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# Agenda

- RFID Overview
  - History and Uses of RFID
  - RFID Concepts
  - Why is RFID so important today?
  - Components to an RFID System
- Rifidi Introduction
  - What is Rifidi?
  - Why is it Useful?
  - Getting Started Today

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# Introduction

- Who is Pramari?
  - Leading US Based RFID Software and Consulting Company
  - Member of EPCGlobal (Standards Group for RFID)
  - Partnered with leading Software Providers (IBM, Oracle)
  - Leading Hardware Partners (AWID, Alien, Identec)
  - Real Project Implementations (Gillette, Best Buy, UTC, Staples)
- About Prasith
  - RFID Veteran with over 7 years in RFID field
  - Architect of earliest EPC RFID implementations and middleware
  - Member of EPC Global Committees for software standards
  - Subject Matter Expert and Exam Reviewer for RFID Certification Exam

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# What is RFID?

- Radio Frequency IDentification

- A solution to many problems in many different industries?
- An old technology that has found new life in Supply Chain Applications?
- A means of ensuring holiday sales promotions work?
- Every gadget head's dream come to life?



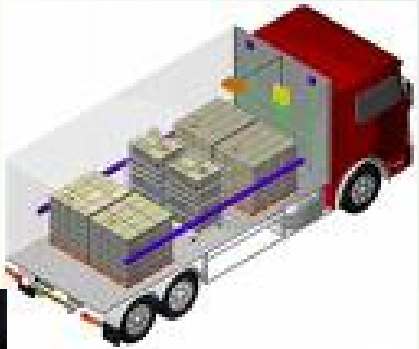
# Where did it come from?

- RFID is not a new idea!

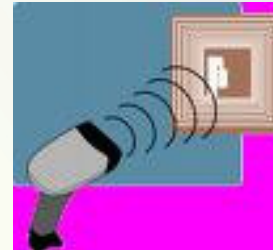


During WWII, an Identification Friend or Foe (IFF) system was developed to distinguish Allied aircraft from German aircraft.

# Common Uses for RFID today



# Bar Code versus RFID

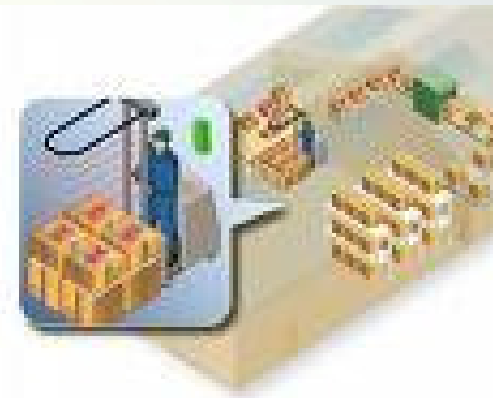


- General visibility
- Batch processing
- Identifies SKUs
- Visible
- Exposed
- Operator intervention
- Read/only

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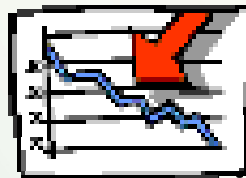
# What does this mean to me?

- Improve product availability
- Reduce theft and counterfeiting
- Increase inventory accuracy
- Streamline logistics efficiency
- Improve business forecasting and planning
- Measure supply chain efficiency and highlight problem areas
- Reduce inventory stuck in the supply chain
- Reduce service costs
- Identify location of specific items
- Allow focus on costly process exceptions
- Reduce labor “touches”
- Increases material handling speeds



# Why is RFID So Hot Now?

- Proven technology
  - Commercial applications date back to 1960's
  - RFID makes it possible to automate manual tasks:
    - Toll Collection
    - Inventory control
    - Supply Chain monitoring
    - Many others
- Cost per unit (tags) has dropped dramatically



Lower operating costs

# Who's Using RFID?

- Hospitals
- Pharmaceuticals
- Retail
- Transportation
- Access Control

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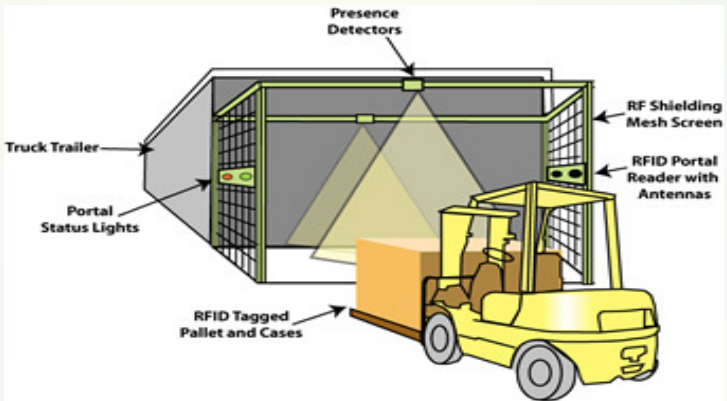
# Other Industries

- Amusement Parks
- Ski Resorts
- Shared Asset Management
- Border Patrol
- Compliance
- Garbage Collection
- Other

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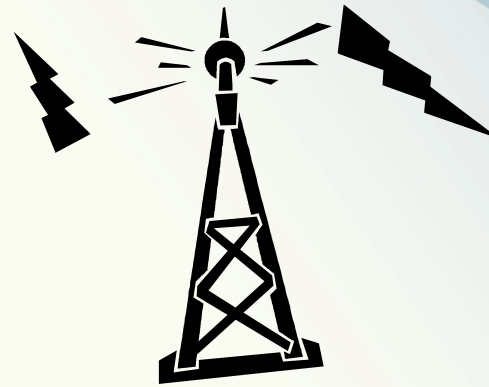
# Where is RFID going tomorrow?



# Basic RFID Concept

An interrogator unit, called a READER transmits a signal to a transponder, called a TAG.

The tag responds with a pre-programmed data transmission, which the reader receives and decodes.



# What makes it tick?

- Tags



# What makes it tick?

- Interrogators



# What makes it tick?

## Antennas

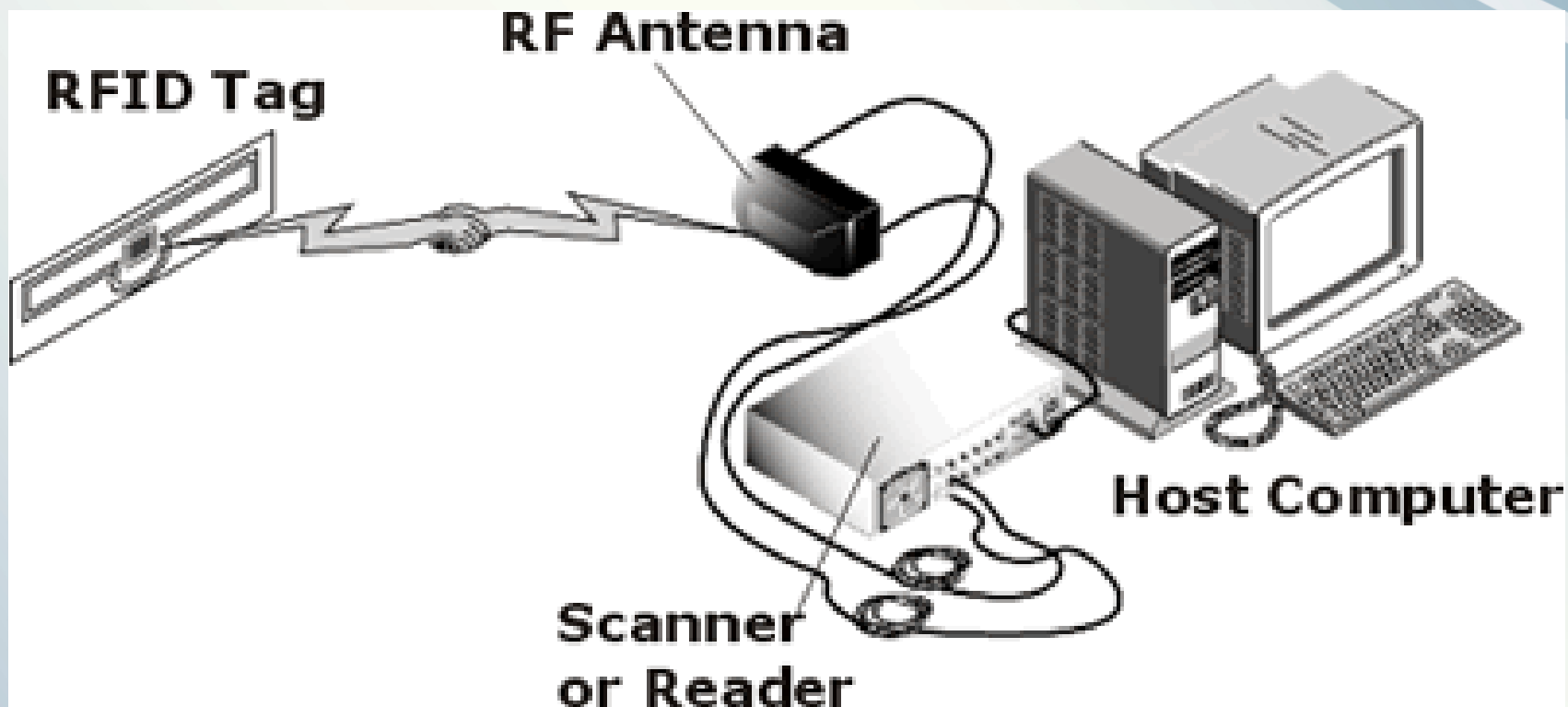


# What makes it tick?

- Systems Management Software

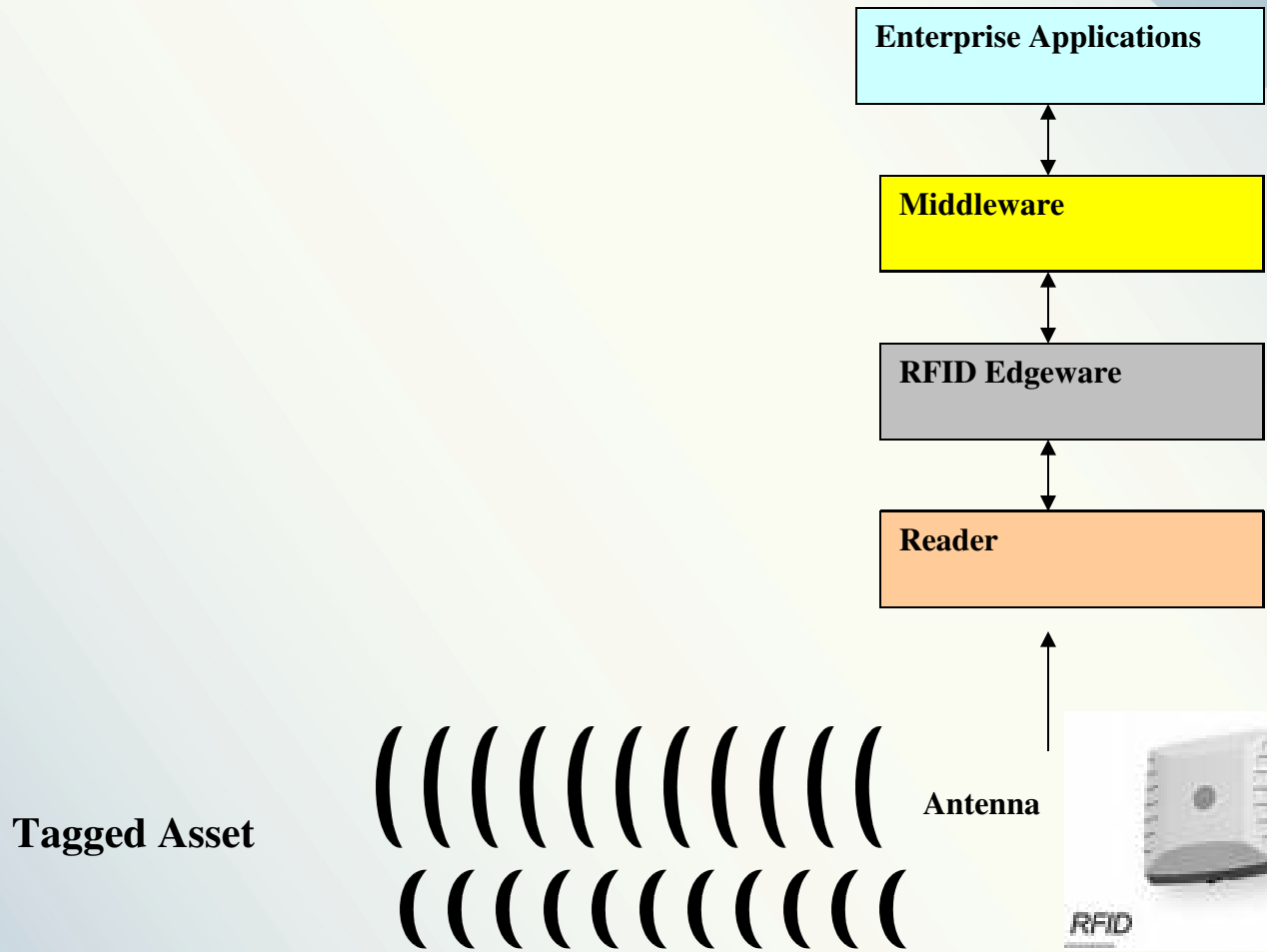


# RFID System Components



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# RFID System Block Diagram



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# Roles of Middleware

- Filtering and collection
- Data communication
- Integration
  - EPCglobal standards
  - ALE
  - ERP Systems

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# What is Rifidi?

- Rifidi is a complete RFID Application Platform
  - Leading set of Prototype and Testing Tools
  - Open Source RFID Middleware Platform
  - ALE and Workflow development tools
  - Based on Eclipse and OSGI w/ Lightweight Emphasis
  - Open Source Ideals – Business Ready Purpose
- Rifidi is an open source RFID community
  - Numerous Contributors – UofA, PennState, IBM, FossTrak
  - Corporate and University Usage – PennState, IBM, HP
  - Over 25,000 downloads strong, Active Forums
  - Developer Contributions to LLRP-TK and other RFID toolkits

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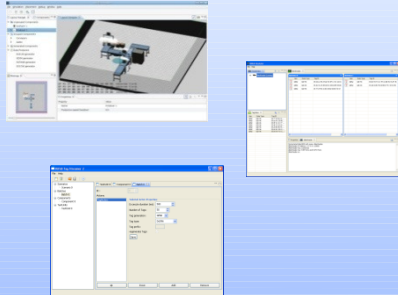
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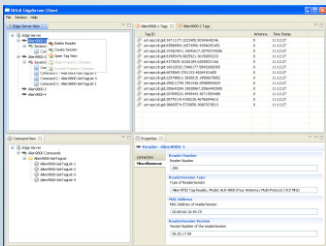


# Rifidi Product Suite

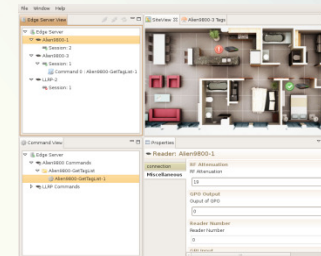


**Rifidi**  
~~ToolKit~~ Designer  
Rifidi Emulator  
Rifidi Tagstreamer

## Rifidi Workbench



## Rifidi EdgeServer



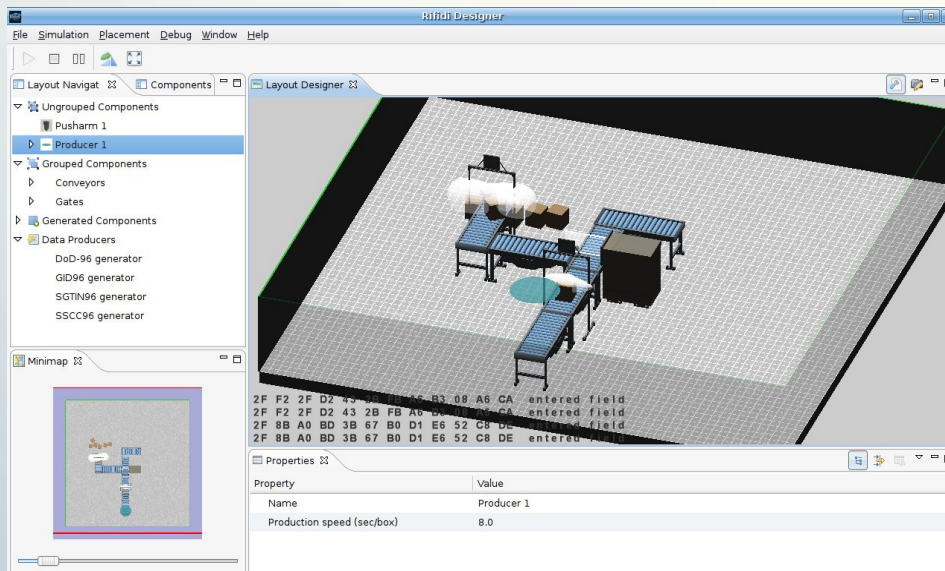
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# Rifidi Toolkit

## “Software Defined RFID”

- The premier Prototyping Suite in RFID today
  - Designer – Create Visual Workflows to simulate RFID Processes
  - Emulator – Develop and Test with Software Defined Readers
  - Tag Streamer – Load Test and simulate large RFID data streams



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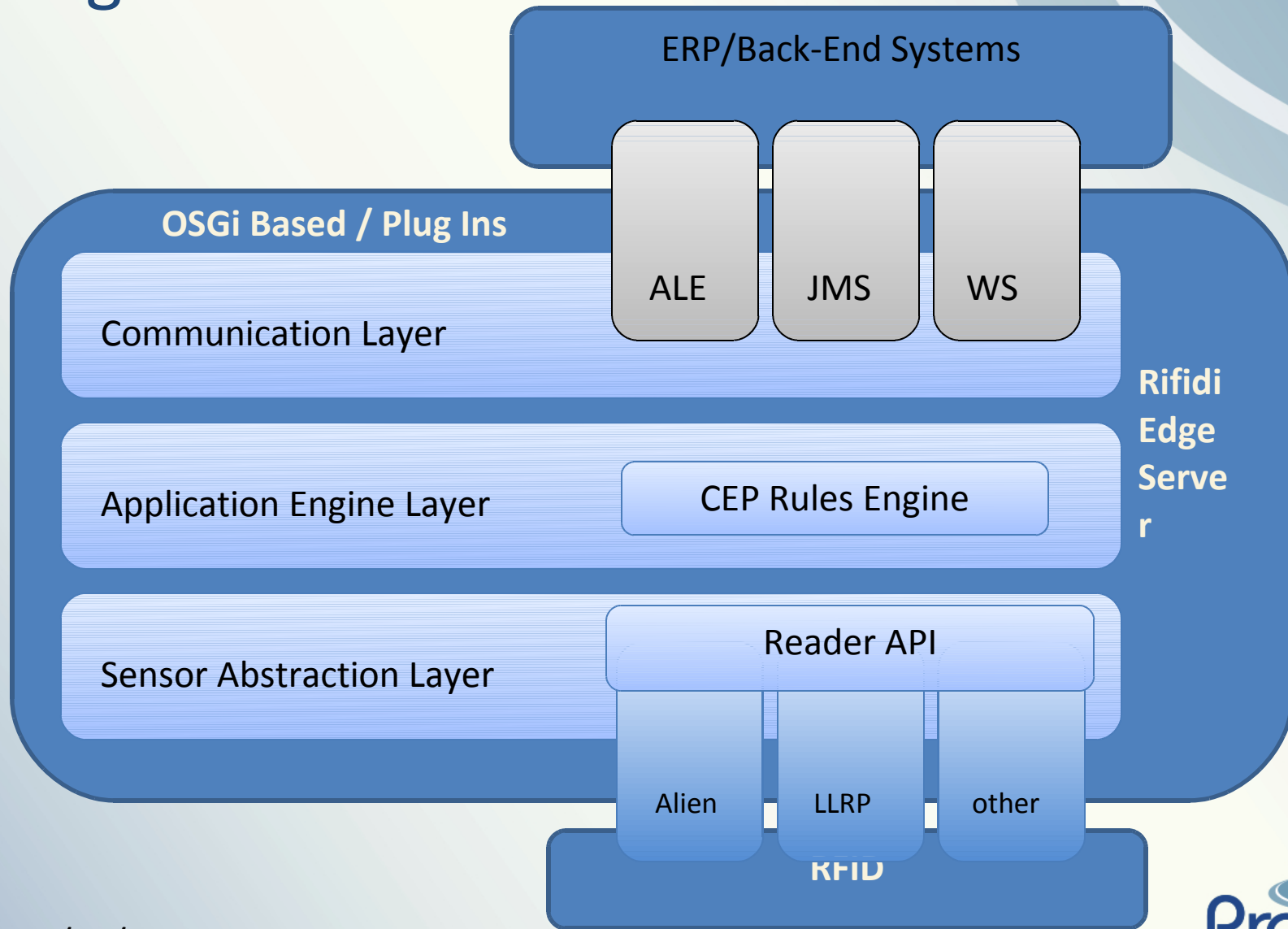
# Rifidi Edge Server

- Cutting edge RFID Middleware Platform
  - Lightweight, High Performance Platform based on OSGI and Java
  - Built with module update and hot deploy features
  - RFID customization of high performance CEP/ESP Engine (Esper)
  - Standards compliant ALE Engine built on top of Esper and FossTrak TDT
  - Combine ALE and CEP modules to create dynamic RFID applications
- Supported by Development & Monitoring Tools (Future)
  - Close integration to our Prototyping Suite
  - Eclipse Based tools to develop RFID Workflows
  - Eclipse and Web Based Monitoring tools for Production Operations
  - Sophisticated Notifications and Alerts definition toolkit

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# Edge Architecture



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# Putting it all Together

- Start Prototyping with Rifidi Toolkit
  - Try scenarios and put together quick demo's
  - Keep the scenarios for virtual testing later
- Develop RFID applications with Rifidi Edge Server
  - Create custom java applications using our Sensor Abstraction Layer
  - Create custom applications using our customized rules engine
  - Leverage platform for communication and integration
- Use Rifidi Workbench to ease development and Monitoring
  - Use Workbench to create standard ALE applications
  - Visually set up readers and data collection methods

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# Sensor Abstraction Layer

The screenshot displays a software application window titled "Sensor Abstraction Layer". The interface is organized into several panes:

- Edge Server View:** A tree view showing the hierarchy of edge servers. Under "Edge Server", there are three main nodes: "Alien9800\_1", "Alien9800\_2", and "LLRP\_1". Each of these nodes has a "Session: 1" sub-node, which in turn contains a "Command 0" sub-node. The commands are: "Alien9800\_GetTagList\_1" for Alien9800\_1, "Alien9800\_GetTagList\_1" for Alien9800\_2, and "LLRP\_GetTagList\_3" for LLRP\_1.
- Command View:** A tree view showing command categories and instances. Under "Edge Server", there are "Alien9800 Commands" and "LLRP Commands". "Alien9800 Commands" includes "Alien9800-GetTagList" with an instance "Alien9800\_GetTagList\_1". "LLRP Commands" includes "LLRP-CreateROSpec", "LLRP-DeleteROSpec", and "LLRP-GetTagList", each with their respective instance names.
- SiteView:** A 3D rendering of a building floor plan, showing rooms, furniture, and various sensors or devices placed throughout the space.
- Properties:** A configuration panel for a selected "Reader: Alien9800\_1". It has tabs for "connection", "General", "GPIO", and "Miscellaneous". The "connection" tab is active, showing fields for "IP Address" (127.0.0.1), "Port" (20000), and "Username" (alien).

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# ALE Development View

The screenshot displays the ALE Development View software interface. At the top, there is a menu bar with 'File', 'Window', and 'Help'. Below the menu bar, the main window is titled 'ALE - Sensor'. The interface is divided into several panes:

- ECSpec View:** A tree view showing the hierarchy: ALE Server > ECSpec: ECSpec > Logical Readers > Alien9800\_1, Alien9800\_2, and Subscribers (highlighted) > 127.0.0.1:10000.
- Logical Reader View:** A list of logical readers: Alien9800\_1, Alien9800\_2, Dock\_Door (with sub-items Alien9800\_1 and Alien9800\_2), and LLRP\_1.
- ECSpec:** A configuration panel for the selected logical reader. It includes:
  - Reporting:** 'Set the properties for the reports.' Name: 'NewReport', Report Set: 'CURRENT'. Options: 'Report if Empty' (unchecked), 'Report only on Change' (unchecked).
  - Output Options:** 'Set the properties for the reports.' Options: 'Include Tags' (unchecked), 'Include EPC' (checked), 'Include Raw Hex' (unchecked), 'Include Raw Decimal (deprecated)' (unchecked), 'Include Tag Count' (unchecked).
  - Filters:** 'Set the filtering criteria. Enter one pattern per line.' An 'Exclude Patterns' text area with a scroll bar.

At the bottom of the window, there is a status bar with 'Edit Reports(72)'.

# Licensing and Support

- Rifidi Toolkit
  - Currently LGPL licensed - soon to be EPL for more flexibility
  - Currently available for download
- Rifidi Edge Server
  - GPL Licensed for standard version
  - Can be dual licensed for OEM's
  - Started Closed Beta program on June 15th, 2009
  - Full Version available in October with Support and Consulting
- Rifidi Workbench
  - Currently LGPL – will be EPL on release
  - Started Closed Beta Program on June 15th, 2009
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