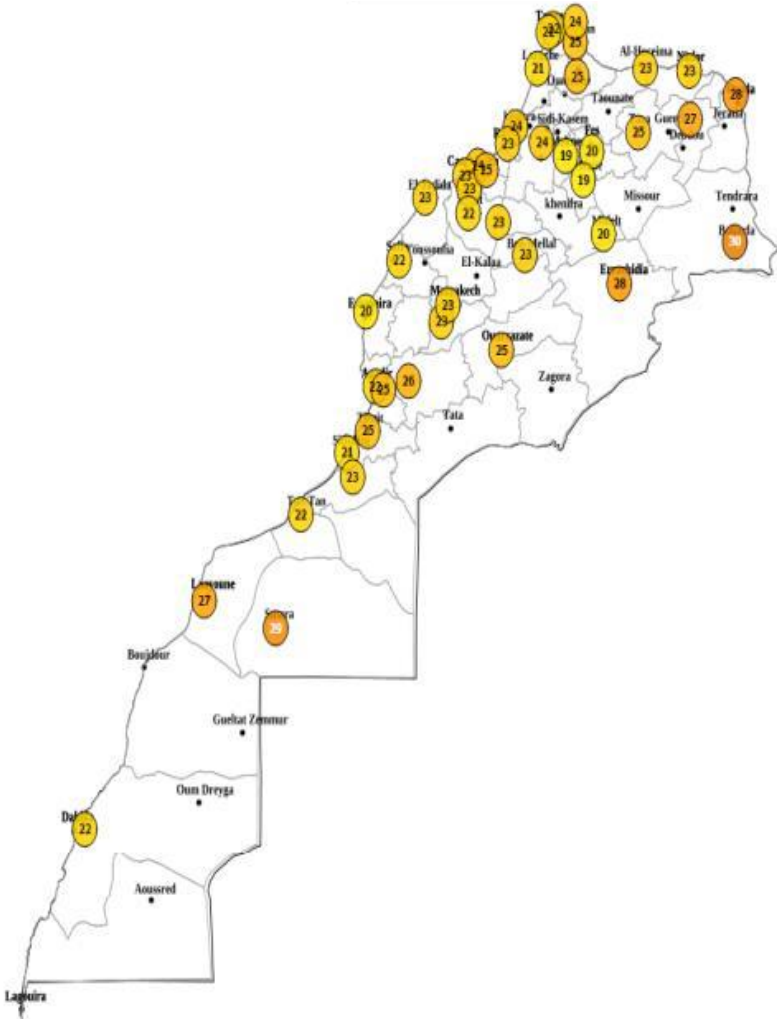
19th February 2024



# Plan

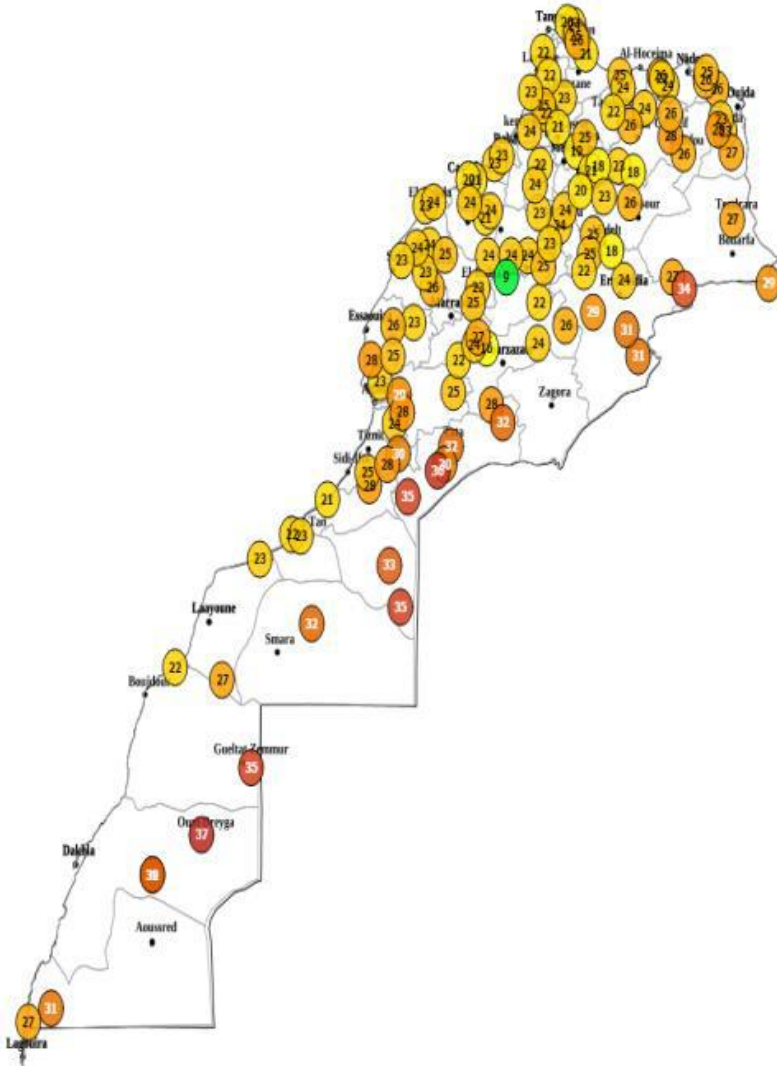
1. Introduction
2. Technical issues
3. Possible outcomes
4. Adopted solution by Moroccan NMS
5. Lessons learned

# 1. Moroccan NMS network



- 44 Manned synoptic stations,
- All of them are equipped with an AWS,
- Multiple suppliers/brands of AWS,
- The concept of AWS network was not considered in the beginning,
- Data are processed locally then sent to the HQ through VPN.

# 1. Moroccan NMS network



- More than 300 AWS,
- Different suppliers/brands of AWS,
- Data are transmitted using internet or GSM,
- For each brand of AWS, there is a dedicated CIPS, each having its own communication protocols & QC procedures.

## 2. Technical issues

When it comes to managing an entire AWS network, heterogeneity is a major concern and often a source of problems.

- ❑ Different brands of AWS,
- ❑ Different telecommunication protocols,
- ❑ Different CIPS solutions.

## 2. Technical issues

All of the above facts imply :

- Partial displays and views are provided to the final user,
- Difficulties to monitor the whole network,
- Different QC approaches,
- Data is stored on separate databases.

## 2. Technical issues

Operational need is:

- Access data through a single portal

For forecasters and nowcasting activities, access to real time data should be available through a single solution on which all stations are there.

- Archive data into the same database

Facilitate data access and retrieval

### 3. Possible ways out

Decide first on integration level & how high should it be ?

*Deal directly with the AWS*

- Detailed manufacturer documentation is needed;
- Communicating directly with the dataloggers is not always an easy task;
- Implies rebuilt of all of the CIPS functionalities ;
- New efforts needed for any new brand of AWS acquired;
- Might be easier with new generation of dataloggers.

*or make use of already existing CIPS*

*(Central Information Processing Servers)*

- Easier;
- Much more feasible



# 3. Possible ways out

## **1<sup>st</sup> case scenario :** *Deal directly with the AWS*

Act directly on the AWS , collect and transmit data towards a central server where it would be processed and fed to various end-points as needed.

This central server will have to manage different telecommunication protocols, deal with multiple data representations and offer a proper and ergonomic display of data from the whole network as well as the possibility to monitor the network.

In short terms, we're building our **own Central Information Processing System (CIPS)**.

### 3. Possible ways out

**2<sup>nd</sup> case scenario :** *Make use of already existing CIPS*

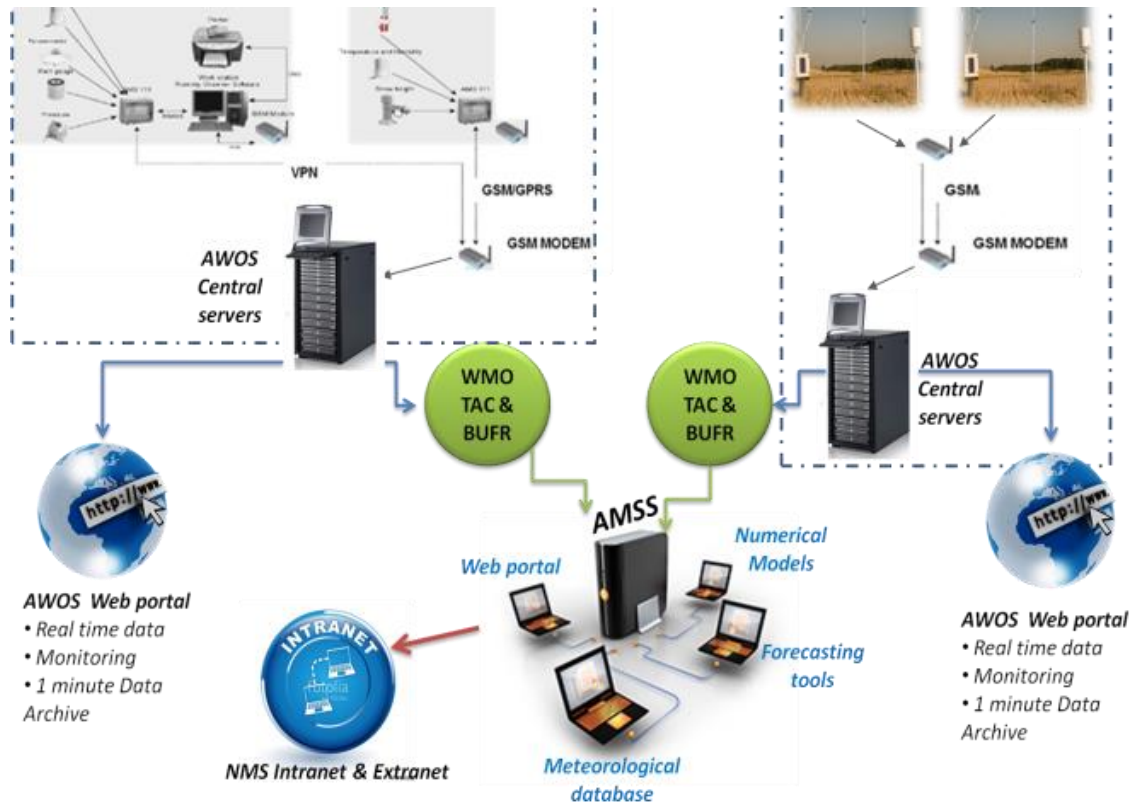
**Make use of** data collection and telecommunication modules on **existing CIPS**, raw data is then accessed and sent toward a **central server** in which it will undergo the same checks and quality control procedures and form part of a **central homogenous database**.

This scenario addresses very well operational needs(centralized access).

However, maintenance and monitoring of the network will still be performed using existing CIPS.

# 4. Adopted solutions by Moroccan NMS

## 1<sup>st</sup> milestone :



- Lower level of integration based on observing messages prepared hourly by existing CIPS according to **WMO standard message formats (TAC and BUFR)**.
- Messages are ingested by the automatic message switching system (AMSS) and disseminated to various end-points : **NWP models, web portal, weather forecasting tools, climate database...etc.**
- Data is extracted on a daily basis from CIPS's databases and archived on DGM climatological database.

# 4. Adopted solutions by Moroccan NMS

## 1<sup>st</sup> milestone :

- We've kept all existing CIPS components ;
- We benefit from the functionalities offered by the existing CIPS ;
- AMSS was a key component to collect and redistribute data;
- DGM internal portals offers data display and visualization features for the whole network;
- Users were somehow satisfied.

Soft, operational, minimum of efforts

but still **NOT** optimal !

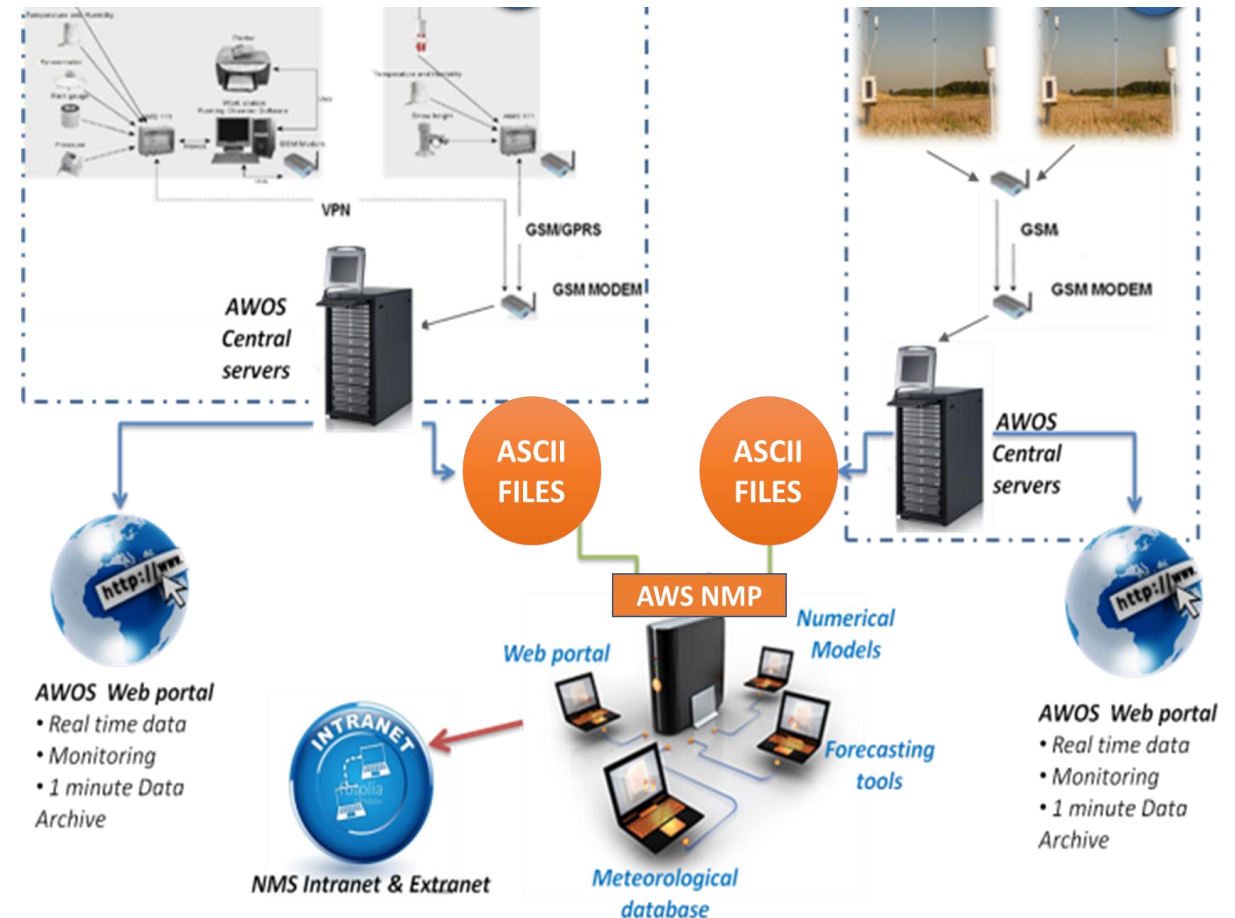
Why ?

Minute data and real time data access is available only using existing CIPS

# 4. Adopted solutions by Moroccan NMS

## 2<sup>nd</sup> milestone :

- Existing CIPS Servers prepare data files to be sent to DGM's own **integration server**,
- No more acquiring CIPS servers with each acquisition of a set of stations
- **AWS Suppliers are required to comply with DGM preferences for preparing and sending data files to a destination of DGM's choice.**



# 5. Lessons learned

- ❑ It's very important to take the necessary time to prepare the technical and functional requirements in CIPS and AWS before you decide to acquire them.
- ❑ Standardization of data format is key when you consider extending your network ;
- ❑ Using the same brand of AWS, whenever possible, helps facilitate maintenance and management tasks of the AWS network.
- ❑ When you consider extending your network, remember that planning ahead will help you spare a lot of time, effort and money.

شكرا على حسن اهتمامكم

Thank You for your attention