



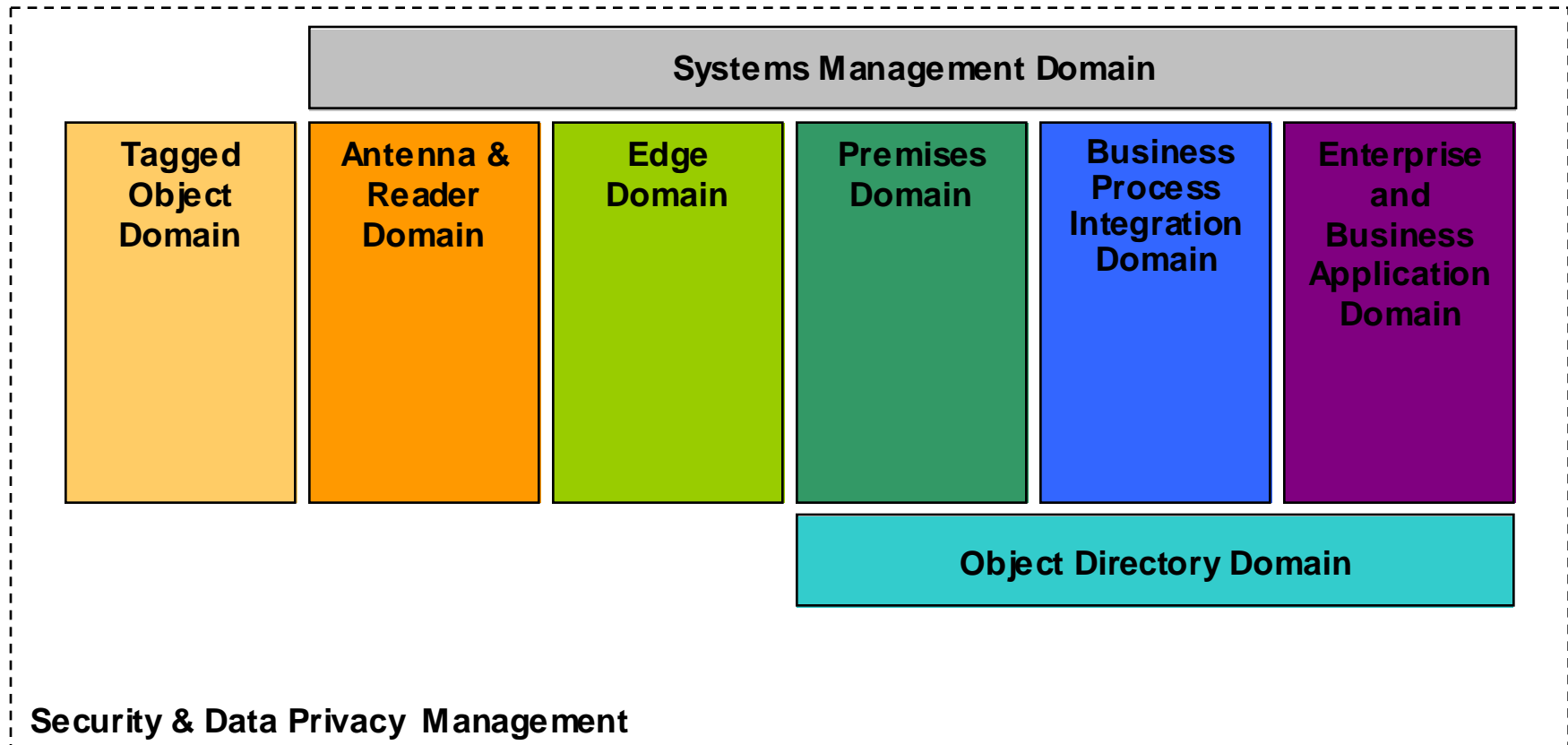
# IBM's Sensor and Actuator Architecture for RFID

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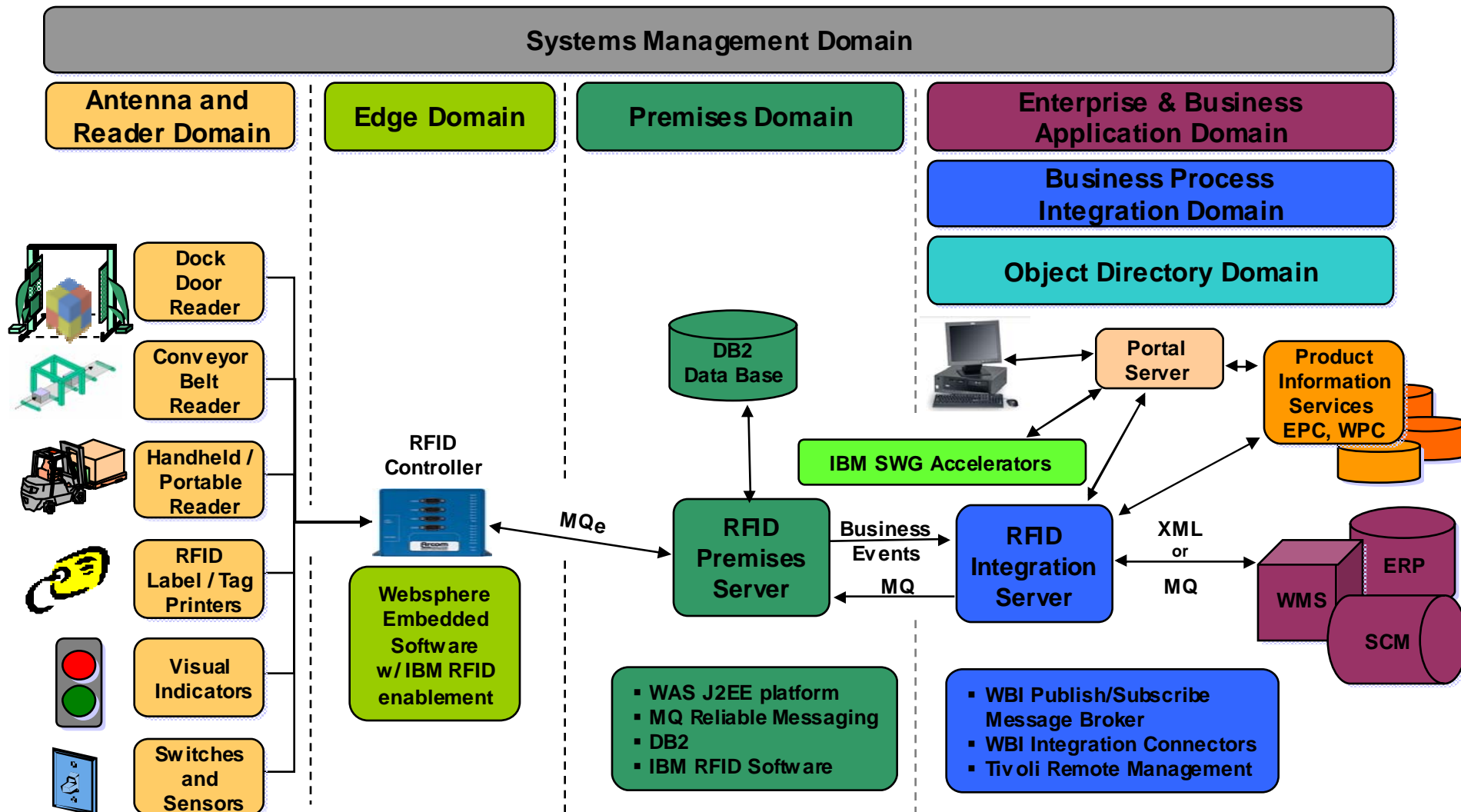
This IBM Statement of Direction, while subject to change, is intended to describe our planned product line in the RFID space, based upon market trends and IBM's perceived customer needs.

# IBM's RFID Architecture Framework

Converts raw RFID data into automatic business decisions



# The IBM RFID High-Level Architecture



Note: Readers, printers, visual indicators, switches/sensors to be provided by third party

# IBM RFID Edge Server

## Edge Domain

### Focus

- Supports multiple downstream RFID readers and other digital I/O devices
- Manages monitoring, configuration, and software/firmware updating of devices
- Isolates all upstream domains from idiosyncrasies of different readers
- Does data filtering close to the readers – keeps raw reader data off of networks
- User programs in this domain can execute quick response tasks - theft detection

### Implementation

- IBM RFID Software bundles
- J9 Java 2 Micro Edition (J2ME)
- SMF/Open Services Gateway Initiative (OSGi)
- Embedded Linux
- Arcom Controller (appliance)

### Features

- Based on Embedded Linux
- Based on Open Services Gateway Initiative (OSGi)
- No keyboard, mouse, screen
- Manages multiple downstream RFID readers
- Manages multiple downstream barcode readers
- Manages multiple downstream digital IO devices
- Provides a flexible set of RFID data filters
- Edge programming model for quick response tasks
- Edge programming for adding new devices
- Built-in device authentication
- Upstream messages sent via reliable message queues

### Benefits

- Secure, reliable platform ensures always-on performance
- Open standards support wide range of applications and devices
- Remote management and update speeds deployment and facilitates use at any location
- Eases the transition from barcodes to RFID tags and simplifies the process of finding only useful information
- Allows new capabilities and devices to be added quickly

# IBM RFID Premises Server

## Premises Domain

### Focus

- Aggregates events and data from multiple downstream RFID Edge Servers
- Creates a updated model of all tagged objects of a single building
- Acts as a second stage filter and only forwards significant business events
- User programs in this domain can execute moderately complex decision tasks
- Maintains a record of which objects were seen where in the supply chain

### Implementation

- IBM RFID software
- WebSphere Application Server – Java 2 Enterprise Edition (J2EE)
- MQ Series - reliable messaging
- DB2 database – dependable long-term event storage
- Linux or MS Windows – flexible deployment choices

### Features

- Based on Java 2 Enterprise Edition (J2EE)
- Manages complex network of Edge Servers & Readers
- Maintains an in-memory image of all objects in building
- Device authentication secures all downstream devices
- Messages sent/received via reliable message queues

### Benefits

- Open standards to support a range of new applications and devices
- Powerful, flexible integration with existing applications enables RFID data to be delivered on demand to enterprise applications
- Single point of control enables secure administration and management of systems in remote locations
- Reduces complexity so that you can focus on products in the supply chain
- Secure, reliable data repository protects valuable data

# IBM RFID Process Integration Server

## Business Process Integration Domain

### Focus

- Aggregates events and data from multiple downstream RFID Premises Servers
- Allows computers to Monitor, Decide, and take action across the entire enterprise
- Acts as single point of integration to enterprise-wide applications
- Supports modeling of business processes and eases RFID process automation
- Support for sharing EPC information with trading partners
- Product Information Management provides a single source of consistent data

### Implementation

- **IBM RFID Software Accelerators (e.g. Pick/Pack/Ship, Three-Way Match Receiving, etc.)**
- **WebSphere Business Integratoin Process Modeler – model “as is” and “to be” processes**
- **WebSphere Business Integration Connect – automatic sending/receiving of EDI docs**
- **WebSphere Integration Server – ready-to-use Enterprise Application Integration (EAI)**
- **AIX or Windows – flexible deployment choices**
- **Extendable to integrate with WebSphere Product Center (Trigo)**

### Features

- Business Objects
- Services oriented architecture
- Common Integration Framework
- Adapter Framework
- Java 2 Enterprise Edition EAI
- Browser based GUIs
- Tooling

### Benefits

- Automates and coordinates business process activities that use RFID data to speed supply chain processes and reduce operating costs
- Connects business systems with multiple trading partners
- Delivers RFID data to enterprise applications within and outside the enterprise
- Provides tooling to design, test, deploy and manage new business process solutions that enhance the value of RFID information
- Manages product information from multiple sources (applications, files, web, etc.) to provide consistent, complete data for use in RFID enabled solutions