Weather Ready Pacific - Executive Business Narrative

> **A Visual Journey Through the WRP Architecture**
>
> Reading Time: 20-30 minutes with diagrams
>
> Date: 2026-04-24
> Version: 2.0 (Updated: Landscape Consolidation, WIS2 Standard Scope, Simplified Product Delivery)

Part 1: The Big Picture – System Landscape

What is Weather Ready Pacific?

Weather Ready Pacific is a programme delivering the Pacific Integrated Forecasting Platform and enabling data infrastructure. The purpose of the IFP is to ingest data, visualize information, produce and disseminate life-saving weather forecasts and warnings. Instead of fragmented and manual processes, the Pacific IFP enables a seamless **data pipeline** that moves information from observations all the way to operational consumers and the public.

> ***The Business Mission:*** *Enable Fiji Meteorological Service and PICT nations to collect meteorological data from national and regional sources, synthesize it into authoritative forecasts, and distribute life-saving warnings through multiple channels—all while maintaining complete data sovereignty over national information.*

The WRP System Landscape

This diagram shows the complete ecosystem where data flows from unified regional observation sources, through regional processing (Regional WIS2.0 Hub Node, PDTS), through the central forecasting hub (IFP), and out to operational consumers and the public.

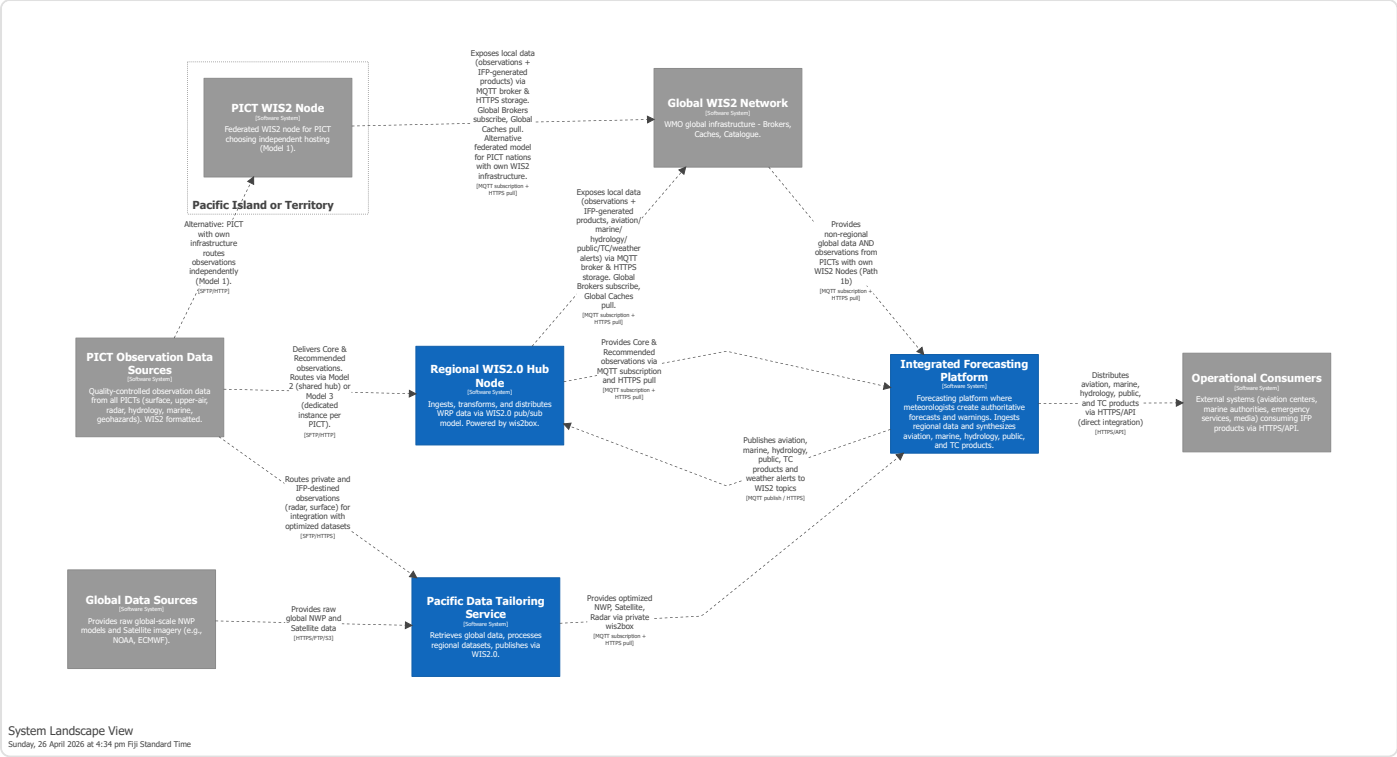

Figure 1: Complete WRP Ecosystem

Understanding the Landscape: The Four-Stage Data Pipeline

The WRP IFP architecture operates as a **four-stage pipeline** that moves meteorological data from raw collection through synthesis into actionable products:

```
┌──────────────────┐     ┌──────────────────┐     ┌──────────────────┐     ┌
│  STAGE 1:        │     │  STAGE 2:        │     │  STAGE 3:        │     │
│  COLLECT         │  →  │  HARMONIZE       │  →  │  SYNTHESIZE      │  →  │
│  Raw Data        │     │  QC, Catalogue   │     │  Create Forecasts│     │
│  From Sources    │     │  & Notify        │     │  & Products      │     │
└──────────────────┘     └──────────────────┘     └──────────────────┘     └

        ↓                        ↓                        ↓
   PICT Networks          Regional WIS2.0 Hub Node      Integrated Forecasting
   (All countries:        (Standard-compliant)      Platform (IFP)              Ma
    observations          PDTS (NWP, Satellite,     (Single Source of Truth)    Eme
    from ground           Radar, Private)                                       Me
    stations)
```

Data Boundary:

- **PICT** responsible for delivering observations in WIS2-ingestible format to either Regional WIS2.0 Hub Node (for Core/Recommended data) OR PDTS (for private data) (Stage 1)
- **Regional WIS2.0 Hub Node** responsible for standardizing Core & Recommended observations and publishing to Global WIS2 (Stage 2)
- **PDTS** responsible for processing private PICT data and global models, delivering optimized datasets to IFP (Stage 2)
- **IFP** responsible for consuming all data streams and delivering forecasts to distribution channels (Stages 3-4)

Why This Pipeline Matters:

- ✅ Automatic: Data flows without manual intervention
- ✅ Reliable: Data cannot be lost—archived at each stage
- ✅ Fast: Forecasts created minutes after new data arrives
- ✅ Auditable: Every data transformation is traceable and logged

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Four Inbound Data Paths

The landscape shows **four distinct pipelines** bringing data **INTO** the forecasting platform:

- **Path 1:** PICT observations via Regional WIS2 (standard route for Core & Recommended data)
- **Path 1a:** PICT observations via National WIS2 Nodes (optional alternative for PICT nations with own infrastructure)
- **Path 2:** PICT private observations via PDTS (for IFP-only)
- **Path 3:** Global models, Satellite imagery etc (requiring processing before going to IFP)
- **Path 4:** Global Context (The Global WIS2 Route)

Path 1: Regional Observations (The Regional WIS2 Route)

```
PICT Observation Sources  →  Regional WIS2  →  IFP
(All countries including     (Core &          (Forecasting)
 Fiji + other PICTs)         Recommended
                             per WIS2
                             standard)
```

- **What:** Standardized, quality-checked observation data from all Pacific Island Countries and Territories (surface weather, upper-air, radar, hydrology, marine observations)
- **Processing:** Each nation handles Stage 1 quality control via their own systems; Regional WIS2.0 Hub Node standardizes for WIS2 compliance where nation does not have their own WIS2 Node.
- **Purpose:** Ensures clean, validated data from Pacific nations follows WIS2 standard classifications
- **Owner:** National Met Services (Fiji, PICTs) + RSMC Fiji (Regional WIS2 steward)

> **Key Principle:** Regional WIS2.0 Hub Node handles **WIS2-standard classifications only** (Core & Recommended data per WMO Unified Data Policy). Private data is explicitly out of scope.

Path 1a: PICT Observations via National WIS2 Nodes (Alternative Route)

```
PICT Observation Sources  →  PICT WIS2 Node  →  Global WIS2  →  IFP
(nations with own WIS2          (Via Global      (Forecasting)
 infrastructure)                 Network)
```

- **What:** Observation data from PICT nations that choose to maintain their own WIS2 Node and publish directly to the Global WIS2 Network
- **Processing:** PICT handles all standardization and WIS2 compliance; IFP subscribes via Global WIS2 Network
- **Purpose:** Allows nations with existing WIS2 infrastructure to route data independently
- **Owner:** Individual PICT National Met Services
- **When Used:** Optional path for nations with mature WIS2 infrastructure; complements Path 1 (Regional WIS2) for nations preferring centralized routing

> **Key Principle:** This path demonstrates **WIS2 interoperability**—IFP can consume observations from either the Regional WIS2.0 Hub Node (Path 1) or directly from Global WIS2 (Path 1a). The source is transparent to forecasters; the system works with both approaches.

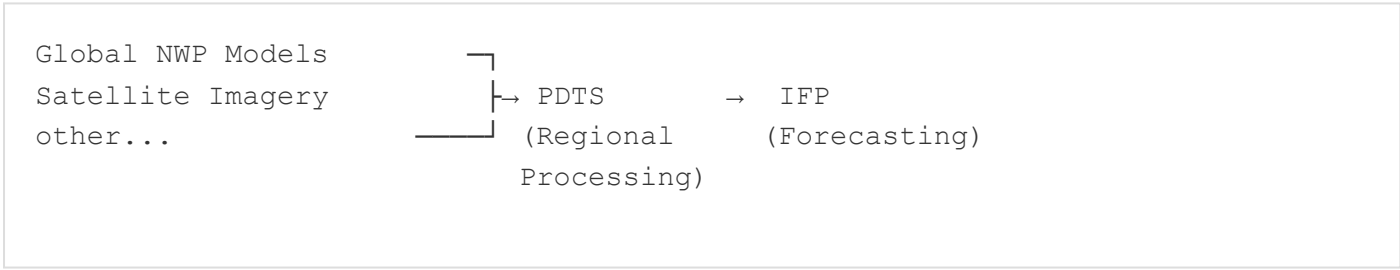
Path 2: PICT private observations

```
PICT Observation Sources  →  PDTS    →  IFP
                                        (Forecasting)
```

- **What:** Private observations from Fiji/PICTs not intended for global WIS2 exchange (private radar, private surface observations)
- **Processing:** ingests private observation datasets with possibility to make tranformations before IFP
- **Purpose:** Provides optimized global datasets + private observations at manageable scale; routes private data directly to IFP without global exposure
- **Owner:** Pacific Data Tailoring Service (AWS cloud-hosted)
- **Routing:** PDTS delivers ALL processed data to IFP only via private wis2box (never to Regional WIS2.0 Hub Node)

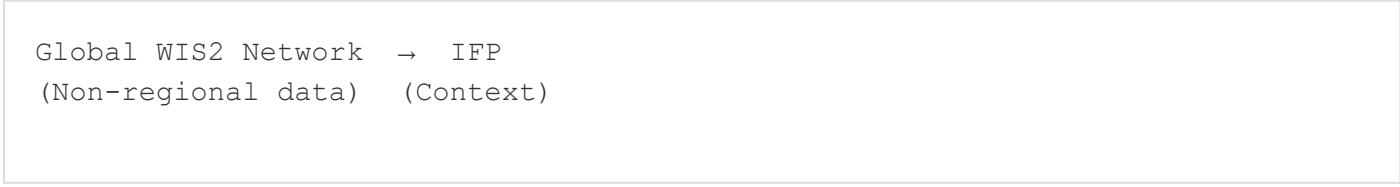
> **Key Principle:** PDTS is a **streamlined, IFP-only pipeline**. It processes global data for Pacific region efficiency AND routes private observations directly to IFP. Private data never transits through Regional WIS2 infrastructure.

Path 3: Global Models Data via Global WIS2 (Non-Regional Context)



- **What:**
  - Global numerical weather models (NOAA GFS, ECMWF, JMA) - optimized for Pacific region
  - Satellite imagery (NOAA, Eumetsat) - cropped to Pacific domain
- **Processing:** PDTS crops global data to Pacific region (reducing data volume), normalizes formats,
- **Purpose:** Gives forecasters global context without manual searching
- **Owner:** Global meteorological community via WIS2 network

Path 4: Global Context (The Global WIS2 Route)



- **What:** International forecasts and observations from partners (Australia, New Zealand, NOAA, ECMWF, JMA, other PICT nations running their own WIS2 Nodes)
- **Purpose:** Gives forecasters global context without manual searching
- **Owner:** Global meteorological community via WIS2 network

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Two Outbound Distribution Paths

Once IFP creates forecasts, they're distributed via **two core channels** to reach different audiences:

Path A: Products to Regional WIS2 ✈️ ⛵ 🌊 ⚠️

```
IFP Forecasts  →  Regional WIS2  →  Global WIS2  →  International Meteorologist
(Aviation TAF,    (Published via    (Available to    (Forecasting Centers,
 Marine Warnings,  WIS2.0 standard   Global           Universities)
 Hydrology Alerts, protocols: MQTT,  Community
 Public Forecasts, HTTPS)           & WIS2
 TC Advisories,                      Subscribers)
 Weather Alerts)
```

- **Audience:** Global meteorological network + emergency management systems
- **Purpose:** Share Pacific expertise; enable international forecasting collaboration; provide standardized alerts (including OASIS CAP v1.2 format)
- **Format:** WIS2.0 standard (MQTT publication + HTTPS object storage)

Note: Weather alerts (CAP-formatted) are treated as generic products, not special-cased. They flow through the same Product Dissemination Engine as aviation, marine, hydrology, and public forecasts.

Path B: Products to Operational Systems ⚙️

```
IFP Forecasts  →  Direct APIs  →  Operational Consumers
(Aviation,        (REST,           (Aviation Authorities,
 Marine,          Webhooks,        Port Authorities,
 Hydrology,       Direct           Emergency Services,
 Public, TC,      Integration)     CMS Systems)
 Weather Alerts)
```

- **Audience:** Organizations requiring direct integration (faster than WIS2 polling)
- **Purpose:** Fast, direct integration with operational systems
- **Format:** REST APIs, direct webhooks, operational formats

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The Central Hub: Why IFP?

The **Integrated Forecasting Platform (IFP)** is the synthesis hub where all data comes together and forecasts are created. Why concentrate here?

Benefit	Rationale
Single Source of Truth	One authoritative forecasting system (not 5-7 competing systems)
Complete Data Access	Meteorologists access observations, global models, and private/optimized data in one place
Regional Coordination	PICT nations benefit from shared forecasting without duplicating infrastructure
Data Sovereignty	PICTs controls all data flows—private data never leaves unless approved
Operational Efficiency	Meteorologists focus on forecasting, not data integration
Multi-Domain Expertise	Create aviation, marine, hydrology, public, and TC forecasts from single system

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Part 2: Drilling Down – System-Level Details

Now that we understand the **big picture** (landscape with 4 inbound + 2 outbound paths), let's drill down into the **three core systems** that make it work.

System 1: Integrated Forecasting Platform (IFP)

IFP's Role in the Pipeline

In the Landscape: IFP is the central **synthesis hub** that receives data via 3 primary sources (Regional WIS2, PDTS, Global WIS2) representing the 4 landscape paths:

1. Path 1: Regional WIS2 (standard observations)
2. Path 1a: Global WIS2 (PICT nations with own WIS2 nodes)
3. Paths 2 and 3: PDTS (private observations + global models)
4. Path 4: Global WIS2 (non-regional context)

IFP creates products for 2 outbound channels (Regional WIS2 for global sharing, Direct APIs for operational integration).

In the Business: IFP is where **meteorologists create authoritative forecasts**—the one system that forecasters use to synthesize all available data into life-saving predictions.

IFP System Context Diagram

This diagram shows **IFP at the system level**—what external systems connect to it, what data flows in/out, and how it fits into the broader ecosystem:

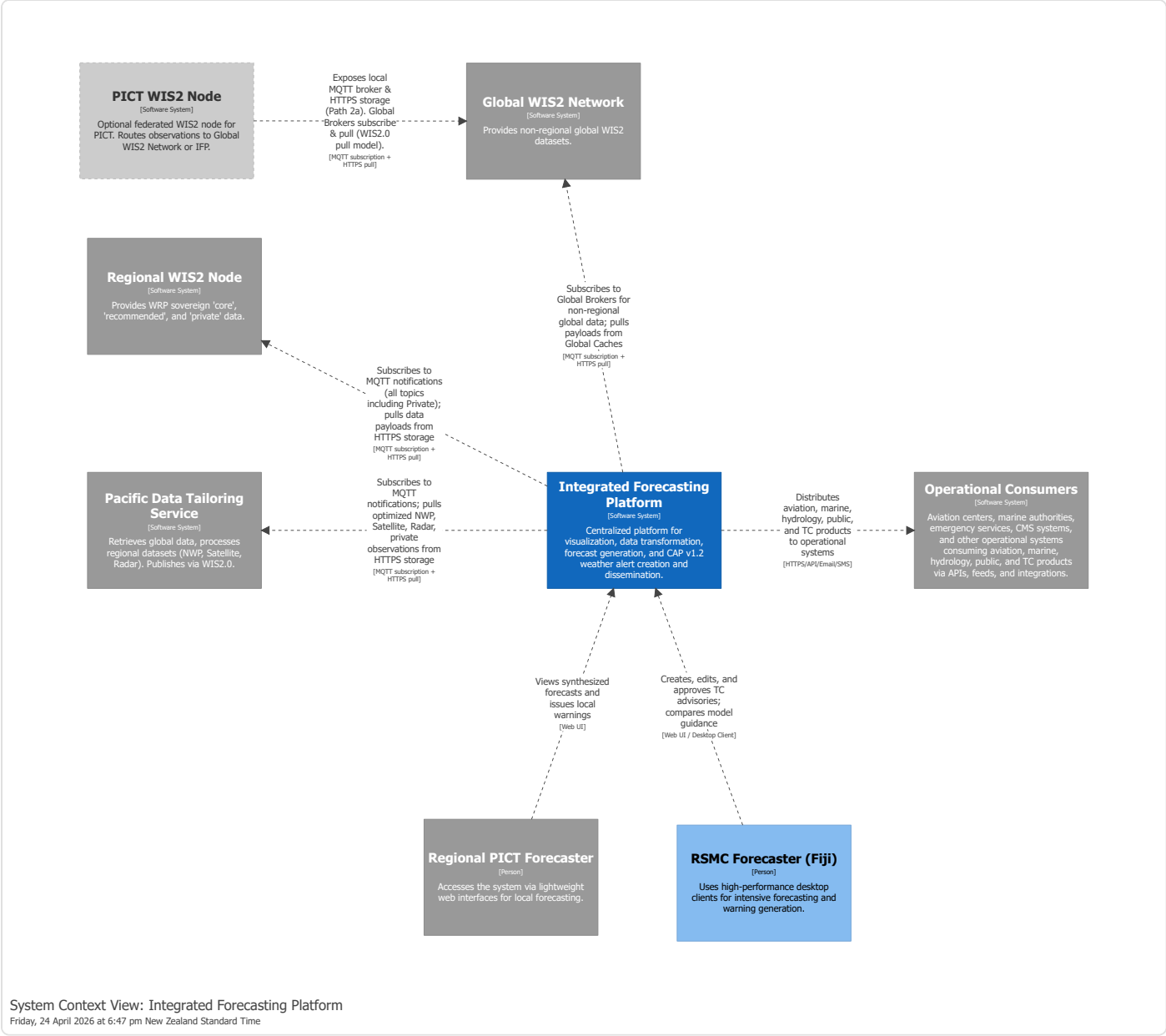

Figure 2: IFP System Context

What IFP Does (System Responsibilities)

Responsibility	Details
Data Ingestion	Receives meteorological data from 3 sources (Regional WIS2 standard observations, PDTS-processed global data + private observations, Global WIS2 context)
Data Processing	Applies domain-specific transformations (TC module for cyclone advisories, etc.)
Forecast Generation	Meteorologists use IFP to create forecasts across 5 domains: Aviation (TAF, SIGMET), Marine (warnings), Hydrology (flood alerts), Public (general forecasts), TC (cyclone advisories)

Responsibility	Details
Product Dissemination	Routes finished forecasts (including weather alerts) to two channels: Regional WIS2 for global distribution, Operational Consumers for direct integration
Data Sovereignty	Super-consumer authorization grants IFP access to private data for forecast quality

What IFP Does NOT Do

- ❌ NOT Stage 1 quality control of raw observations (handled at source by PICT nations)
- ❌ NOT WIS2 publishing (Regional WIS2.0 Hub Node handles this)
- ❌ NOT Global data acquisition (PDTS handles this)
- ❌ NOT User-facing visualization (separate Visual Weather Server application)

Key Business Value

For Meteorologists:

- One system to access all forecast data
- Real-time data integration (no manual copy-paste)
- Multi-domain forecast creation from single interface
- Access to private observations improving forecast quality

For Fiji Met Service:

- Single forecasting authority (no competing systems)
- Forecast quality through data completeness
- Regional hub position (serve all PICT nations)
- Operational efficiency (meteorologists spend <5% on data integration)

For PICT Meteorologists:

- **Online Weather Web Application:** Remote forecasters from PICT nations access the single-page web application (Online Weather) rather than requiring the Visual Weather fat client
- **Reduced Infrastructure Requirements:** Eliminates need for dedicated forecasting desktops at PICT locations
- **Lower Bandwidth Demands:** Web-based access uses significantly less bandwidth than fat client applications, critical for regions with limited connectivity
- **Remote Access Capability:** Meteorologists can access forecasting platform from any location with internet connection

- **Operational Flexibility:** Regional forecasters contribute local expertise while leveraging centralized IFP data and processing

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System 2: Regional WIS2.0 Hub Node

Regional WIS2.0 Hub Node's Role in the Pipeline

In the Landscape: The hub that:

- Receives standardized observations from all PICT nations
- Publishes Core & Recommended data to Global WIS2 (WIS2-standard classifications only)
- Receives IFP forecasts and redistributes them globally via WIS2
- Provides observation access to IFP for forecasting

In the Business: The **data sovereignty enforcement point**—ensuring that only WIS2-standard classified data (Core & Recommended) is published to global networks, while private data is explicitly routed elsewhere.

> **Key Principle:** Regional WIS2.0 Hub Node operates per **WIS2 standard classifications only** (Core & Recommended per WMO Unified Data Policy). Private data is out of scope and routes via PDTS to IFP instead.

Regional WIS2.0 Hub Node System Context

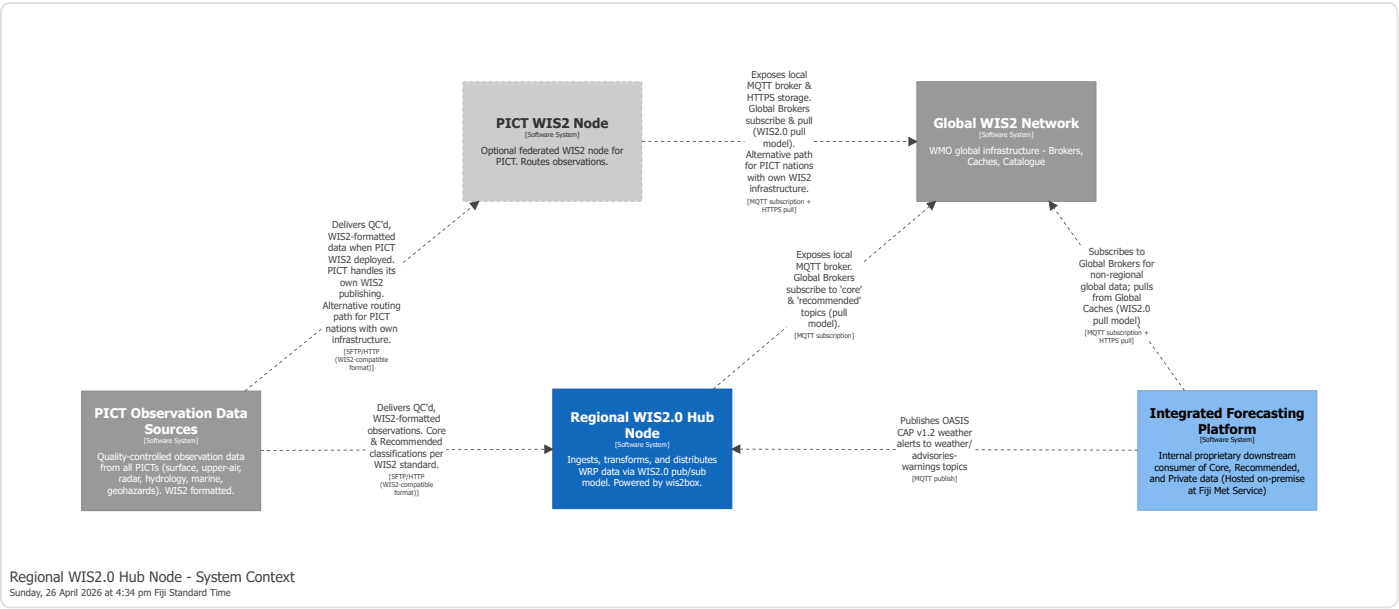


Figure 3: Regional WIS2.0 Hub Node (Unified PICT Perspective)

What Regional WIS2.0 Hub Node Does (System Responsibilities)

Responsibility	Details
Observation Consolidation	Receives Core & Recommended observations from all PICT nations (unified data source)
WIS2 Classification	Enforces WIS2 standard classifications (Core & Recommended only; no private data)
WIS2 Publishing	Publishes Core & Recommended data to Global WIS2 Network (MQTT + HTTPS)
Metadata Cataloging	Maintains ISO 19115 metadata for geographic discovery (pygeoapi)
Forecast Reception	Receives finished IFP forecasts and republishes to Global WIS2
Observation Archive	Stores Core & Recommended observations in standardized archive (S3)
WIS2 Standard Compliance	Ensures all published data meets WMO Unified Data Policy classifications

What Regional WIS2.0 Hub Node Does NOT Do

- ❌ NOT Handle private data (explicitly out of scope per WIS2 standard)
- ❌ NOT Stage 1 quality control (handled at national level)

- ❌ NOT Forecast generation (IFP handles this)
- ❌ NOT Process or route data that doesn't fit WIS2 classifications (PDTS handles private data)

Key Business Value

For Fiji Met Service:

- Single point of WIS2 compliance enforcement
- Data published to global network increases regional visibility
- Single platform for all PICT observation consolidation
- Clear governance: WIS2-standard data only

For PICT Nations:

- Unified observation architecture (no 7 separate systems)
- Can choose to run own WIS2 Node (federated) or delegate to Regional (managed by Fiji)
- Core & Recommended data automatically published (open access per WMO)
- 100% control over data sharing decisions (can designate observations as Recommended instead of Core)

For Global Meteorological Community:

- Standardized WIS2 access to Pacific data
- Compliance with WMO Unified Data Policy
- Direct access via MQTT and HTTPS

System 3: Pacific Data Tailoring Service (PDTS)

PDTS's Role in the Pipeline

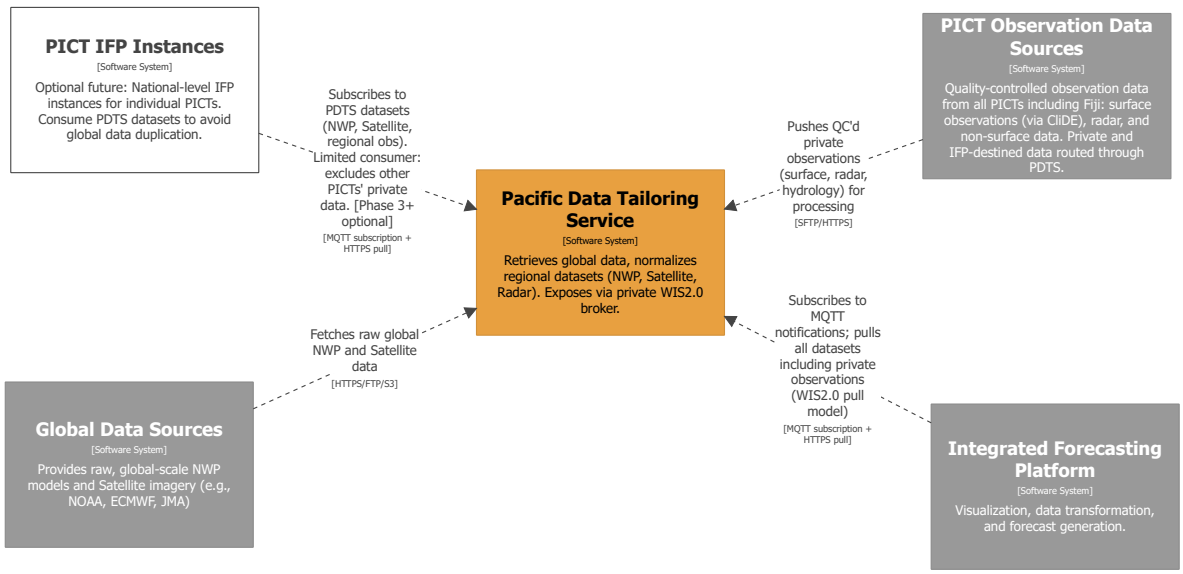
In the Landscape: The system that:

- Retrieves global numerical weather models (NOAA, ECMWF, JMA, etc.)
- Processes global data (Satellite imagery, global NWP, etc.) optimized for Pacific region
- Ingests private observations that are NOT published via Regional WIS2
- Routes appropriate data to IFP only

In the Business: The **private data and global optimization processor**—ensuring IFP has access to world-class forecasting data at manageable scale, while enforcing data confidentiality for private observations.

> **Key Principle:** PDTS is an **IFP-only pipeline**, not a data source for the global WIS2 network. It handles data that Regional WIS2.0 Hub Node either cannot process or that is explicitly private.

PDTS System Context Diagram



System Context View: Pacific Data Tailoring Service
Friday, 24 April 2026 at 7:06 pm New Zealand Standard Time

Figure 4: PDTS System Context

What PDTS Does (System Responsibilities)

Responsibility	Details
Global Data Retrieval	Automated download of NWP models from NOAA, ECMWF, JMA, others (4x daily)
Satellite Data Fetch	Retrieves satellite imagery from NOAA, Eumetsat, Himawari and normalizes formats

Responsibility	Details
Geospatial Optimization	Crops global GRIB2/NetCDF to Pacific region (reducing data volume transferred and stored)
Private Observations Ingest	Receives private PICT observations (private radar, private surface data)
Observation Transformation	Applies any needed transformations on PICT-sourced observation data (extensible)
Data Staging	Stores intermediate datasets in S3 Data Cache for multi-source composition
IFP-Only Distribution	Routes ALL processed data (global + private observations) to IFP via private wis2box (never to Regional WIS2)
Buffering & Resilience	Store-and-forward buffering for network resilience

What PDTS Does NOT Do

- ❌ NOT End-user access (IFP provides that)
- ❌ NOT Publish to Regional WIS2.0 Hub Node (data routes directly to IFP only)
- ❌ NOT Publish to Global WIS2 (all PDTS outputs are private/IFP-only)
- ❌ NOT Forecast generation (IFP handles this)
- ❌ NOT Stage 1 quality control (assumed pre-validated at source)

Optional Future: PICT IFP Instances (Phase 3+)

The architecture allows for **optional future scenario** where individual PICT nations run their own IFP instances. These instances would:

- Consume PDTS datasets (global models, satellite, and private observations)
- Generate local forecasts and products
- Operate as **limited consumers** of PDTS data
- **NOT** have access to other PICTs' private data
- Still use Regional WIS2 for standard observation data

This remains **provisional/future** and is not part of Phase 1 scope.

Key Business Value

For IFP Forecasters:

- Access to world-class global models at manageable scale
- Radar data included (critical for severe weather prediction)
- Tide predictions included (critical for marine forecasting)
- Private observations accessible (improves forecast quality)

For Fiji Met Service:

- Don't need to download/store terabytes of global data
- Bandwidth-efficient (PDTS handles compression/cropping)
- Handles data types Regional WIS2.0 Hub Node cannot process
- Private observations protected (never exposed to Global WIS2)

For PICT Nations:

- Can access public PDTS data (if available in future)
- Private data routed only to IFP
- Reduces need for per-country global data infrastructure

Part 3: The Complete Picture – How It All Works Together

The End-to-End Data Journey

Let's trace a **real-world scenario** to see how all three systems work together:

Scenario: Creating a Cyclone Advisory

Time: 2026-06-15 06:00 UTC - Tropical Cyclone "Milo" is developing northeast of Fiji

Stage 1: Data Collection

```
AWS Stations → PICT Sources                STEP 1: Collect observations
   (real-time)   (standardized)            Fiji AWS report: 145 kph winds
                                           Manual reports: Heavy rainfall observe
                                           Result: Validated observations ready

Satellite Imagery → PDTS                  STEP 2: Get optimized global data
   (real-time)      (crop to region,        Satellite cropped to Pacific region
                     normalize)             Optimized for faster transmission

Global Models → PDTS                      STEP 3: Get processed global models
   (GFS, ECMWF)     (optimize)             Global models cropped to Pacific
```

```
                                        Reduced data volume for efficiency
```

Stage 2: Data Harmonization

```
PICT Sources       → Regional WIS2       STEP 4: Archive standard observations
   (observations)    (standardized,        Core & Recommended observations
                     cataloged)          stored in S3, indexed in metadata catal

PDTS               → IFP                 STEP 5: Deliver private & optimized dat
   (satellite,       (private wis2box)     Private observations, optimized global
    models,obs)                           Ready for forecasting

Global WIS2        → IFP                 STEP 6: Access global context
   (context data)    (subscription)        International forecasts and observatio
```

Stage 3: Forecast Synthesis

```
Regional WIS2     ─┐   (Path 1: Observations from WIS2 network)
   (observations)  │
                   │
PDTS               ├→ IFP              STEP 7: Create forecast
   (global +       │  (Meteorologist    Meteorologist opens IFP
    private obs)  ─┤  uses all data)    Has access to:
                   │                    - PICT observations (Path 1)
Global WIS2    ────┘                    - Optimized global models (Path 2)
   (context)        (Paths 2a, 3: Global context) - Global context (Paths 2a, 3)

                  RESULT:
                  Creates: TC Advisory (standard format)
                  "CYCLONE WARNING: Cat 2 Milo approaching Fiji"
                  Issues at 06:15 UTC (15 minutes from latest data)
```

Stage 4: Product Distribution

```
IFP Advisory       → Regional WIS2       STEP 7a: Global notification
   (Standard         (WIS2 protocol)     Alert published on WIS2 network
    format)          → Global WIS2       Meteorologists in Australia, NZ see it
                     → International     Emergency management worldwide notified

IFP Advisory       → Direct APIs         STEP 7b: Operational deployment
   (Operational      (webhooks)          Fiji Emergency Authority gets it
    format)          → Fiji Emergency     immediately (no WIS2 lag)
```

```
                    → PICT Nations
```

Timeline: Observation → Advisory

- 06:00 UTC: Latest observations arrive
- 06:04 UTC: Data standardized through Regional WIS2 + PDTS
- 06:15 UTC: Meteorologist creates advisory in IFP (11 minutes)
- 06:16 UTC: Alert distributed via 2 channels simultaneously
- 06:17 UTC: Emergency operators and media receive warnings
- **Total: 17 minutes from observation to operational systems** (vs 2-3 hours manually)

The Business Value Stack

```
┌─────────────────────────────────────────────────────────┐
│  BUSINESS OUTCOME: FASTER, SAFER, COORDINATED FORECASTING  │
├─────────────────────────────────────────────────────────┤
│                                                         │
│  Level 3: PUBLIC IMPACT                                 │
│  └─ Communities receive warnings faster                 │
│     Cyclone planning can begin earlier                  │
│     Lives saved through faster decisions                │
│                                                         │
│  Level 2: OPERATIONAL EFFICIENCY                        │
│  ├─ Meteorologists spend <5% time on data integration   │
│  ├─ Focus 95% of time on forecasting (not data wrangling)  │
│  ├─ Single forecasting system (not 5-7 incompatible tools) │
│  └─ Multi-domain products from one interface            │
│                                                         │
│  Level 1: TECHNICAL ENABLEMENT                          │
│  ├─ Automatic data pipeline (no manual handoffs)        │
│  ├─ Real-time data availability                         │
│  ├─ Complete data access (observations + global + special) │
│  └─ Data sovereignty enforcement (private data protected)  │
│                                                         │
└─────────────────────────────────────────────────────────┘
```

Part 4: Key Business Decisions Explained

Why This Architecture? (The Strategic Choices)

Decision 1: Four Data Inbound Paths (not one or two)

Question: Why not have one or two systems that collect all data?

Answer:

Aspect	Reason
Path 1 (Regional WIS2)	WIS2-standard Core & Recommended data; national sources; efficient data consolidation across PICT nations
Path 2a (PICT WIS2 Nodes)	Optional federated route for PICTs with mature WIS2 infrastructure; supports national data sovereignty choice
Path 2 (PDTS)	Routes private observations directly to IFP (bypasses global network); processes global models for Pacific efficiency
Path 3 (Global WIS2)	Global forecasts needed for trend analysis; sourced from standard network rather than custom integration

Business Benefit: Each path serves distinct purpose (standard sharing, national sovereignty, private isolation, global context). Prevents monolithic bottleneck; enables independent scaling and governance.

Decision 2: Two Product Outbound Paths

Path	Why Needed
WIS2 Products	Standardized publishing and sharing through WIS2 network
Operational	Specialised bespoke integration; to with PICT based systems and delivery channels

Business Benefit: Standandized sharing and and target bespoke integration as required

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Decision 3: Regional WIS2.0 Hub Node - WIS2 Standard Classifications Only

Question: Why does Regional WIS2.0 Hub Node not handle private data?

Answer:

- **WIS2 Compliance:** WIS2 standard only recognizes Core & Recommended classifications (per WMO Unified Data Policy); Private is not a WIS2 classification
- **Clean Separation:** Regional WIS2 = Core/Recommended public data; PDTS = private and global model data
- **Operational Clarity:** No ambiguity about what Regional WIS2 publishes globally
- **Future-Proofing:** If private data policy changes, PDTS absorbs it; Regional WIS2 remains standards-compliant

Business Benefit: Architecture follows WIS2 standard exactly; reduces governance complexity; enables confident global data sharing.

Decision 4: Cloud + On-Premise Hybrid

Question: Why mix cloud and on-premise systems?

Answer:

System	Location	Why
IFP	Hybrid	Visual Weather Server in Fiji backend for VW Fat Client; where the Visual Weather heavy lifting occurs, but with potential to synchronized with Visyak Weather Server in cloud as a backend for the Online Weather application used remotely by PICTs
Regional WIS2	Cloud (AWS)	Needs global network; scalability; public endpoint
PDTS	Cloud (AWS)	Global data bandwidth; processing power; serves multiple regions

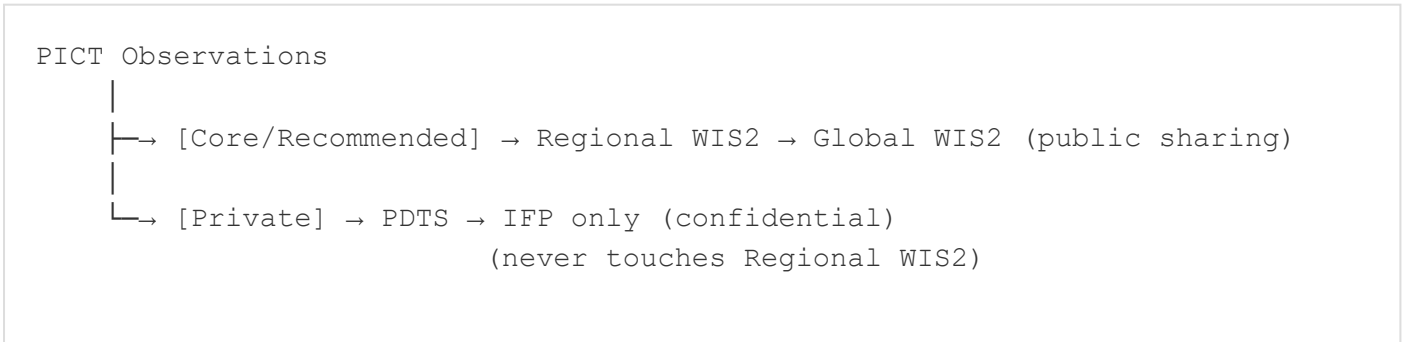
Business Benefit: Sensitive data stays on-premise; scalable regional systems in cloud; best of both worlds.

Part 5: Data Sovereignty – How Private Data Stays Private

WIS2-Standard Data Classification & Private Data Routing

WRP enforces data sovereignty using the WIS2-standard two-tier system for publicly-shared data, with private data routed separately via PDTS:

Routing Architecture for Data Sovereignty



Enforcement: Three Technical Layers

```
LAYER 1: ROUTING (Architectural Separation)
├─ Core/Recommended observations → Regional WIS2 direct
├─ Private observations → PDTS direct
└─ Policy: Different systems, different pipelines

LAYER 2: STORAGE & NETWORK
├─ Core/Recommended → Regional WIS2 public bucket + MQTT topics
├─ Private → PDTS private bucket + private MQTT topics
└─ Policy: Private topics never exposed on public Regional WIS2 broker

LAYER 3: API ENDPOINTS & ACCESS
├─ Regional WIS2 public HTTPS (anyone with internet can access Core/Recommended
├─ PDTS private S3 (IFP credentials only)
└─ Policy: Private data completely inaccessible via public APIs
```

PICT Nation Data Sharing Decision

Each PICT nation decides which tier their observations fall into:

Option A: Full Sharing (Tier 1: Core)

```
My AWS observations → Regional WIS2 (Core classification)
                    → Global WIS2 (published)
Everyone can access (WMO-compliant)
```

Option B: Selective Sharing (Tier 2: Recommended)

```
My AWS observations → Regional WIS2 (Recommended classification)
                    → Global WIS2 (approval-gated)
Request required from Global WIS2 subscribers
```

Option C: Private (Tier 3: Private)

```
My AWS observations → PDTS (private bucket) → IFP only
Never published to Regional WIS2 or Global WIS2
Never leaves region unless I decide to share
```

Benefit: PICT nations retain 100% control over data sharing; WRP enforces it technically at multiple layers.

Summary: Why This Architecture

Business Outcome	How Architecture Delivers It
Safety	Minimize time from observation to operational warning (vs 2-3 hours)
Efficiency	Meteorologists spend <5% on data integration (vs 30-40%)
Coordination	One forecasting hub for all PICT nations (not 7 competing systems)
Sovereignty	Private data technically enforced to stay private (not just policy)
Compliance	Regional WIS2 follows WIS2 standard exactly
Scale	Global data at manageable size (cropped by PDTS, not IFP)
Participation	PICT can choose level (run own WIS2, use cloud, delegate all)
Expertise Sharing	Pacific forecasts visible to global community (increases influence)
Simplicity	Fewer systems, clearer roles, easier to understand and maintain

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