Flex4Apps

WP5 D5.1: Platform Architecture & Integration

NXP | SECURE CONNECTIONS FOR A SMARTER WORLD

Flex4Apps – Introduction

▸ **Situation**: Many sensors produce large data amounts

▸ **Challanges for future systems**:
  – Extract the important information fast
  – React quickly to anomalies
  – Reveal hidden correlations
  – Keep data secure

▸ **Solution**: Flex4Apps - Smart system connecting multiple sensors to the cloud
  – The Flex4Apps platform architecture shall monitor, analyze and hence utilize Big Data (technologies).

▸ **NXP target**:
  – The project requires an efficient and flexible end-to-end security concept.
  – For instance, common Plug & Play concepts could be upgraded to industrial Plug & Trust systems by introducing automatic authentication and secure data transmission methods.

Application Scenarios for Flex4Apps

Use Case	Domain	Sensors	Real-time adapted sensor usage	Security consideration
Elderly house	healthcare	Heart rate, glucose monitoring, breath rate, oxygen level, …	Priority sensor reading for sensors on critical persons	Personal privacy
Building Automation	Personal, enterprise	Temperature, humidity, gas composition, noise, …	Priority transmission on suspect sensor data allows for targeted setting of building controls	External interference on Sensor network must not be the 'open window' to vital networks in the building
Factory Monitoring	Industry	Temperature, pressure, chemical composition…	Early warning for shift in machinery settings.	Competition insight in factory status Machinery data must be guaranteed to be correct for proper feedback.
Network Monitoring	Industry	Network elements providing log data, status info	Use network optimally by knowledge of status on network elements	Information on functioning of network elements must not be open.

Architecture Considerations

- **Observations:**
  - Solutions nowadays are heterogeneous
  - With different deployment of applied security
  - With variety of sensors/actors used (basic On/Off up to smart with identification, en/decryption, etc.)
  - Neither simple nor standalone - turning one gear may trigger unexpected behavior in one or many unexpected areas and unexpected locations.
  - Companies want quick return on invest → security follows functionality.

- **System topologies:**
  - Generally follow the architecture shown on the right site
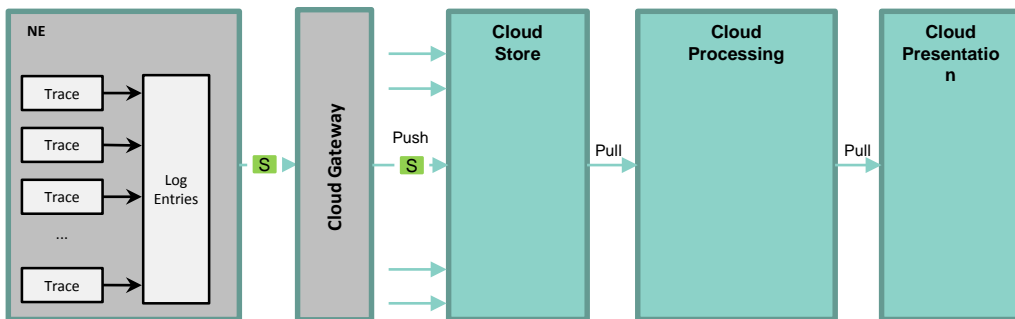
- **Next generation solutions need to be architecture conscious**
  - key hole surgery is envisaged. A minimal invasive change shall lead to a maximum result.
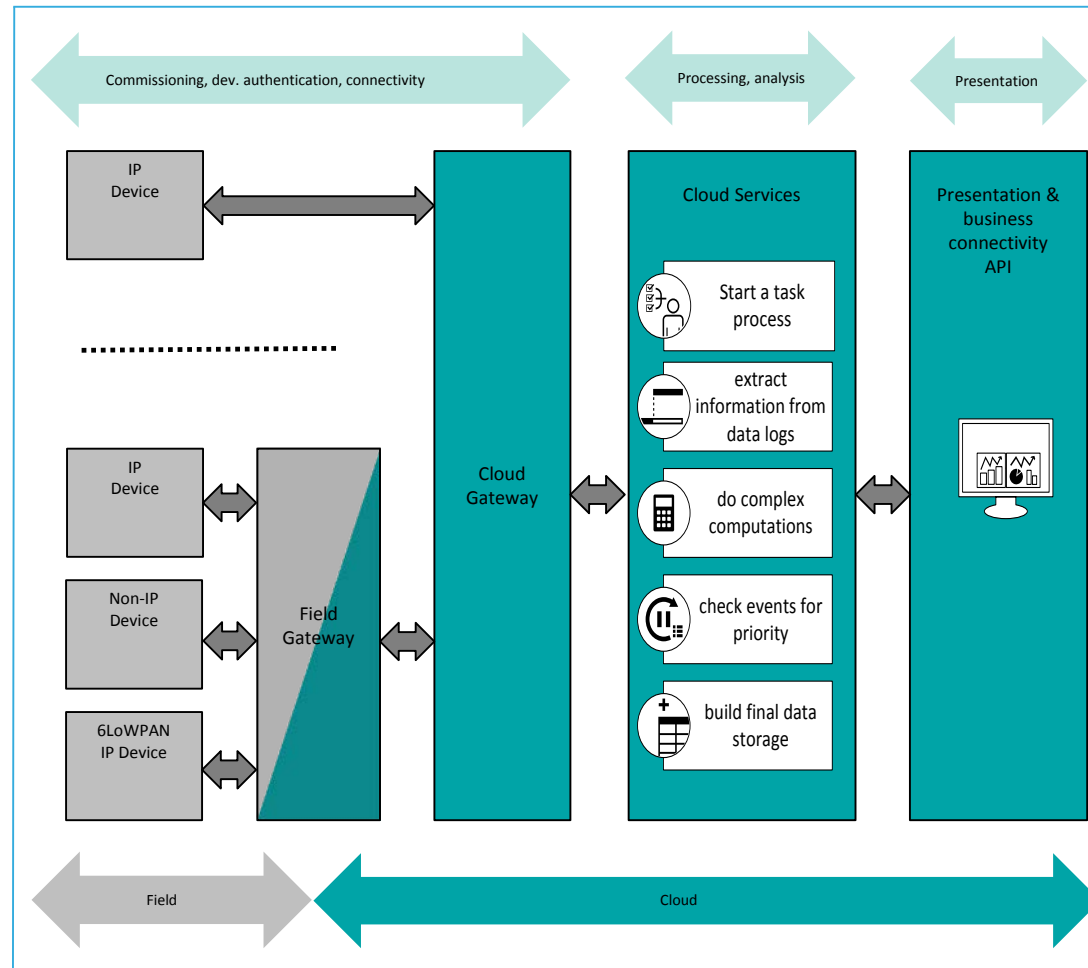
Flex4Apps Use Cases

Telecommunication Architecture

Home-Automation Architecture
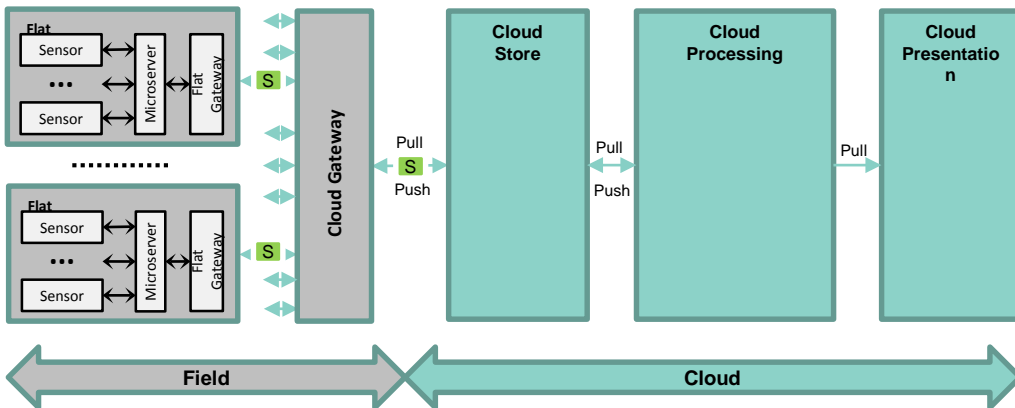
S - Interface examples for secured data communication

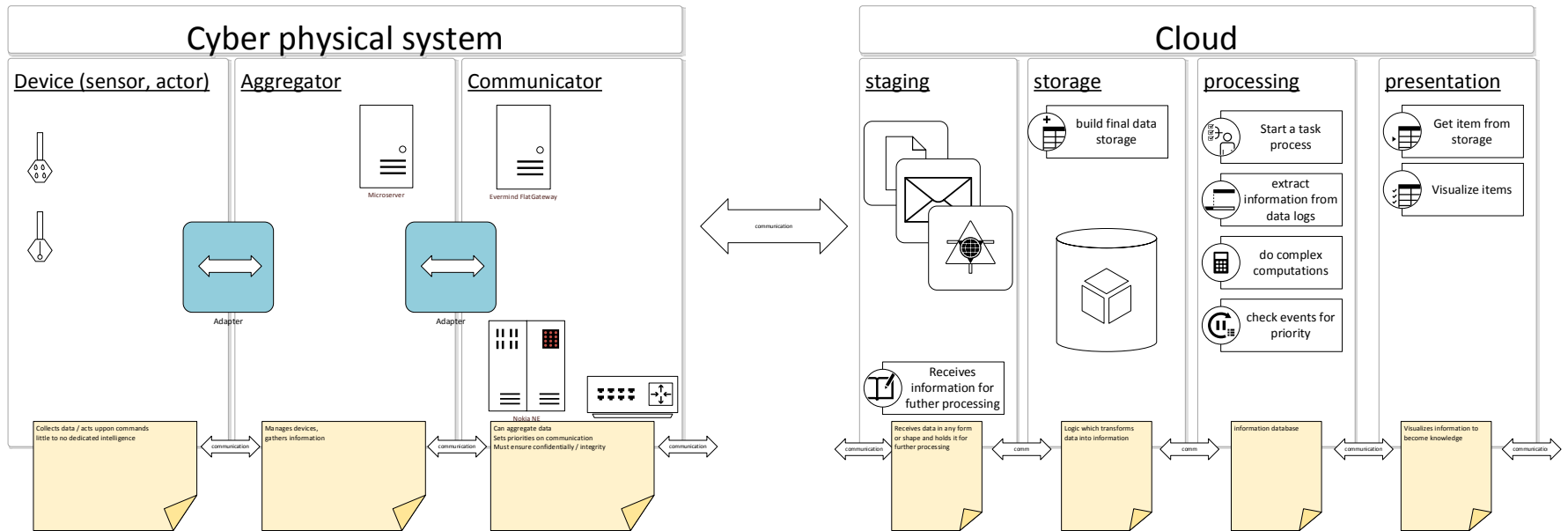▶ **NXP challenge in the Flex4apps project:** To add security to a Flex4Apps framework:

- With minimum invasive changes in existing systems?
- With user determined protection mechanisms to prevent data loss / theft?
- To adjust security levels of data transfers with respect to priority and content

Architectures

Architecture overview

Cyber physical system

Device (sensor, actor)	Aggregator	Communicator

Microserver

Evermind FlatGateway

Adapter · Adapter · Nokia NE

Collects data / acts uppon commands
little to no dedicated intelligence

Manages devices,
gathers information

Can aggregate data
Sets priorities on communication
Must ensure confidentially / integrity

communication

Cloud

staging	storage	processing	presentation

build final data storage

Start a task process

Get item from storage

extract information from data logs

Visualize items

do complex computations

check events for priority

Receives information for futher processing

Receives data in any form or shape and holds it for further processing

Logic which transforms data into information

information database

Visualizes information to become knowledge

communication

Structure of the architecture document

- **2. Architecture**
  - Overview
  - Cloud
    - Staging
    - Storage
    - Processing
    - Presentation
  - Cyber Physical devices
    - Devices
    - Aggregator
    - Communicator
    - Customer business logic
  - Security
  - Software COTS

- **1. Introduction**
  - Short description of FLex4Apps
  - Overview of the document
  - Glossary and abbreviations
  - References
  - Conventions

- **3. Dynamic behavior of the architecture**
  - Workflows
  - Sequences

- **4. Reasons for the architecture**
  - System architecture capabilities
  - Network architecture capabilities
  - Risk analysis

- **5. Requirements traceability**