TRANSITIONING MET SERVICES

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Topics

1. Operational exchange of IWXXM in a hybrid AMHS/SWIM environment
2. Use of Internet for MET-SWIM
3. A list of MET-SWIM information services which will be/preferred to be transmitted over CRV
4. The benefit of aggregation functions for MET-SWIM in APAC

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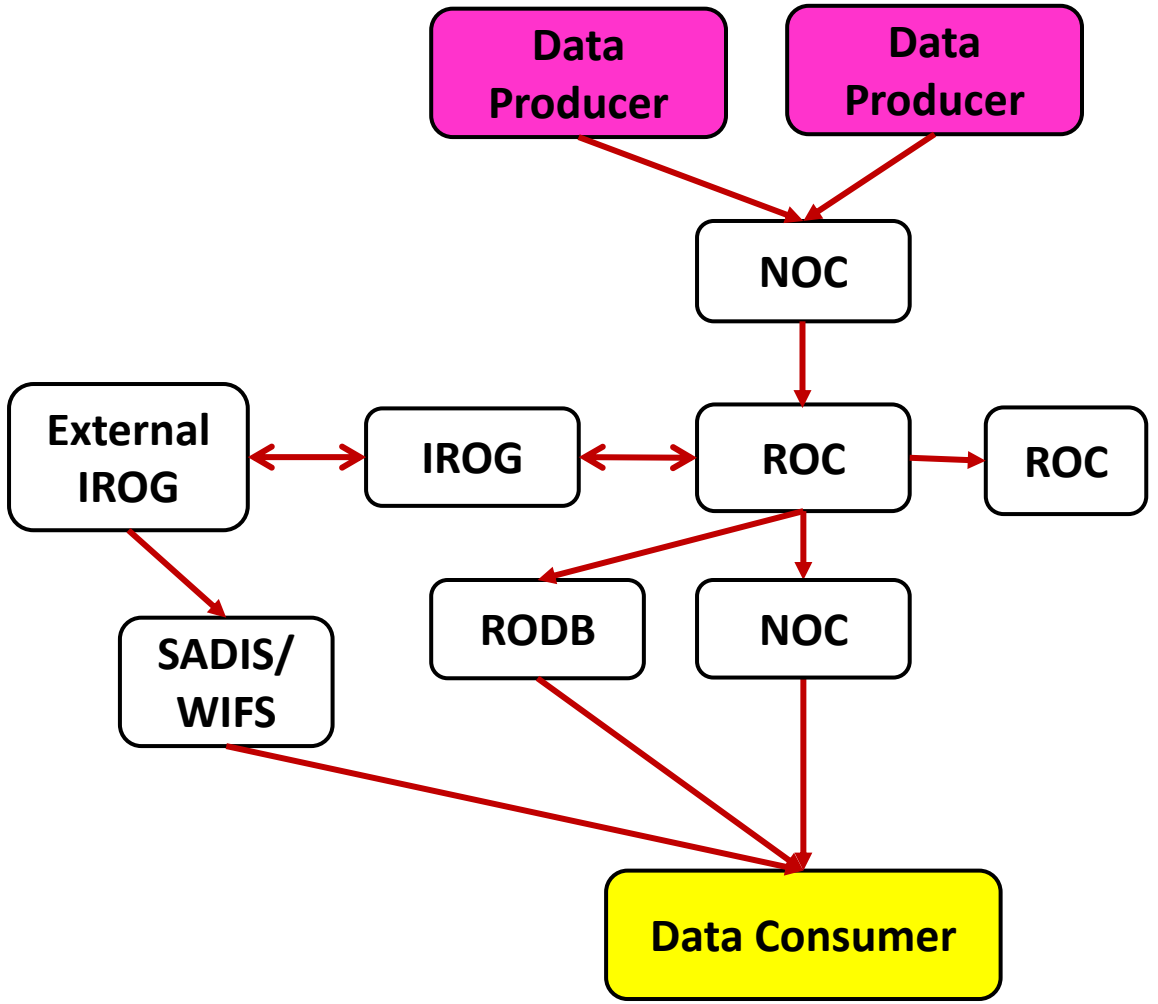
Current OPMET Exchange

- Current OPMET exchange involves:
  - National OPMET Centres (NOCs)
    - QC and aggregate State data
  - Regional OPMET Centres (ROCs)
    - QC and aggregate regional data
  - Regional OPMET Databanks (RODBs)
    - Stores regional data & provides on demand
  - Inter-regional OPMET Gateways (IROGs)
    - OPMET gateway to/from other regions
  - SADIS and WIFS
    - Global OPMET repositories
  - Data Consumers



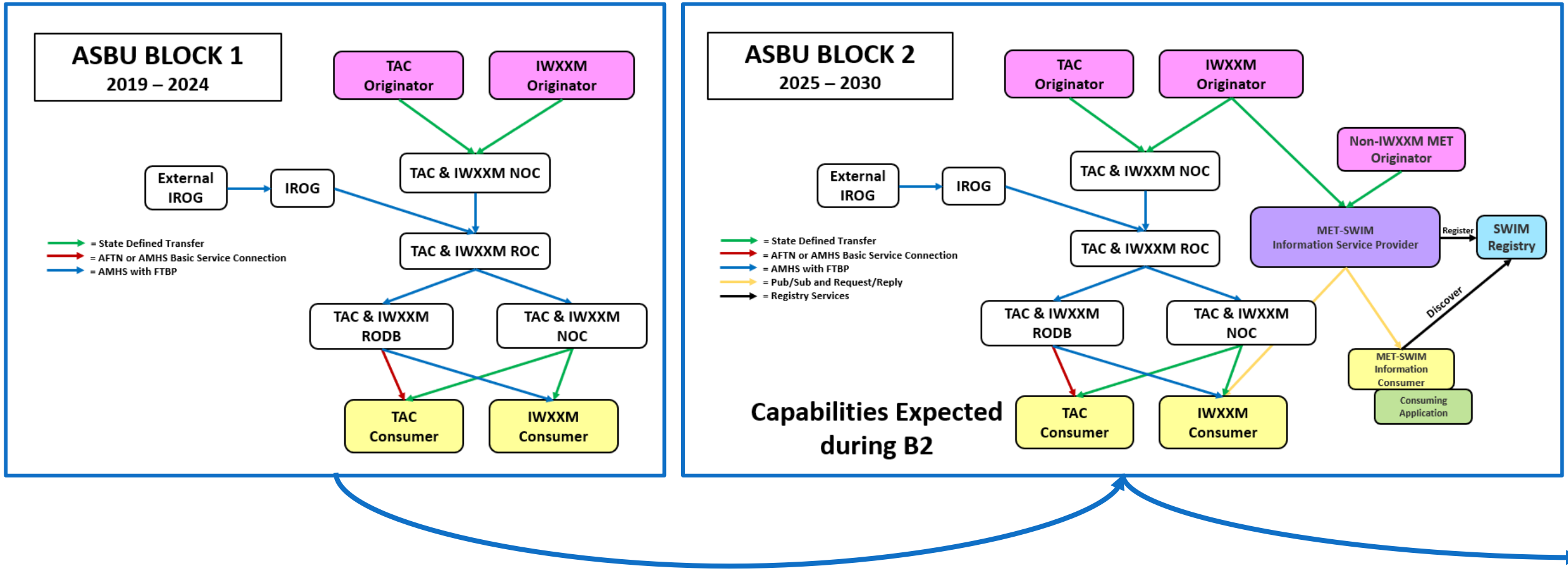
Evolution of OPMET Exchange

Key updates:

- Block 1 (2019-2024): Exchange of both TAC & IWXXM over AFS
- Block 2 (2025-2030): Implementing information services as Recommended Practices and ceasing exchange of TAC
- Block 3 (2031-2036): Implementing information services as Standards
- Block 4 (2036+): Information services as primary exchange mechanism for MET information

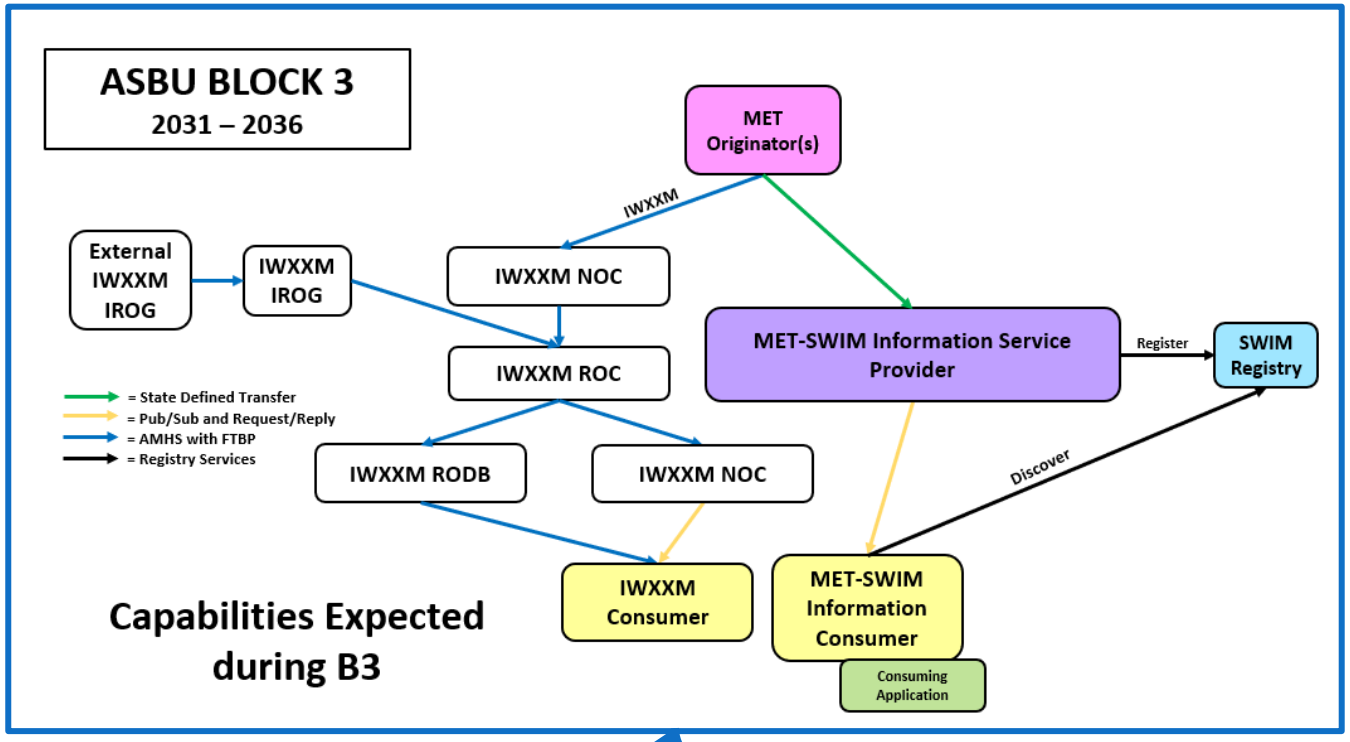
Evolution of OPMET Exchange

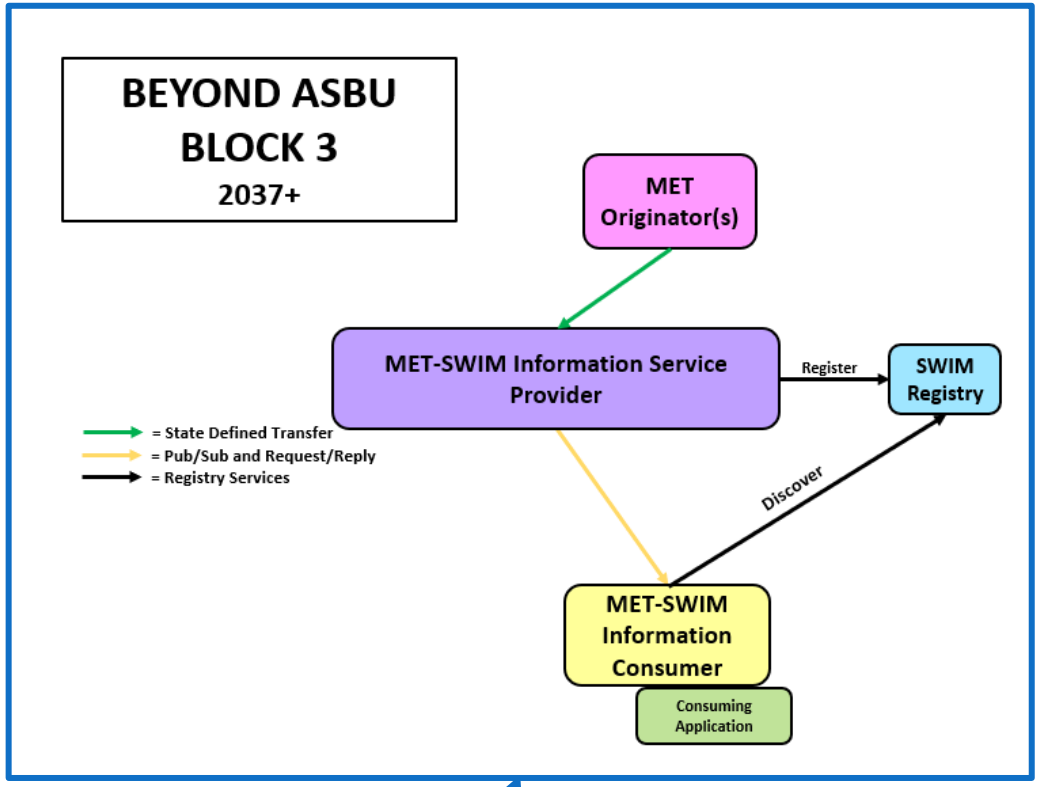
Block 1 (2019-2024) to Block 2 (2025-2030)



Evolution of OPMET Exchange

Block 3 (2031-2035) and Block 4 (2036+)





Evolution of OPMET Exchange

- IWXXM generation: ICAO Annex 3
  - recommended practice since 2013
  - standard since 2020
- Every State will provide, or arrange the provision of, IWXXM
- IWXXM will be made available via the AFS (AMHS/FTBP)
- IWXXM via SWIM will be in parallel with AFS exchange, allowing users to transition to SWIM

Current OPMET Status

- Many APAC States rely upon a translation centre to
  - generate IWXXM
  - Exchange IWXXM
- TAC quality varies considerably
- IWXXM generation from source preferred

- Some States are asking can they bypass AMHS
  - …. are they generating IWXXM????

METP WG-MIE Decisions

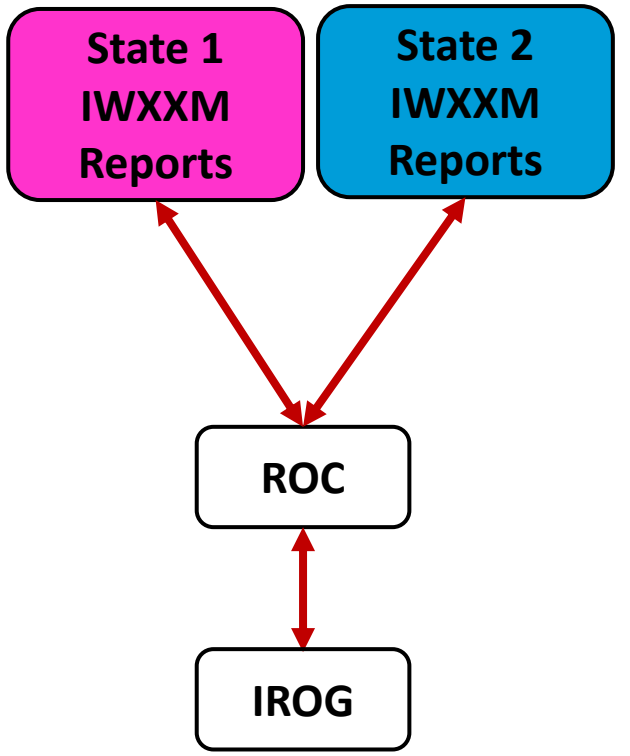
- All States are required to provide met information
- Not all States will provide Met Information Services
- Bulletins/collectives (aggregation) not used in MET-SWIM

What is hybrid exchange

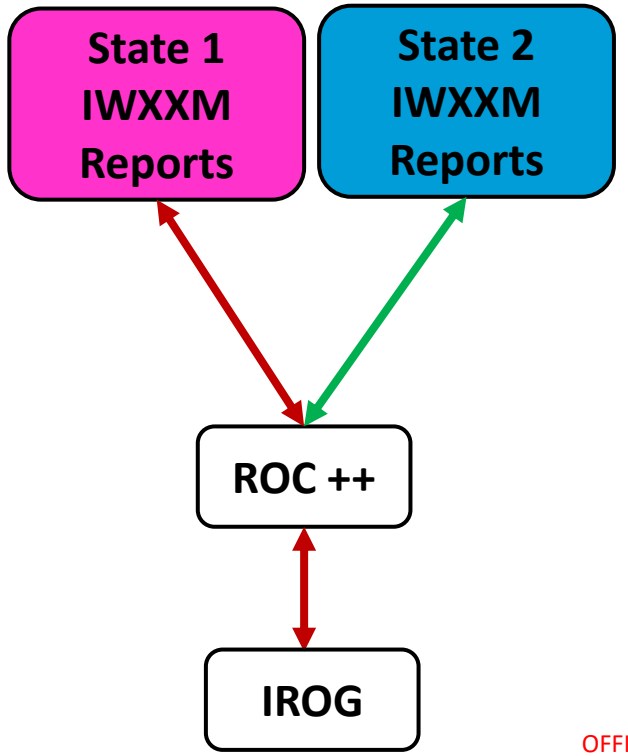
AMHS/FTBP

SWIM Messaging

Standard architecture



Hybrid Architecture



ROC would need to provide:

- SWIM to AMHS gateway
- ROC would need to expose data received from IROG

- ROC may need bi-directional conversion of reports & bulletins

Hybrid exchange

- Benefits:
  - Cost savings for States providing NOCs that haven’t implemented AMHS

Hybrid exchange

- Dis-benefits:
  - ROC++ need to manage additional agreements with States that provide information via SWIM
  - ROC++ incur additional costs for transition and planning
  - ROC++ may incur additional costs to re-develop the SWIM capability as SWIM matures

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Use of the Internet

Decision METP WG-MIE/9-03: Use of the internet

That, MET-SWIM support the exchange of information over the internet

Why:

- Users currently access Met-data via internet
- Users access met services from anywhere in the world
- Large datasets to be exposed to meet user needs

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Evolution of MET Services

- Met Services provided traditional alphanumeric code (TAC) products
- TAC is both a data format and visualisation

- IWXXM already available for METAR/SPECI, TAF, SIGMET, AIRMET, VAA, TCA, SWXA

- IWXXM to be generated from source

- TAC form proposed to cease in 2030
- IWXXM products expected to be kept until at least 2033

Evolution of MET Services

- MET-SWIM services will offer:
  - Objects (e.g. IWXXM)
  - Grids (e.g. netCDF, GRIB)
  - Images (e.g. PNG, JPEG, SVG, geoTIFF)

- Information Service Providers will expose services via
  - Messaging: Pub/Sub (AMQP)
  - Web services: Req/Reply (OGC EDR API, WMS, WFS, WCS)

New MET Information Services

- WAFS Information Services (2025)
  - Very large gridded datasets provided every 6 hours
  - Significant weather objects (IWXXM)
- Quantitative Volcanic Ash Concentration Information (QVA) Services (2025)
  - Large gridded datasets provided ad hoc
  - QVA polygons (IWXXM)
- Aerodrome Meteorological Observation Information Services (AMOIS) (2030)
  - IWXXM (every 1-60mins)
- Aerodrome Meteorological Forecast Information Services (AMFIS) (2030)
  - IWXXM (every 1-6hrs)
- Hazardous Weather Information Service (HWIS) (2030)
  - Large gridded datasets provided frequently (every 15-60mins?)
  - Polygons (IWXXM) - every 15mins?

MET-SWIM services over CRV

- Benefits of MET-SWIM over the CRV
  - Perceived superior cyber security, timeliness, reliability

MET-SWIM services over CRV

- Dis-benefits of MET-SWIM over the CRV

MET-SWIM services over CRV

Service	Pub/Sub, Req/Rep	User	Comment

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MET-SWIM Roles

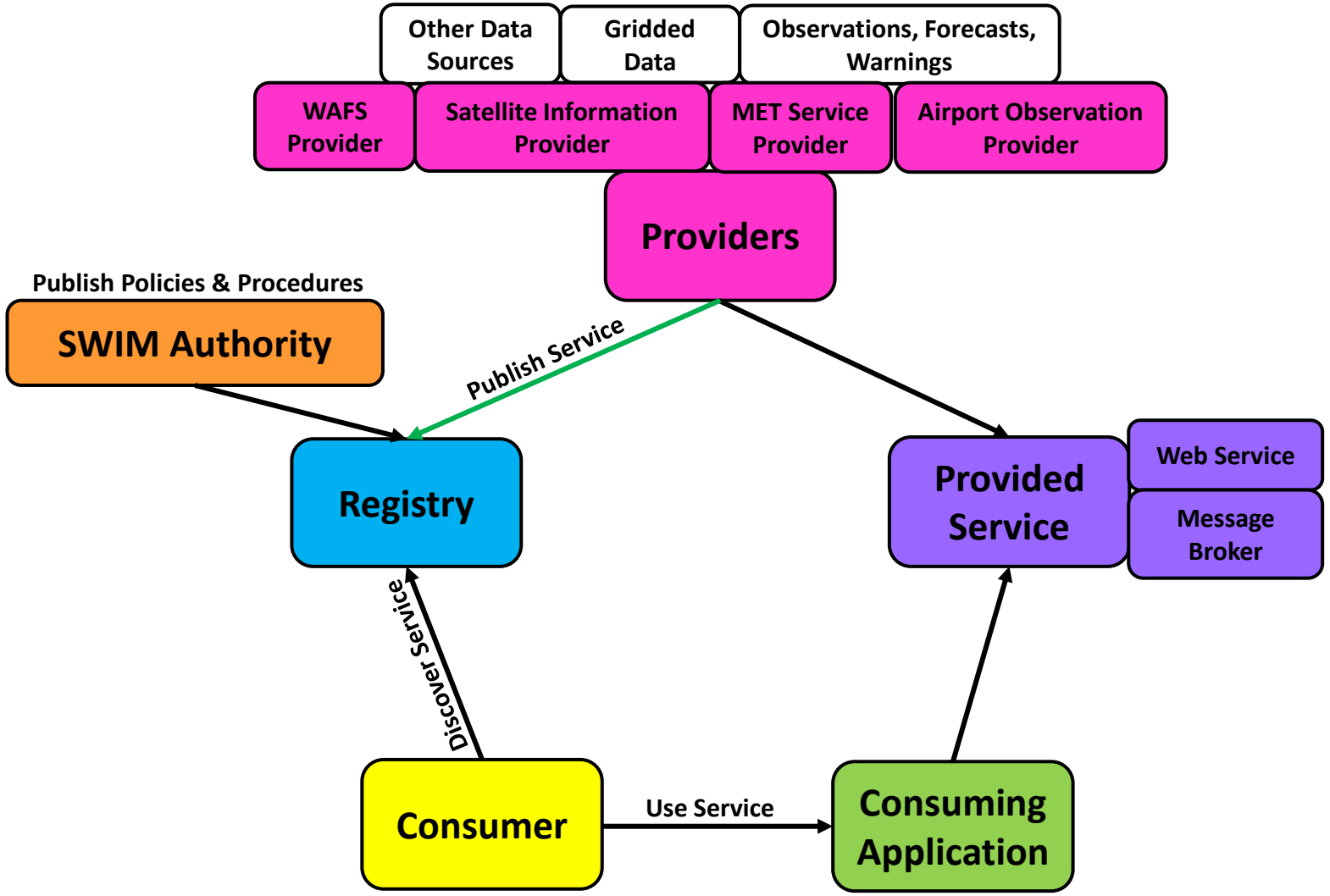
Function/Role	Block 0 2013-2018	Block 1 2019-2024	Block 2 2025-2030	Block 3 and Beyond >2031
Data Provider	MWO, AMO, AMS, VAAC, TCAC, WAFC	MWO, AMO, AMS, VAAC, TCAC, WAFC, SWXC	MWO, AMO, AMS, VAAC, TCAC, WAFC, SWXC, HWIS	Accredited MET Information Service Provider
Data Aggregator and Validator	NOC, ROC, RODB, IROG	NOC, ROC, RODB, IROG	NOC, ROC, RODB, IROG SWIM Broker	SWIM Broker
Data Repository	WAFC, RODB, State/NOC	WAFC, RODB, State/NOC	WAFC, RODB, State/NOC Accredited MET Information Service Provider	Accredited MET Information Service Provider

Historic Met-SWIM architecture

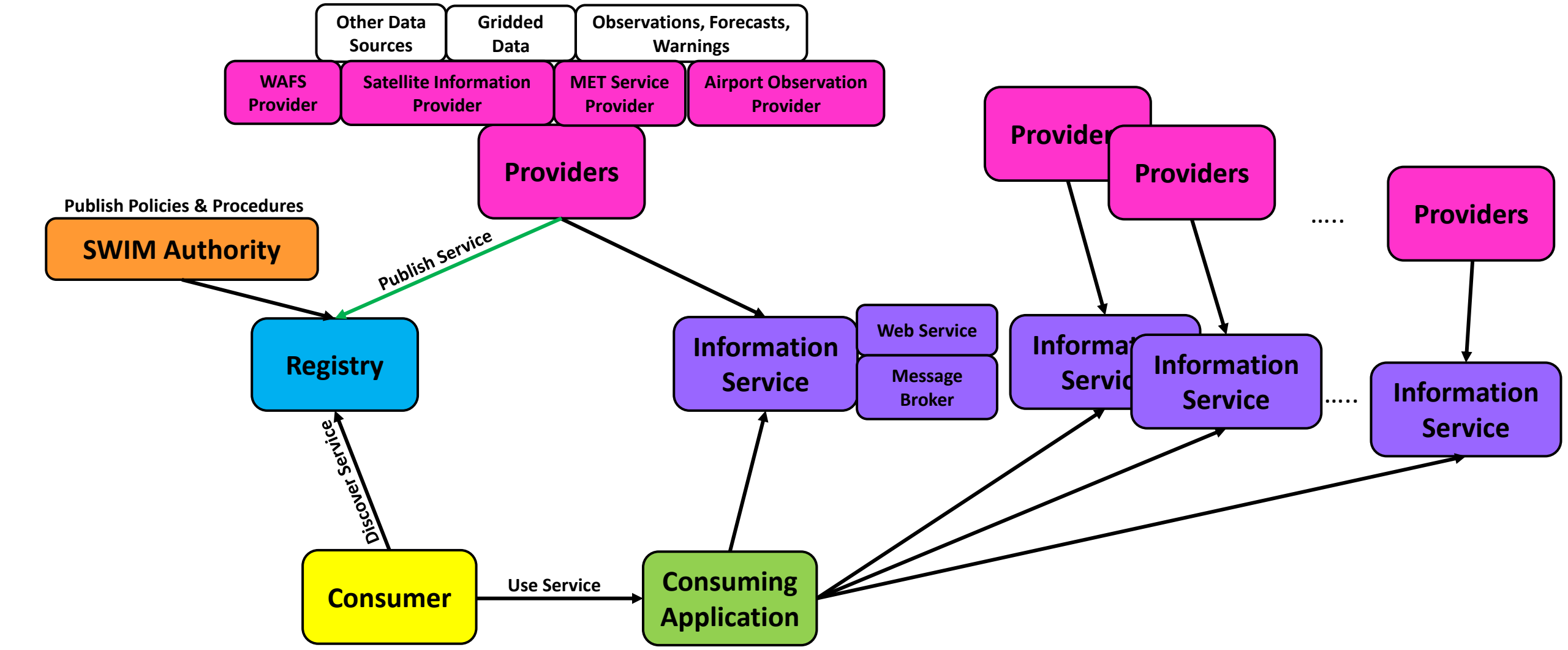
- Every State is required to provide, or arrange the provision, of their data via SWIM
- Users could directly connect to services they require, or a service provider that has access

- Problem:
  - All States need to design SWIM services supporting many users
  - All States managing a large number of unique users (in parallel) accessing SWIM services
  - Users identifying and managing access to a large number of service providers
  - Uncertainty whether commercial providers will offer aggregated data

Generic Met-SWIM Model



If we do nothing



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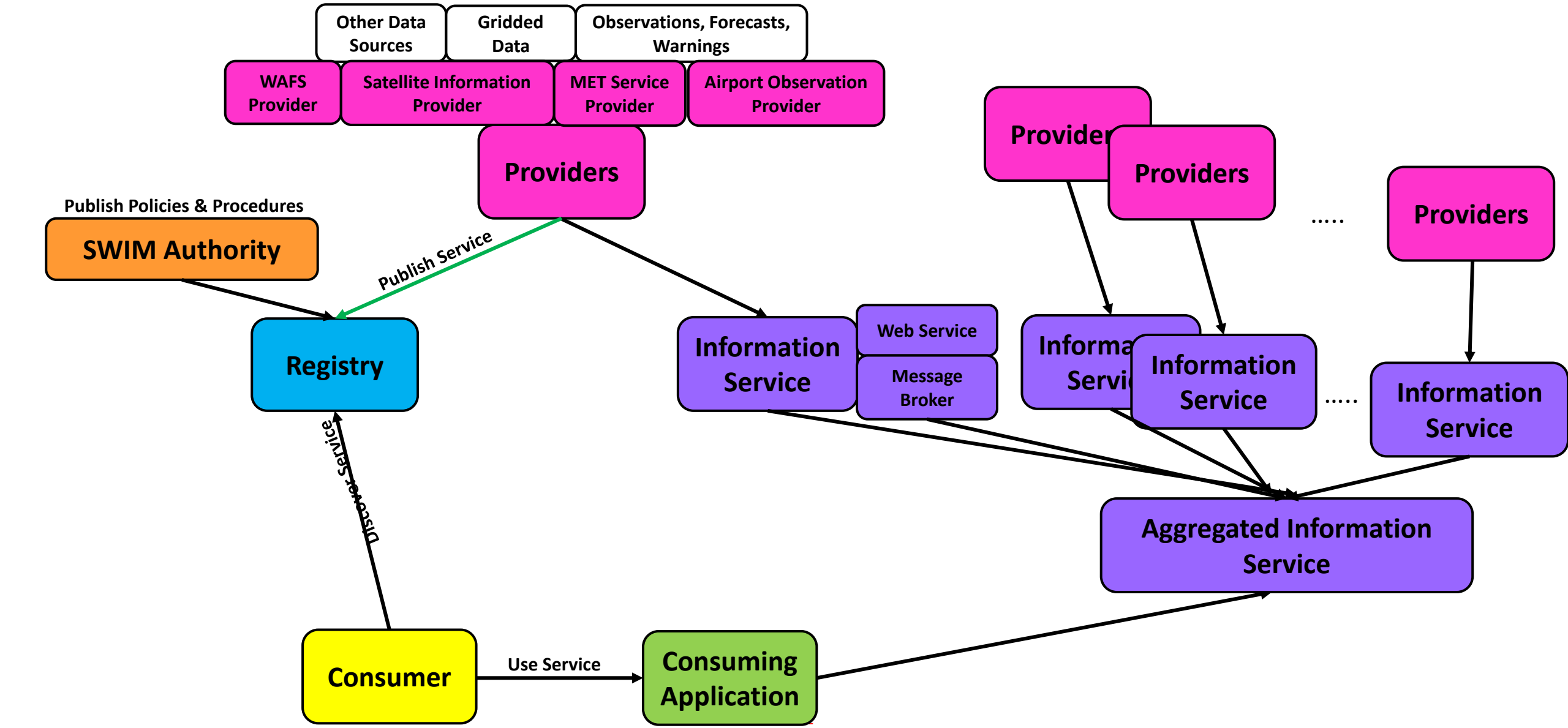

Current Status

- WG-MIE is exploring options including
  - Option 1: Regulated
    - Pro's: Globally consistent
    - Con's: Likely slower to adapt to change and requires selection of centres
      - Who/how centres selected
  - Option 2: Unregulated
    - Pro's: More agility in solution
    - Con's: Cost and quality may vary and uncertainty when the service will be available
- EUR MET3SG and APAC SWIM/TF exploring solutions independently
- Capability and terminology yet to be agreed
  - Single sign-on
  - Aggregation of data, or a catalogue of services

METP Decision 5/5 — Aggregation Function in Information Services

That, the WG-MIE be tasked to continue to investigate options for data aggregation function that allows for easy access, discovery and retrieval of meteorological information by users, via information services.

Note. - a focus will be on defining the access problems to be solved, analysing the feasibility of potential technical solutions that are aligned with the SWIM concept, as well as a recommendation on the practical aspects of whether national/regional centres (as authorised in ICAO regulatory documents), or individual service provider(s), are optimal entities to take the responsibility.

Regulated Aggregation

- Benefits

Regulated Aggregation

- Dis-benefits

Unregulated Aggregation

- Benefits

Unregulated Aggregation

- Dis-benefits

Questions?