

RFID State of the Industry:

Applications, Users and Technologies

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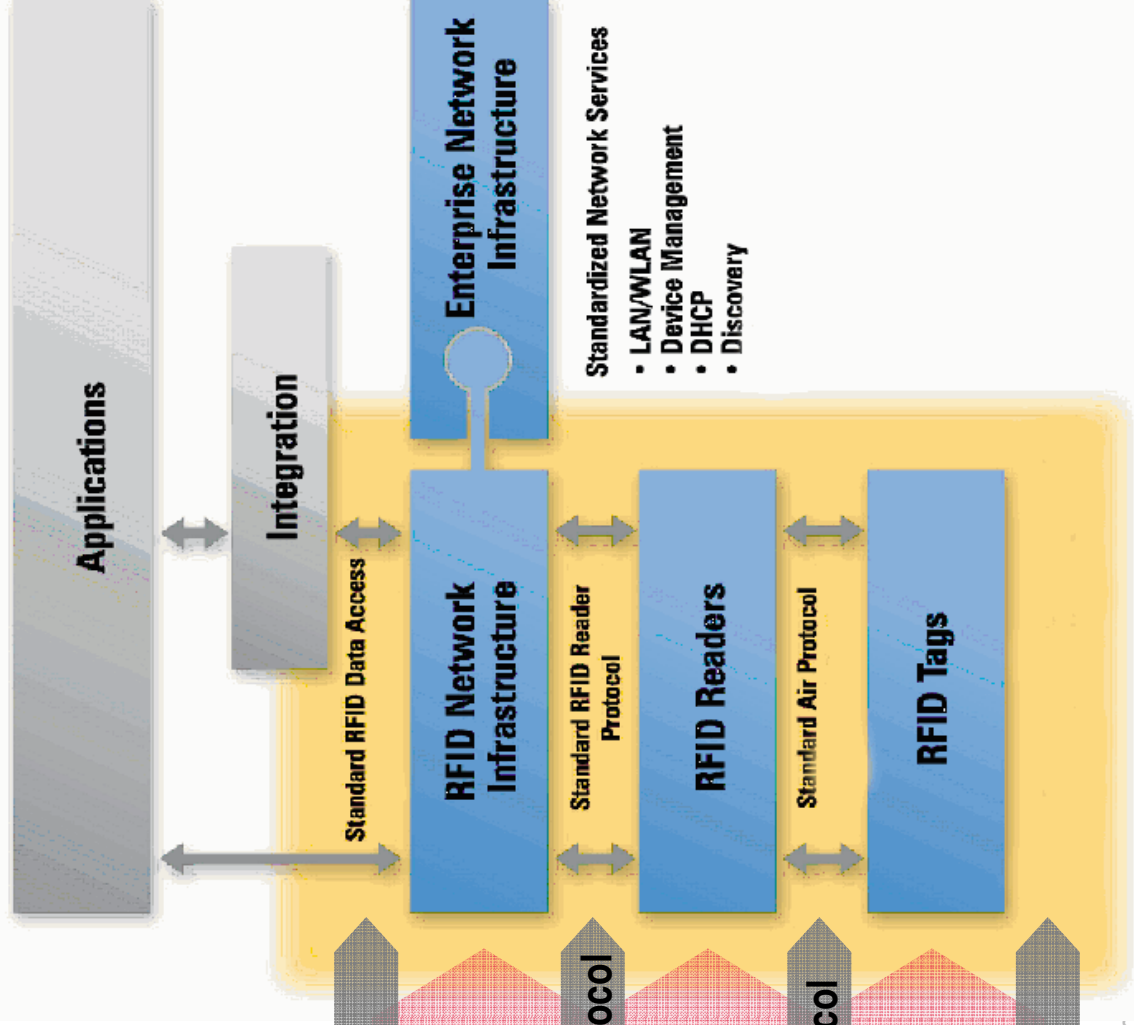
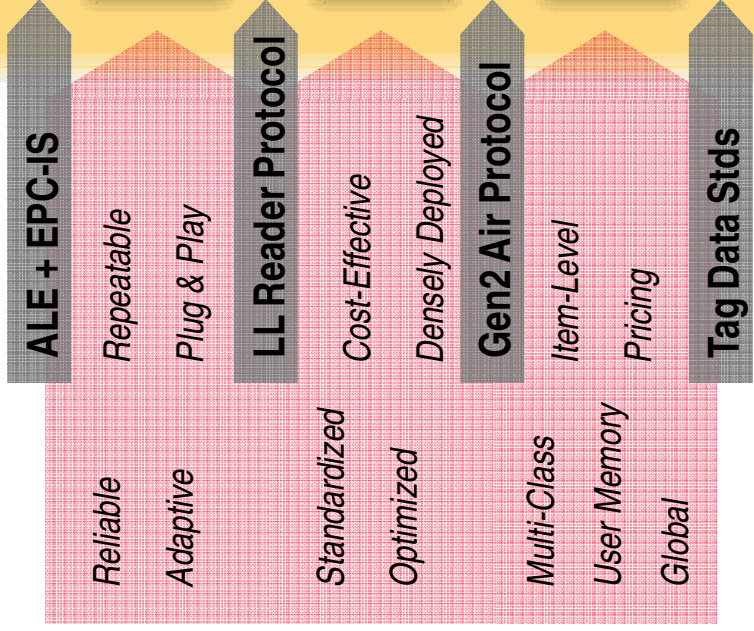
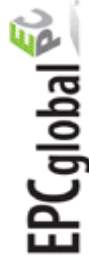
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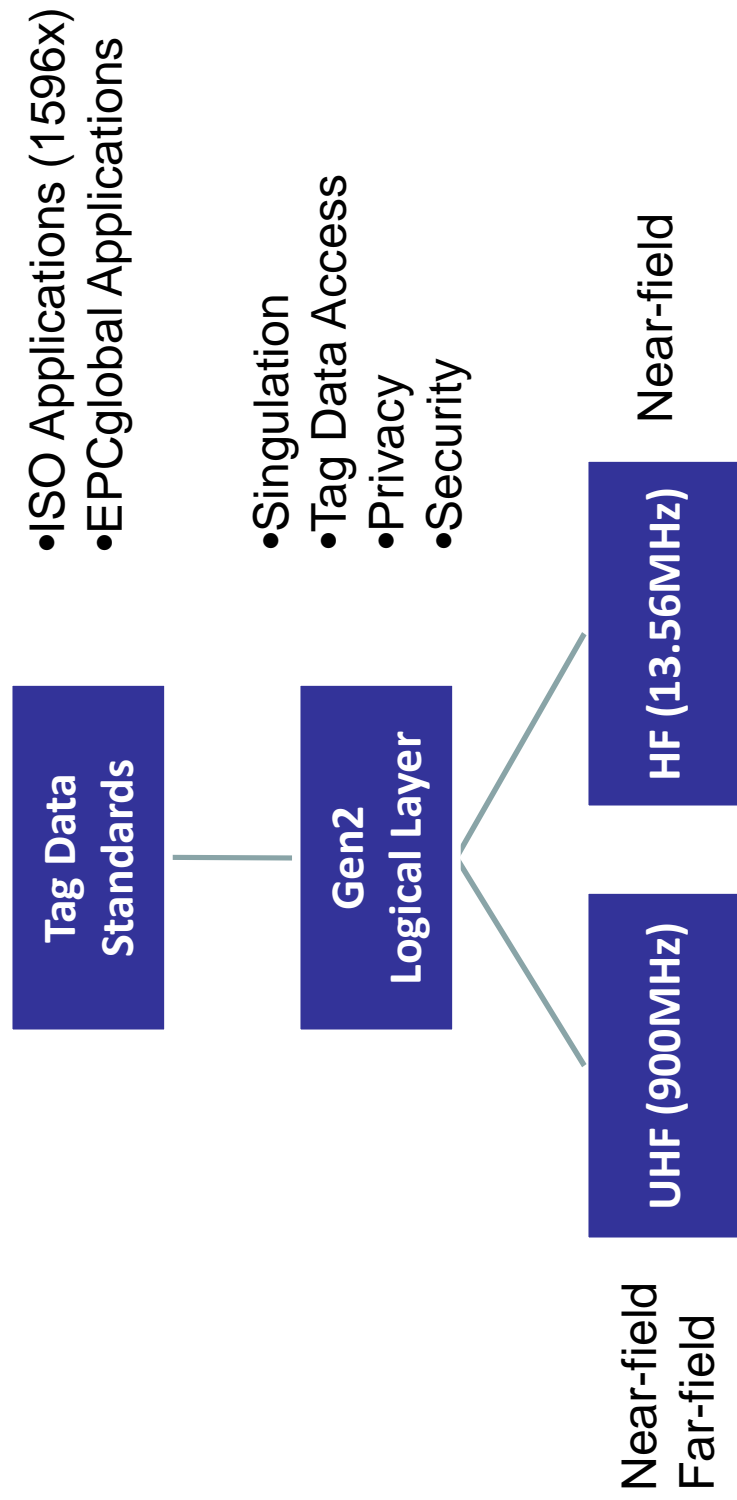
What I'll be talking about...

- Passive RFID
- Ground-breaking work done at the MIT Auto-ID Center from 1998-2003
 - Back then... driven, staffed, and funded by Big Retail and Big Software
- Where is RFID today?

Standard Layered Architecture



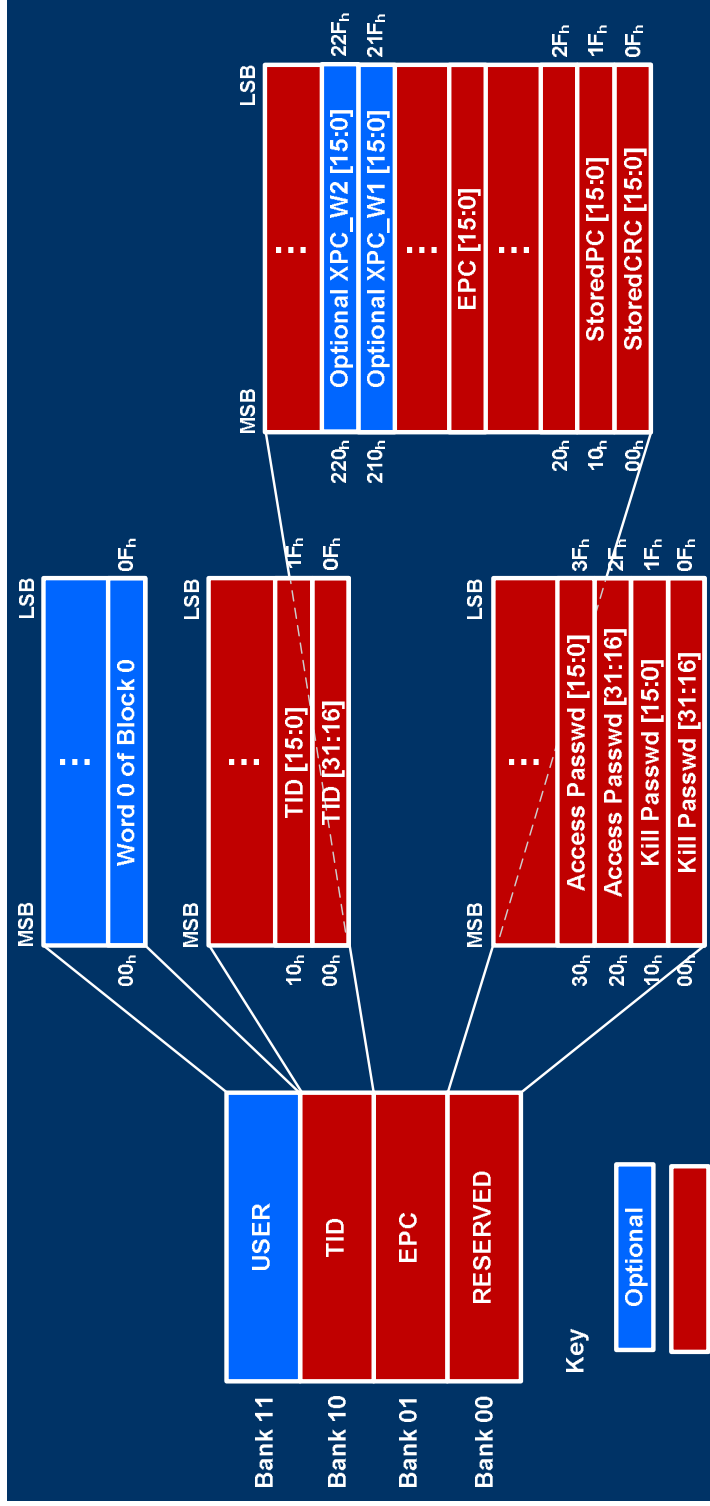
Gen2 Air Protocol



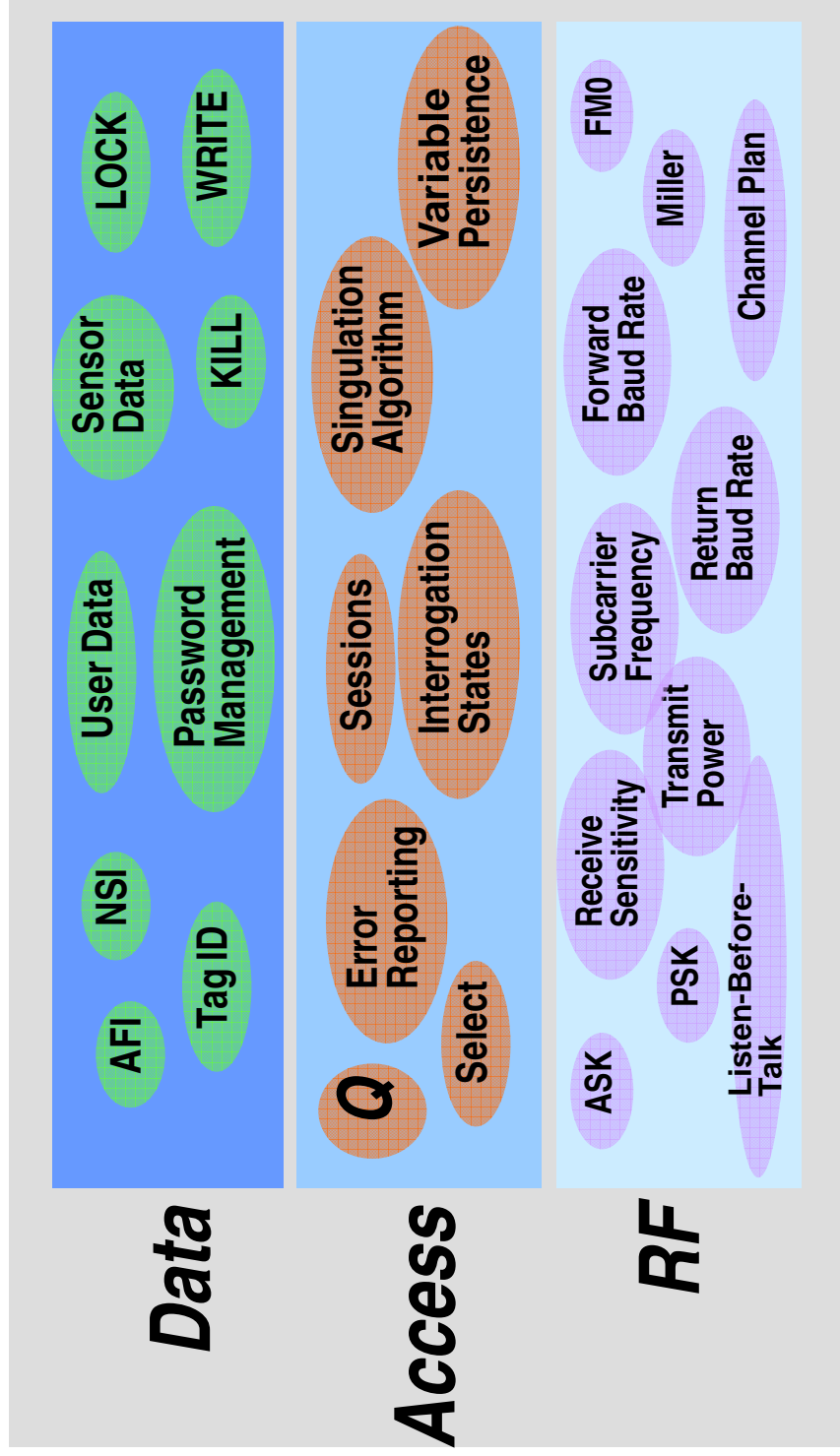
Gen2 Tag Classes

	Features	Notes	Range
Class-1	EPC, TID, and a kill function Optional tag recommissioning, memory write locking, and user memory	Base Gen2 functionality Passive backscatter	10m
Class-2	Extended TID, extended user memory, and authenticated access control Additional features to be defined	Higher functionality tags Incorporates all of Class-1 Passive backscatter	
Class-3	A power source that may supply power to the tag and/or to its sensors Optional data logging	Battery-assisted passive tags Incorporates all of Class-2 Passive backscatter	60m
Class-4	Communications via a powered transmitter Option tag-to-tag communications	Active tags Incorporates all of Class-3 Powered transmitter	

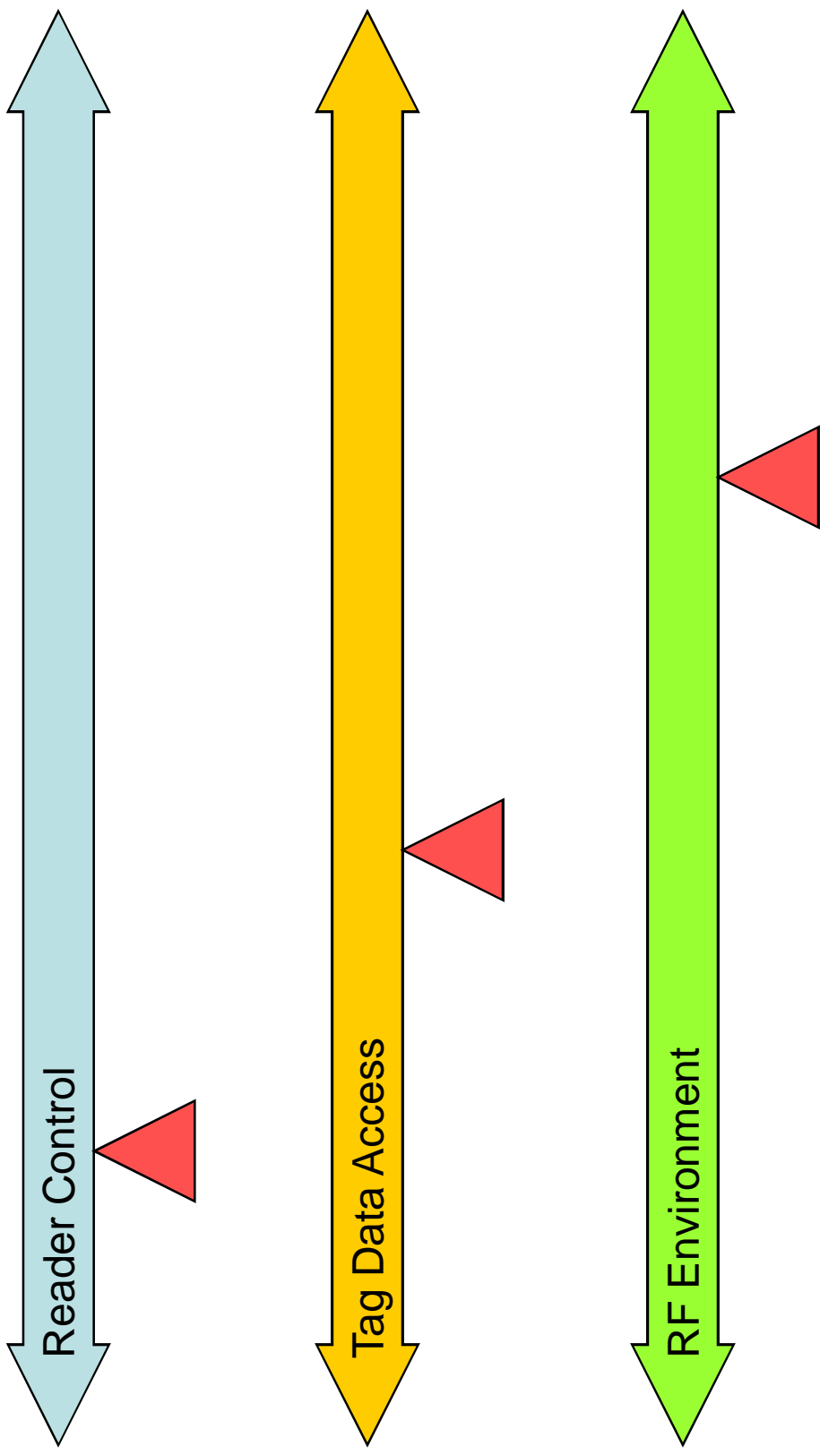
Gen2 Tag Memory



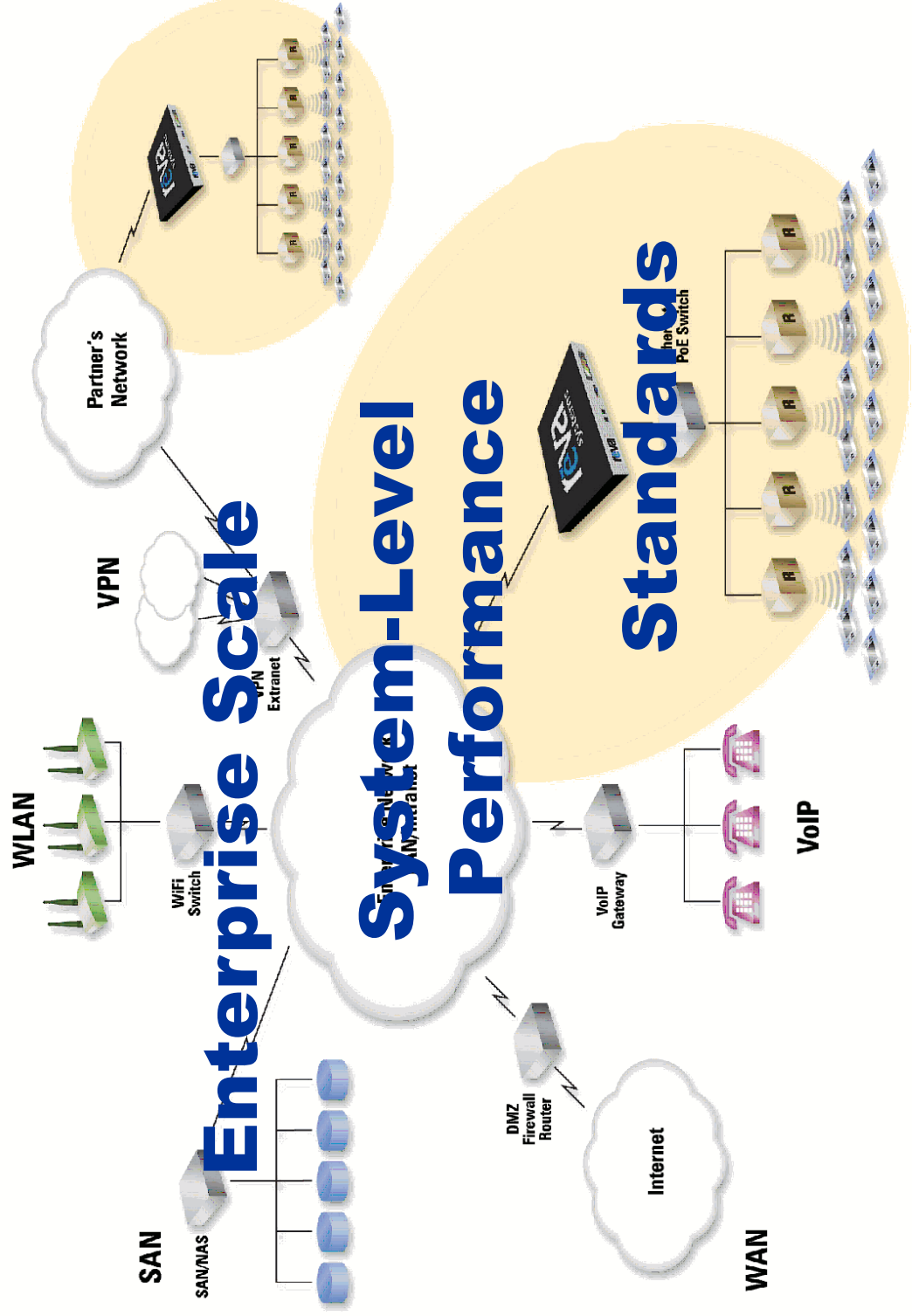
Gen2 Parameters



Application RF Requirements?



Structured RFID Deployment



RFID Technology Reached Critical Mass in 2007

Today

Worldwide Regulatory Harmonization

Gen2 Air Protocol

Standardized Reader-Network Interface

Item-Level Tagging

Specialty Tags

Low-cost Integrated Reader Silicon

Direct Application Interfaces from Major Enterprise SW Suppliers

Scalable RFID Network Infrastructure

2008

2007

2006

2005

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RFID Market

Rapid Expansion in 2008

Today

Expansion within facilities

Expansion to more facilities

Expansion via Network Effect

Expansion among peers

Expansion by regulation or mandates

Expansion by geography

Expansion across vertical markets

Expansion through applications

2007

2008

2009

2010

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Passive UHF Deployment

Physical Infrastructure

- Fixed Readers
- Choke-points
- Portals
- Mobile
- Cart
- Vehicle
- Handheld
- Dedicated scanner
- Embedded Reader Modules
- Antennas
- Near-field
- Far-field

Passive UHF Deployment

Security and Privacy

- Tag Password Protection
- Tag Deactivation
- Permanent or Temporary
- Data-access or Range-reduction
- Tag Re-commissioning
- Tamper Evidence
- Tag Anonymization
- Front-end asset database
- Tag Counterfeit Detection
- Tag User Data Memory

Passive UHF Deployment

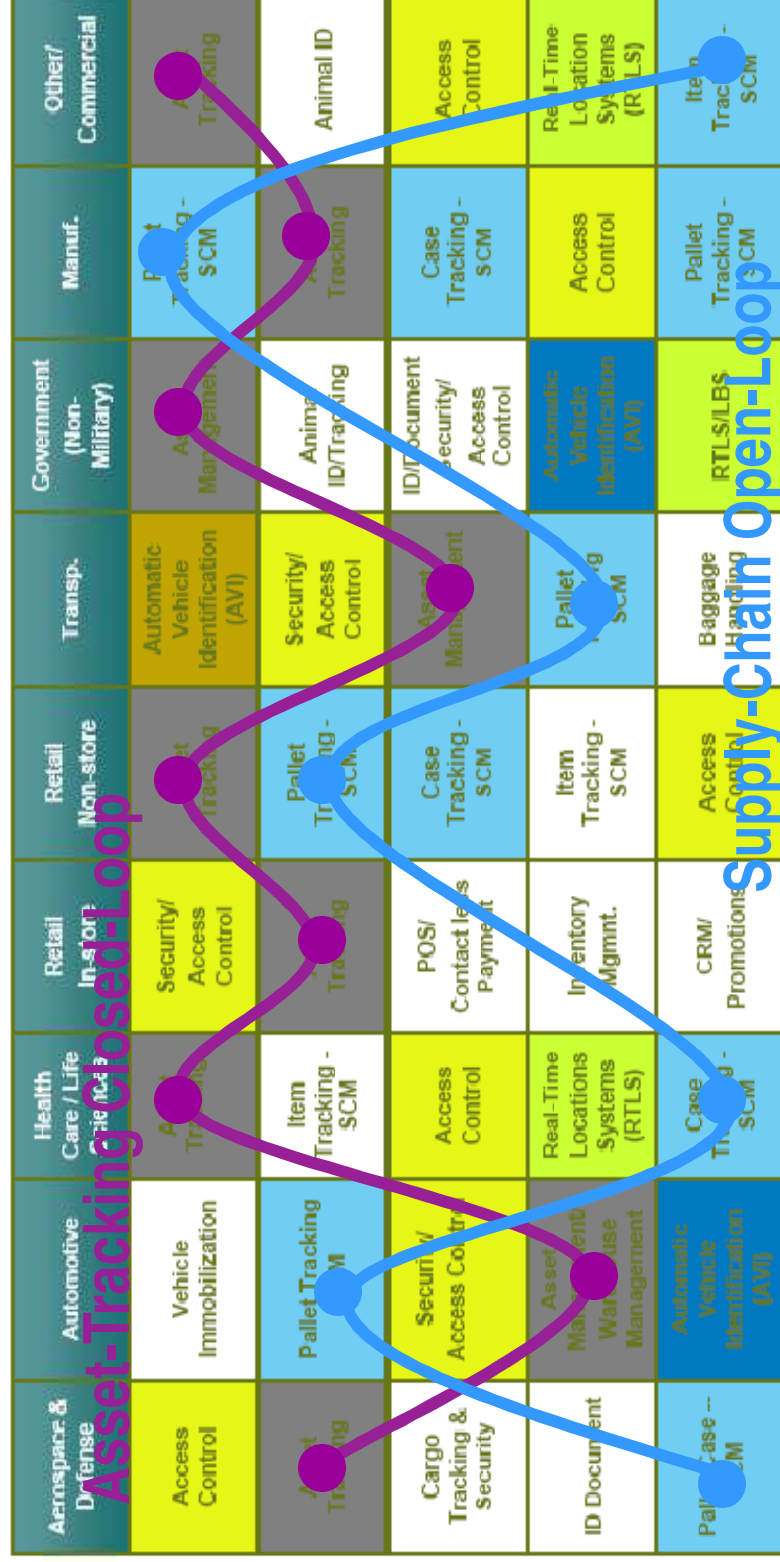
Example Applications

- Automated Inventory
- Work-In-Process
- User Self-service
- Item Location
- Transportation and Logistics
- Healthcare Delivery
- Food Safety
- ...
- ...

RFID Applications by Vertical Market

Q: What is the most common applications used with RFID technologies in 2006?

Ranked within each environment (based on % currently using/plan to use)



Source: Motorola EMB Market Intelligence

Current Trends: Asset-Tracking

- IT Assets
 - Servers, blades
 - Communications and networking gear
 - Laptops
- Reusable/Returnable Containers and Conveyances
- Sarbanes-Oxley...

Telecom

Financial

Hospitals

Postal

Logistics

Manufacturers

Current Trends: Healthcare Delivery

- Patient Safety
 - Errors cost Medicare \$8.8 billion and resulted in 238,337 potentially preventable deaths during 2004 through 2006 –
ScienceDaily, April 2008
- Surgical Specimen Tracking
- Medical Equipment Assets
- Protocol Compliance
- Clinical Trials
- Geriatric Residences
- Medication Verification
- Enhanced Treatment Experience
- IT Assets

Hospitals

Current Trends:

Electronic Article Surveillance

- Replacing legacy AM and RF systems
 - which don't work very well...
- Expanding the scope and reach of EAS
- Source-tagging is "free"

Retail

Current Trends:

Sensor Integration

- Battery-Assist Tags can be equipped with on-tag sensors
- On-tag logging and processing
- Cold-chain monitoring

Hospitals

Logistics

Manufacturers

RFID is a Green Technology

- 12% of Food Shipments in the US spoil during shipping and handling.
- Retailers experience 8% out-of-stocks on normal goods, up to 20% on promotional items.
- Postal services economizing on needless transfers
- Recycling

Logistics

Retail

Postal

Thank you for your time...

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