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Putting RFID to Work

May 2, 2006



Key Considerations to Ensure a Successful RFID Implementation

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Agenda

- What do you want to do and how do you get there?
- Key Considerations
 - Extensible software platform
 - Enterprise network management
 - Scalability – ability to grow
- Case Studies
- Summary

What do you want to do?

- Address a host of business issues
 - Track assets or patients within your four walls?
 - Ensure patient safety (medication, equipment, etc)?
 - Know what shipments are available outside of your four walls?
 - Ensure the authenticity of the inventory?
- Select technologies that allow incremental adoption
 - Flexible, extensible, scalable, secure
- Get started now
 - Get technology in-house

Where are we now?

- Research and education
 - Understanding technology options and business drivers
- Pilots, proof-of-concepts
 - Single sites, single network
 - Typically one vendor, limited devices
- 2nd generation technology has emerged
 - EPCglobal Gen2 protocol
 - 2nd generation hardware and software
- Continued business justification
 - Reduction in component costs
 - Increase in maturity and reliability

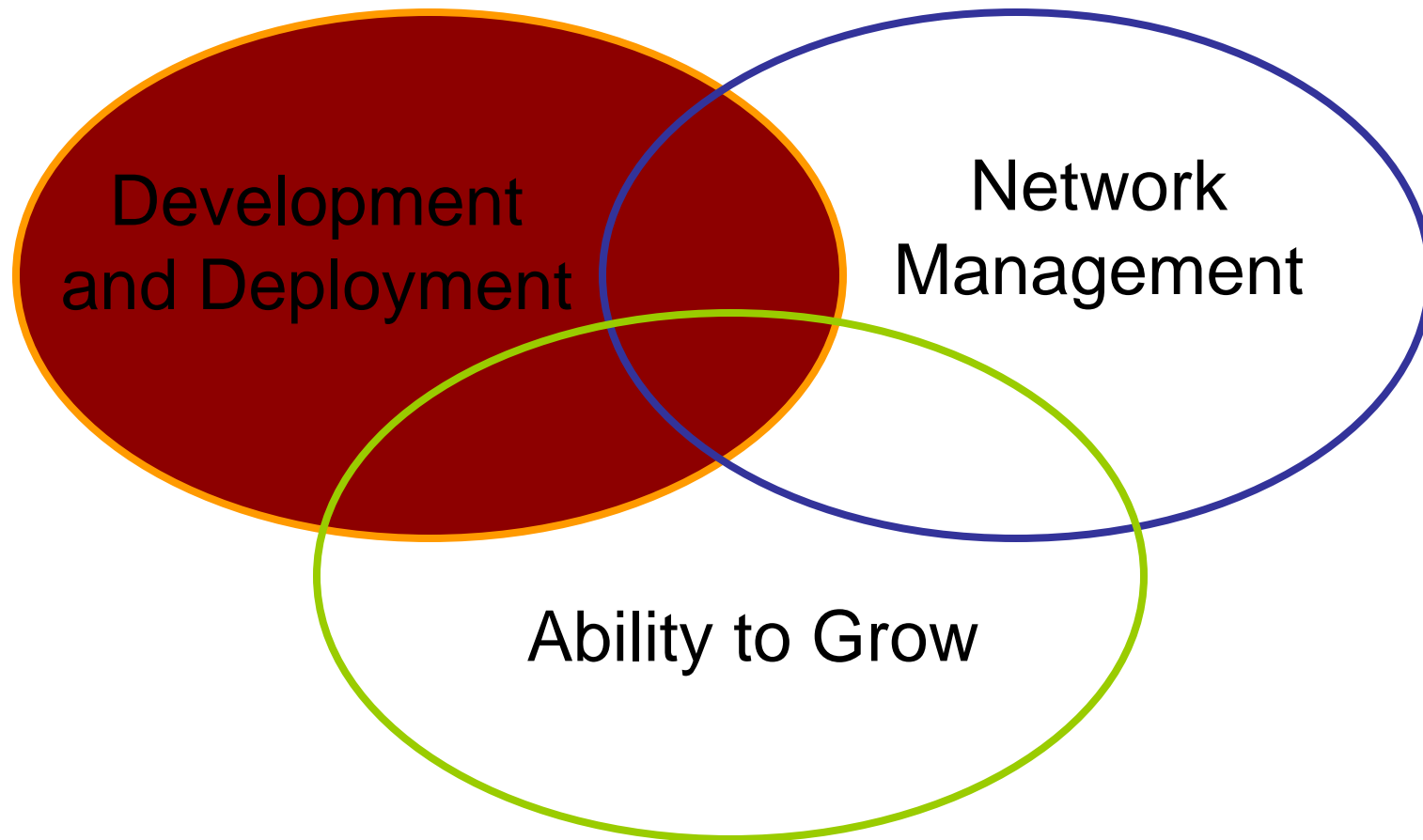
What challenges might you run into?

- Changing RFID landscape
 - Require abstraction from standards, protocols, and hardware offerings
 - Integrate varying technologies (barcodes, active and passive RFID, RTLS, sensors, PLCs)
- Network management
 - 20 devices – you **could** have a management problem
 - 100+ devices – you **do** have a management problem
- Integration with existing systems
 - Both hardware and software
- Start-up/growth costs for RFID implementations

Who will help you along the way?

- Standards Bodies
 - EPCglobal - Electronic Product Code (EPC) specification
 - International Organization for Standardization (ISO)
- Hardware Vendors
 - RFID (i.e. ThingMagic, AWID, Symbol, Zebra, Printronix)
 - PLCs, sensors and peripherals (i.e. motion sensors, LED displays)
- Software Vendors
 - Middleware providers (i.e. Sybase iAnywhere)
 - Enterprise Applications (i.e. SAP, WMS)
- System Integrators
 - Network level and Application level

What do you need from your software?



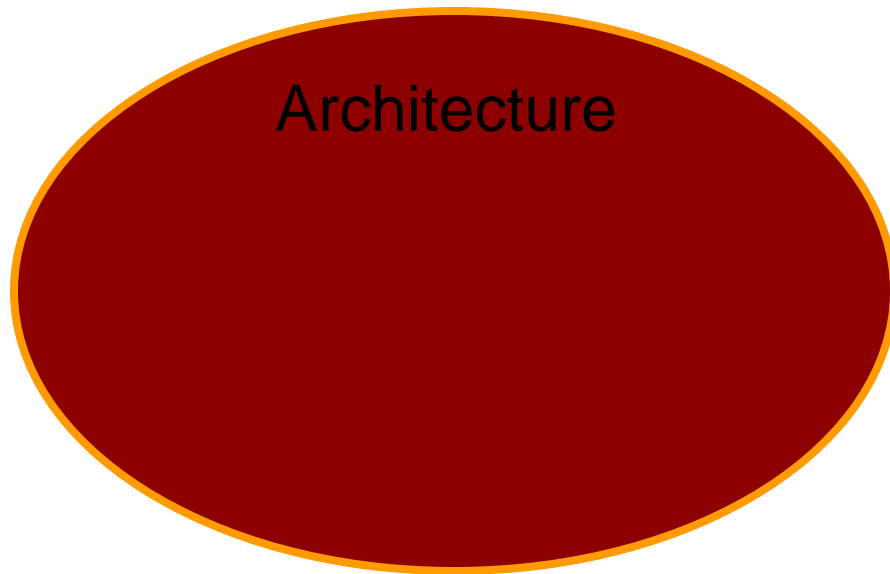
Development and Deployment



RFID Middleware

- Handles data movement from readers to enterprise systems while adding business value
- Abstracts low-level hardware, standards and protocols
- Provides development options and tools to make developers and integrators successful
- Seamless integration of components to create a complete RFID network

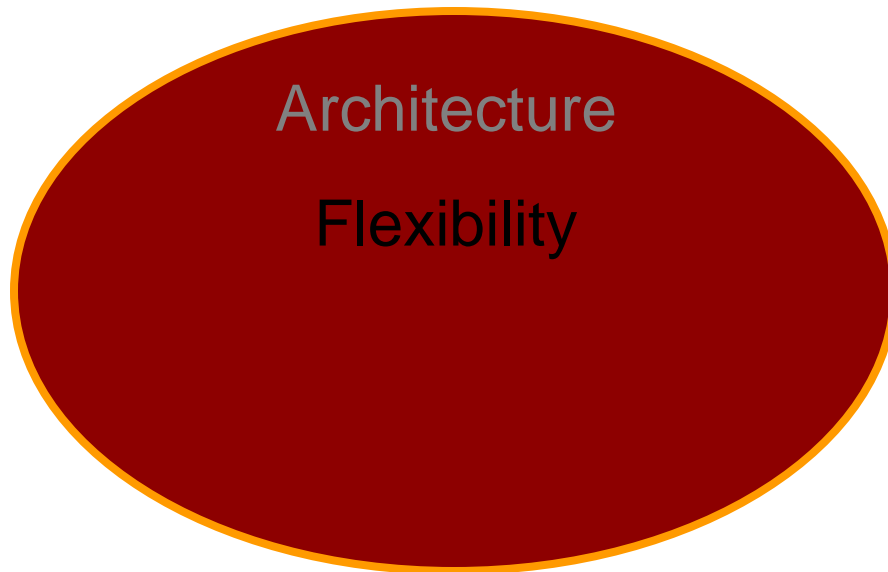
Development and Deployment



- Distributed vs centralized
 - Filtering, data aggregation and logic execution
 - Network connectivity
 - Resource efficiency
- Management function
- Real-time automation control and error recovery



Development and Deployment



- Application development
 - Application Level Events (ALE)
 - Multi-protocol reporting
- Enterprise integration points
 - HTTP(s), MSMQ, SMTP, SOAP, UDP, TCP, files
- Service Oriented Architecture (SOA)
 - Web Services

Development and Deployment

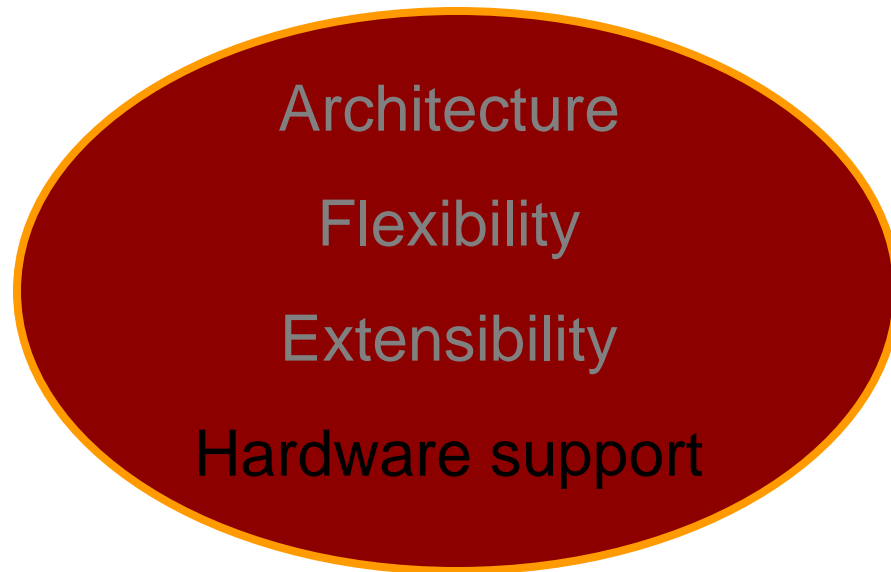
Architecture

Flexibility

Extensibility

- Dynamic support for new tag formats (including custom data)
- Ability to add custom logic to extend functionality

Development and Deployment



- Single API to interact with wide range of RFID hardware
 - Developers focus on creating business logic and value
- Build robust, flexible, future-proof solutions
 - No hardware, standard, or protocol lock-in
- Support for EPC, ISO and proprietary/custom tags
 - Allows for flexible choices in tag and hardware selection
 - Support of current standards, with flexible architecture to support future standards

Network Management

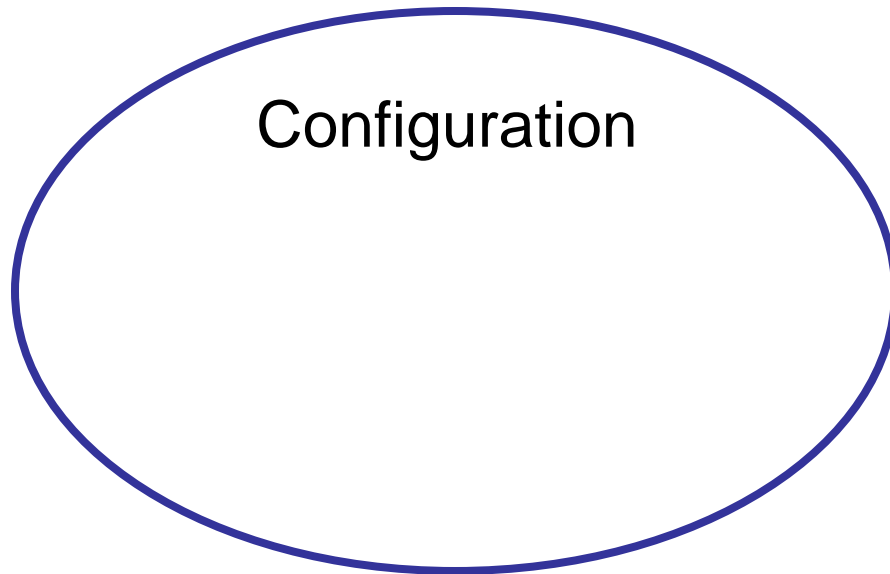
- Central management of entire RFID network even across distributed locations
- Provisioning, version control and patching
- Real-time administrator alerts



**Enterprise
Manager**

Network Management

- Exposes all hardware properties from visual console
- Ability to define configuration groups and profiles and apply settings to group members
- Define roles that provide specific access according to permissions



Network Management

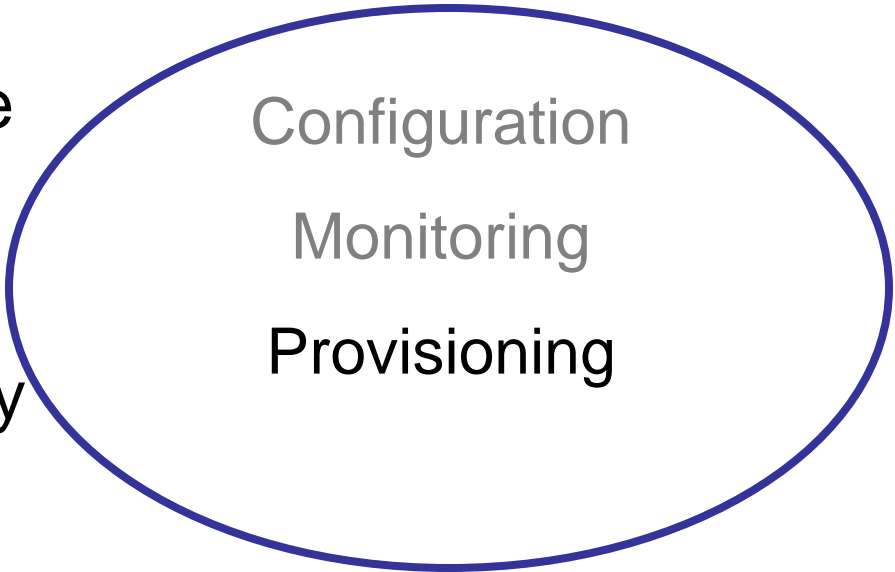
- Ability to monitor and troubleshoot malfunctioning readers
- Proactive repair before network failure
- Replacement hardware automatically configured based on profile data



Configuration
Monitoring

Network Management

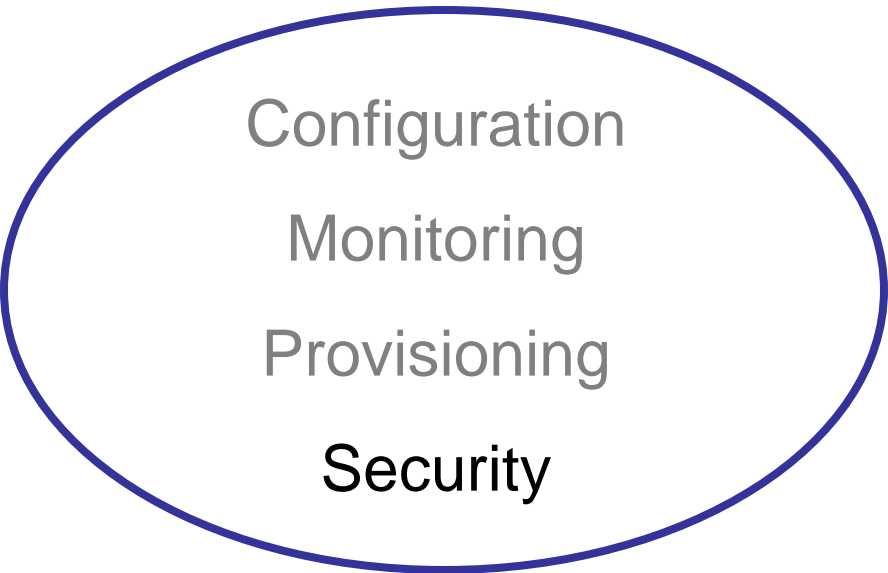
- Application Logic
 - To local and remote locations
- Device firmware
 - Where supported by hardware vendor
- Supporting applications



Configuration
Monitoring
Provisioning

Network Management

- Authentication
 - Users must log in before gaining access to network
- Authorization
 - Based on pre-defined roles
- Transport encryption



Configuration
Monitoring
Provisioning
Security

Ability to Grow

- The ability to grow your deployment without having an adverse affect on performance
- Includes network complexity, business logic, remote locations, management



Scalability

Ability to Grow

- Increase number and type of devices
- Add new antennas for additional read points
- Modify/add tag types being monitored



Increased functionality

Ability to Grow

- Repeat same configuration at other location
- Require management capability to handle remote locations

Increased functionality

Add new locations

Ability to Grow

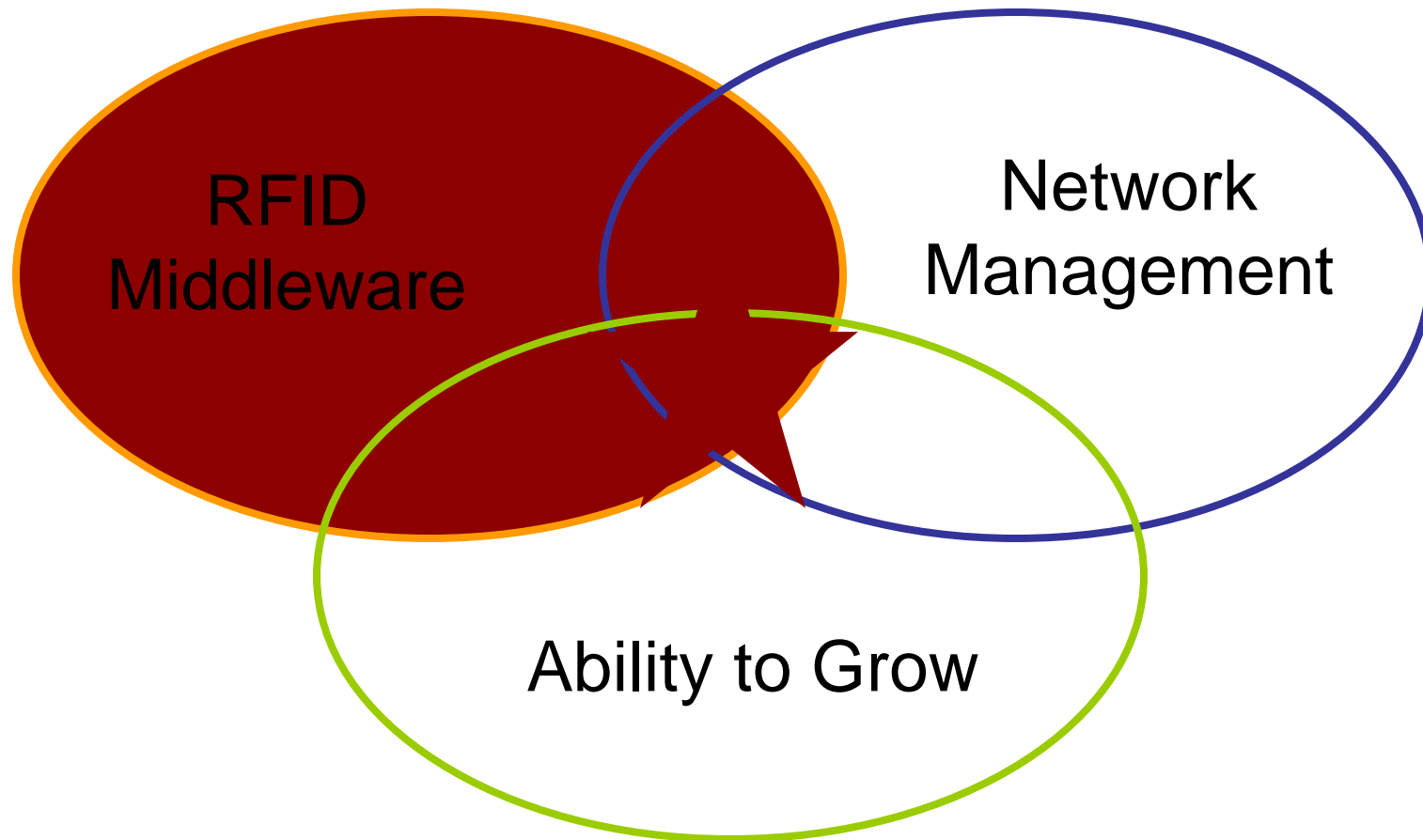
- New applications that subscribe to and process data from current network
- New applications using new, dedicated hardware
- New applications that use existing hardware to provide additional value

Increased functionality

Add new locations

Add new applications

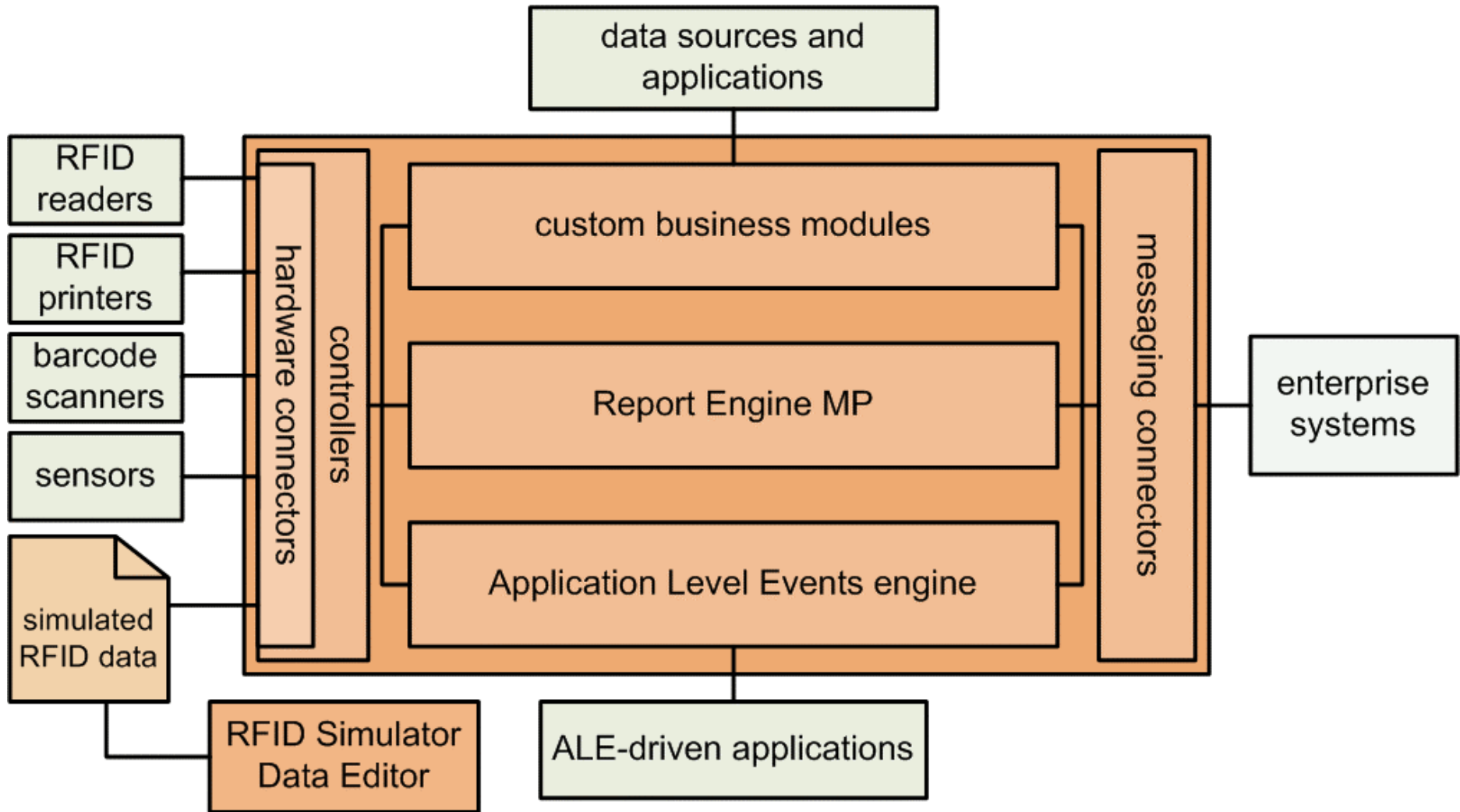
Software Platform Sweet Spot



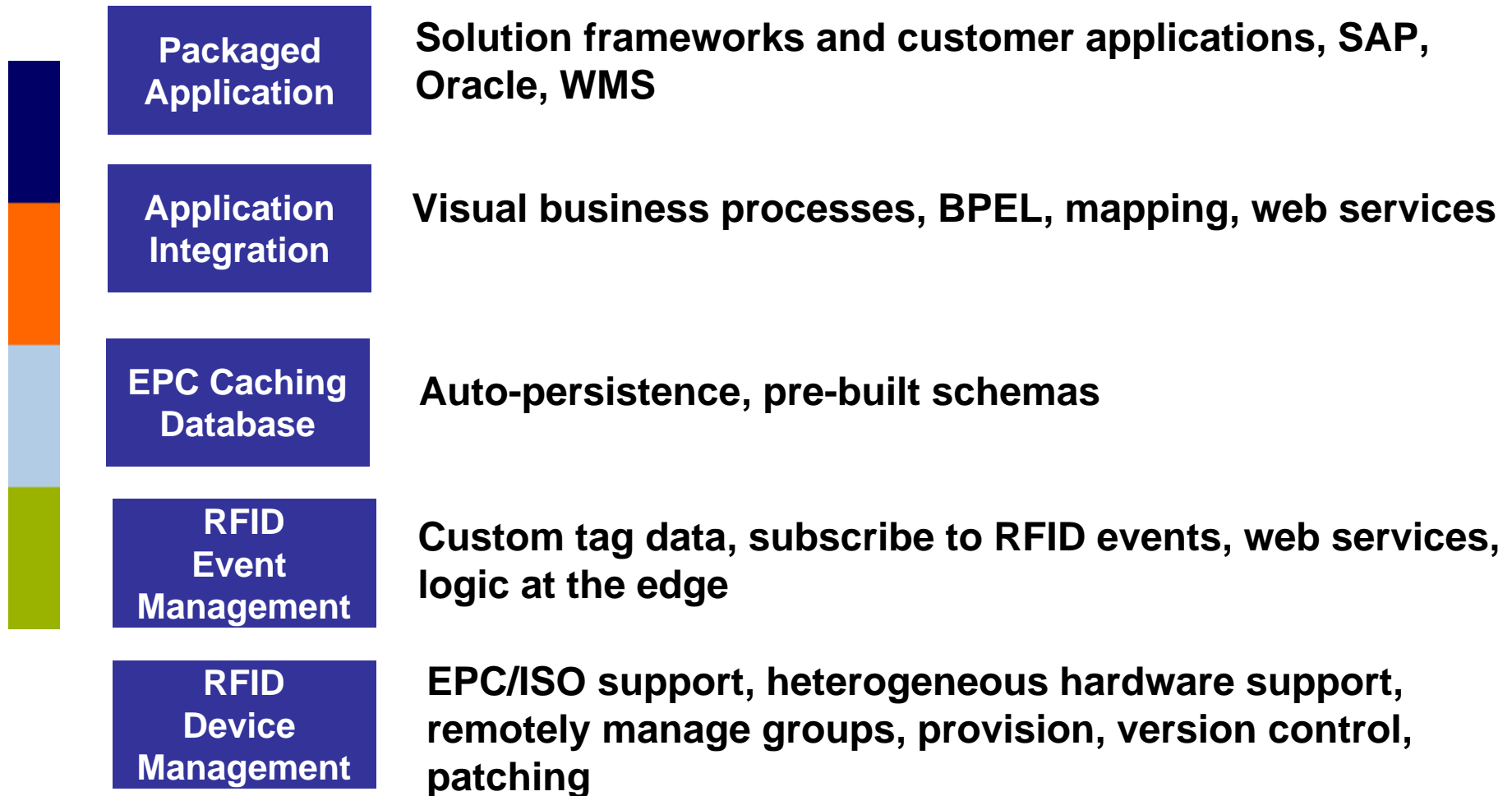
Optimal Solution Environment

- Distributed environments with centralized management
 - Processing at edge, mobile devices, and data center
 - Support for occasionally-connected environments with guaranteed data delivery
- Support for many diverse devices
 - Not only RFID, but also barcode, PLCs, sensors and controllers
 - Single management interface
- Multiple applications to be interfaced
 - Ability to add new application to existing hardware
 - Codeless orchestration and rules creation
 - Visual environment or direct web services
- Complex data structures/relationships
 - Extensible RFID data schema: linking and external repository

Flexible Software Architecture



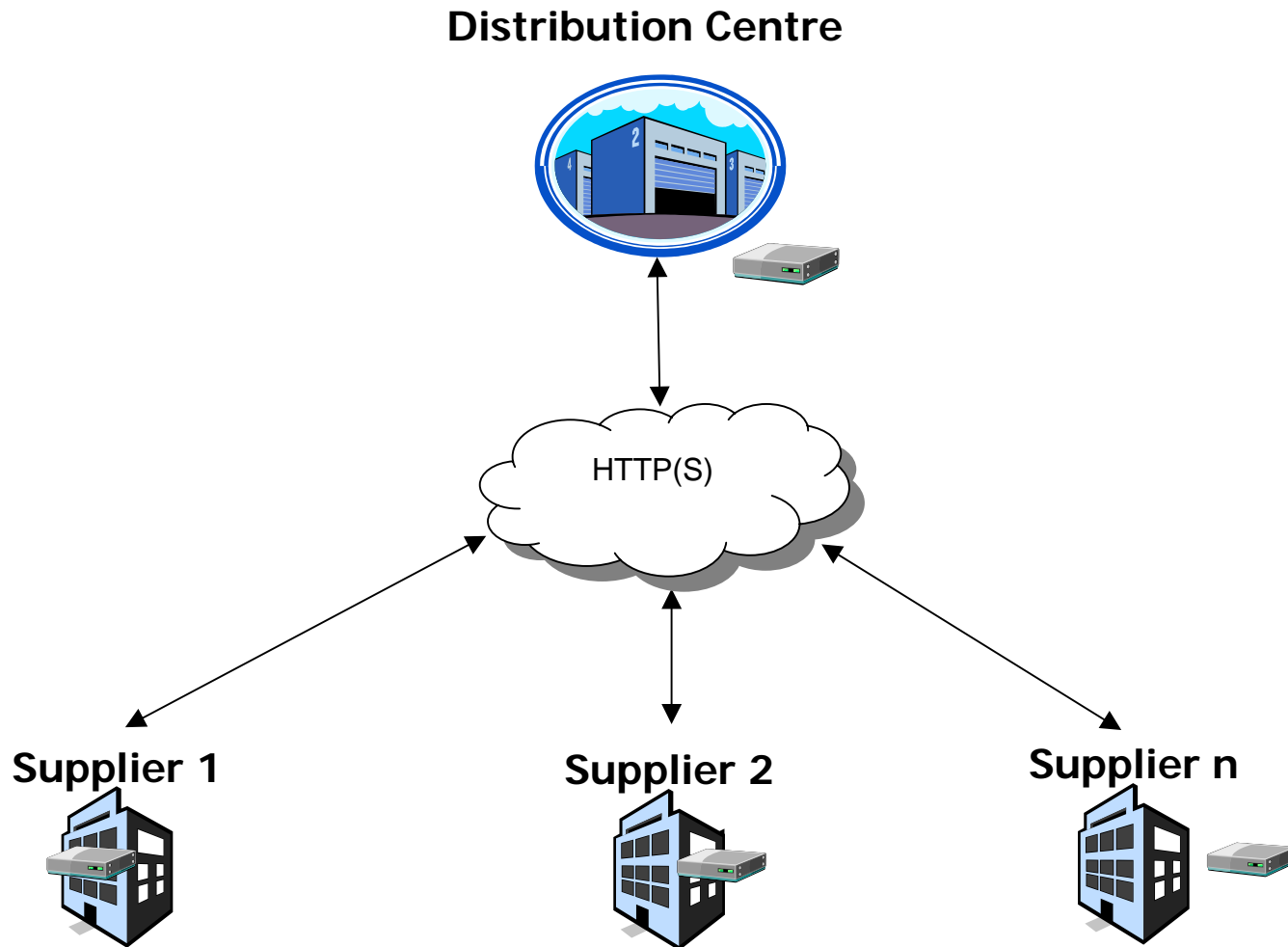
Complete RFID Stack



Case Study #1 – Asset Tracking

- Requirements
 - Ability to track both high value and low value assets within a single solution
 - Management of the hardware and software from central location
 - Alerting capabilities based on custom business rules
 - Ability to persist, query and represent asset location
- Solution
 - RFID Anywhere Location Information System
 - Integrates a variety of technologies (Passive/Active RFID, RTLS)
 - Hardware management & monitoring
 - A single infrastructure to calibrate locations and coordinates

Customer Case Study #2



Case Study #2 – Shipping/Receiving

- Requirements
 - Local processing of data, logic
 - Support for multiple hardware platforms
 - Guaranteed delivery of data from supplier sites to distribution centre
 - Management of entire network from central location
 - Simplified way to add new sites to network
- Solution
 - RFID Anywhere implemented at each supplier site
 - Provides abstraction over hardware layer to easily support multiple hardware vendors
 - Enterprise Manager and Site Managers for network management
 - SQL Anywhere at supplier sites
 - SQL Anywhere database for storage
 - QAnywhere and MobiLink for data synchronization to distribution centre

RFID Scorecard for Evaluators

- **Management**

- Provision parameters of heterogeneous devices (RFID readers and printers, barcode scanners, intelligent sensors and controllers)?
- Ability to provision business rules centrally to a distributed environment?
- Ability to monitor and manage the RFID network?

- **Development**

- Existing Business Logic out of the box: Commissioning, Order Entry, Tag printing self-service
- Ability to place logic at the edge (fixed), the edge (mobile), and centrally (data center)?
- Abstracted from ISO and EPC standards?
- Choices of webservices and/or BPI (visual) in an integrated fashion and “RFID-aware”
- Abstracted from heterogeneous hardware?
- Ability to handle custom tag data?
- Ability to simulate your RFID environment (test without hardware)?

- **Business Process and Integration**

- Based on Web Services (e.g, register and be notified of RFID events directly in your application).
- Ability to transition from RFID events to business events (BPEL) and processes?
- Ability to map business processes to logical groupings of readers?
- Ability for business processes to ‘hand shake’ application adapters, web services, databases, and a variety of queues (flavors of JMS).

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