Migration Strategies

(With an Emphasis On Moving from 125 kHz Prox to 13.56 MHz Contactless Smart Card Technology)

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Agenda

- **Introduction & Caveats**
- **Definitions**
  - **Prox, Contactless Smart Cards, Multi-technology Cards**
- **Why migrate to Contactless Smart Cards?**
  - **Comparisons, Features, Multi-application capabilities, ISO, etc.**
- **Migration Strategies**
  - **Multi-technology cards**
  - **Use existing cards and add contactless smart card sticker**
  - **Use multi-technology readers**
- **Optimum Migration Strategy**
- **Migration choice comparisons**
- **Moving data from legacy applications**
- **Integrated card issuing**
- **Wedge Readers**
- **Summary**
- **Questions & Answers**

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Introduction & Caveats

- **This presentation discusses migration strategies, not new project implementations**

- **Of course the best solution is to rip out the old legacy systems and start from scratch _but_**
  - **Cost impact is major factor**
  - **Re-badging thousands of employees may be an obstacle**
  - **What to do during interim period?**

- **Some of the solutions presented here may be the long-term solution or used as a stepping-stone for migration to a single contactless smart card solution**

What is Prox?

- **"Prox" is a term used predominately in the United States to describe an RFID technology used in the Access Control Market**
  - **Requires no physical contact between a card and reader**
  - **Operates at 125 kHz**
  - **Typical operating distance from 4 to 6"**
  - **Packaged in cards or key fobs**
  - **Read-only**
  - **Data content typically from 26 to 40 bits**
  - **Generally very low security of data**
  - **No ISO standards exist**
  - **More than 250 million Prox cards have been sold**

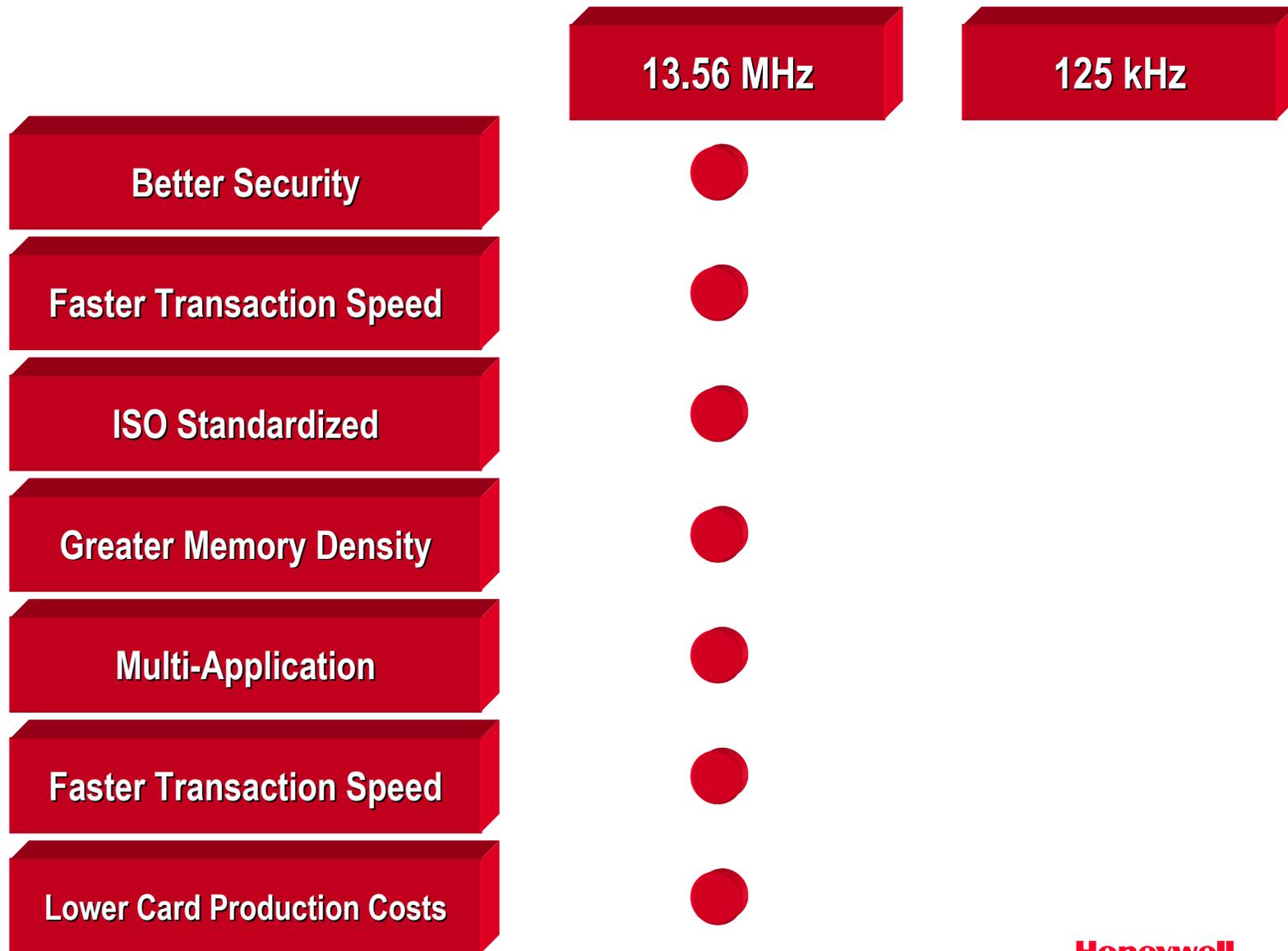# What is Contactless Smart Card Technology?

- **Contactless Smart Cards**
  - **Requires no physical contact between a card and reader**
  - **Operates at 13.56 MHz**
  - **Typical operating distance from 2" to 6"**
  - **Maximum operating distance of 39"**
  - **Packaged in cards, key fobs, stickers, labels, and more**
  - **Data content from 256 bits to 4k bytes and more**
  - **Memory can be segmented for *multi-application* use**
  - **Very high security**
  - **Supports true read/write on the fly**
  - **ISO Standardized (ISO 14443A/B & 15693)**

What is a Multi-Technology Card?

- **Card that contains more than one machine readable ID technology**
- **Choices include:**
  - **Contact Smart Card**
  - **13.56 MHz Contactless Smart Card**
    - **PicoPass™, Mifare™, iClass™, MyD™, etc.**
  - **125 kHz Prox**
    - **HID, Indala, AWID, EM, etc.**
  - **Magnetic Stripe**
  - **Debit Stripe**
  - **Bar Code**
  - **Optical Stripe**
  - **Barium Ferrite (Magnetic Technology)**
  - **Etc.**

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Why Migrate to Contactless Smart Cards?

|	13.56 MHz	125 kHz
Better Security	●	
Faster Transaction Speed	●	
ISO Standardized	●	
Greater Memory Density	●	
Multi-Application	●	
Faster Transaction Speed	●	
Lower Card Production Costs	●	

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Why Migrate? (cont.)

- **Added Benefits With No Increase in Price**
- **Increased Security**
- **Ability to use same card for additional applications:**
  - **Biometrics: Carry multiple templates on card**
  - **Logical Access**
  - **ID: Carry Tamperproof Digital Photographs**
  - **Portable Database: Encrypted Information for authentication or emergencies**
- **Interoperability**
- **Future Growth**

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Why Migrate? (cont.)

- **Multi-Application Support**
  - **64 bit serial number**
  - **32 applications each with individual secret keys**
  - **Each application "slot" has up to 232 usable bytes**
  - **Can combine multiple apps to increase memory**

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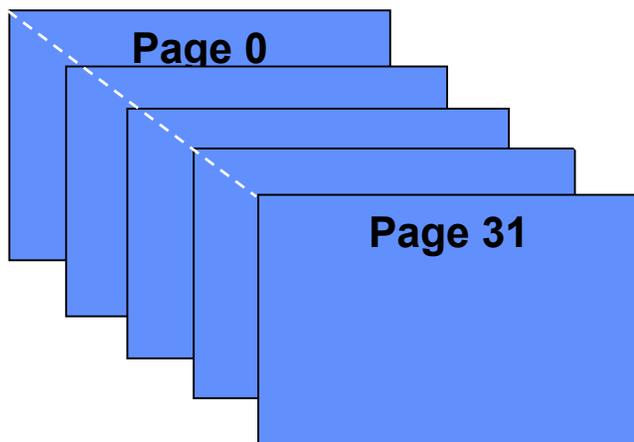
Multi Application example using PicoPass 32KS

Application	Data Blocks
0	Access Control
1 - 4	Logical Access
5	Time & Attendance
6	Vending
7 - 14	Finger Print (2 fingers)
15 - 16	IRIS Scan
17 - 27	Digitally Signed Photograph
28 - 30	Environmental & Building Mgmt
31	Burglar Alarm Arm/Disarm

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- **Multi-Application Support**
  - **Smart cards allow multiple applications - each protected with its own keys**
  - **Vendor should disclose keys for unused applications, i.e., open key strategy**
  - **Open Key Strategy advantages:**
    - **Other application slots free for use**
    - **Increases value of access control card**
    - **Allows one card to be used for many applications at the same time**
    - **Eliminates obsolesce**
    - **You're in control, switch access control vendors without reissuing cards**

Why Migrate (cont.)
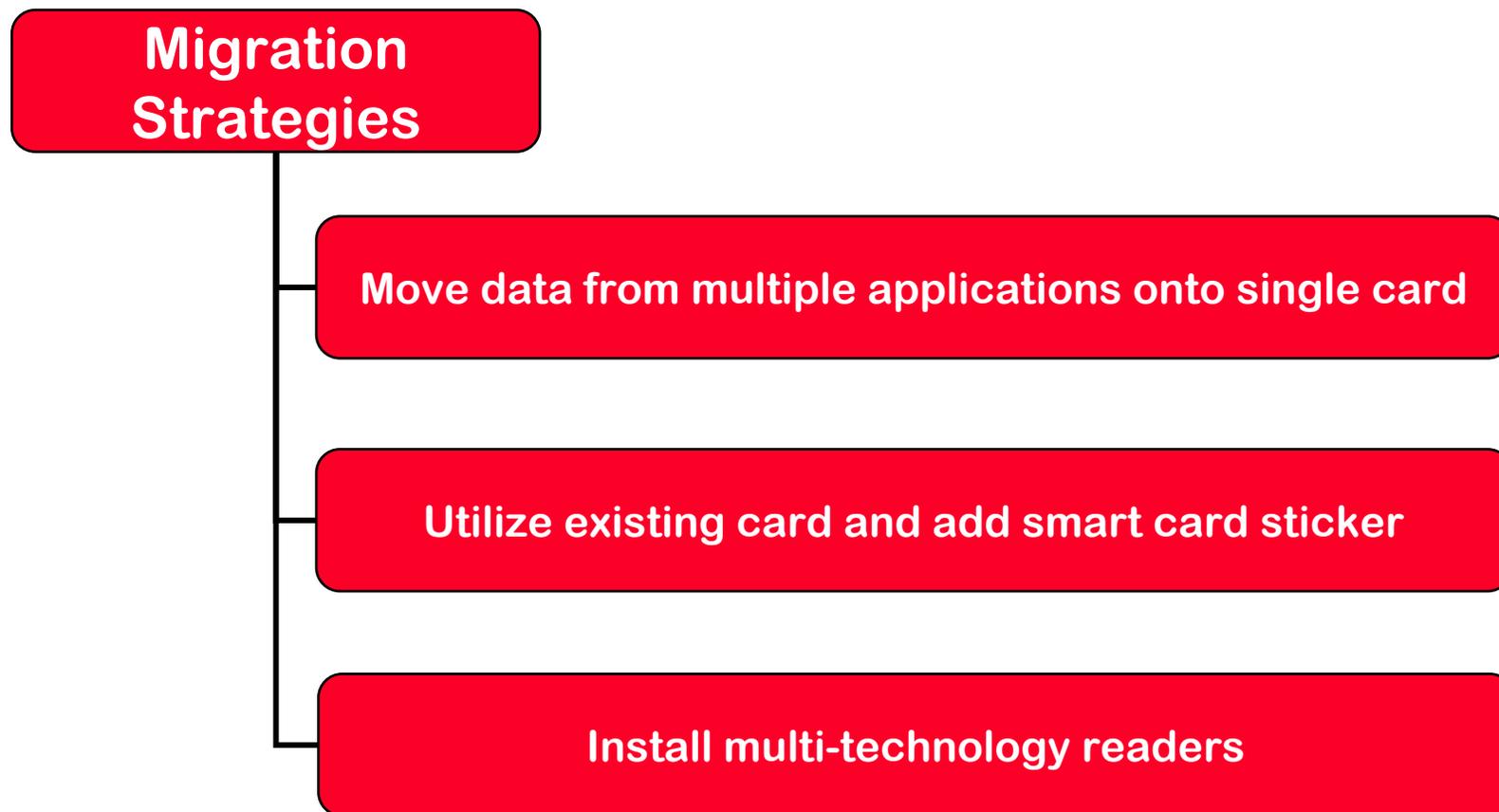
- ## International Standardization
  - **Current 125 KHz Prox Technology**
    - **No ISO existing or planned standardization**
    - **Proprietary**
      - **HID, Motorola, AWID, Casi-Rusco, etc.**
  - **New 13.56 MHz Contactless Smart Cards**
    - **Standards DO exist**
      - **ISO 14443A, 14443B, 15693**
    - **Open standards with interoperability encourages broad supplier support and customer acceptance**
    - **Open standards can increase martket size driving prices down**
    - **Facilitates interoperability between vendors and applications**
    - **Helps to drive costs down**
    - **Helps to eliminate obsolence**
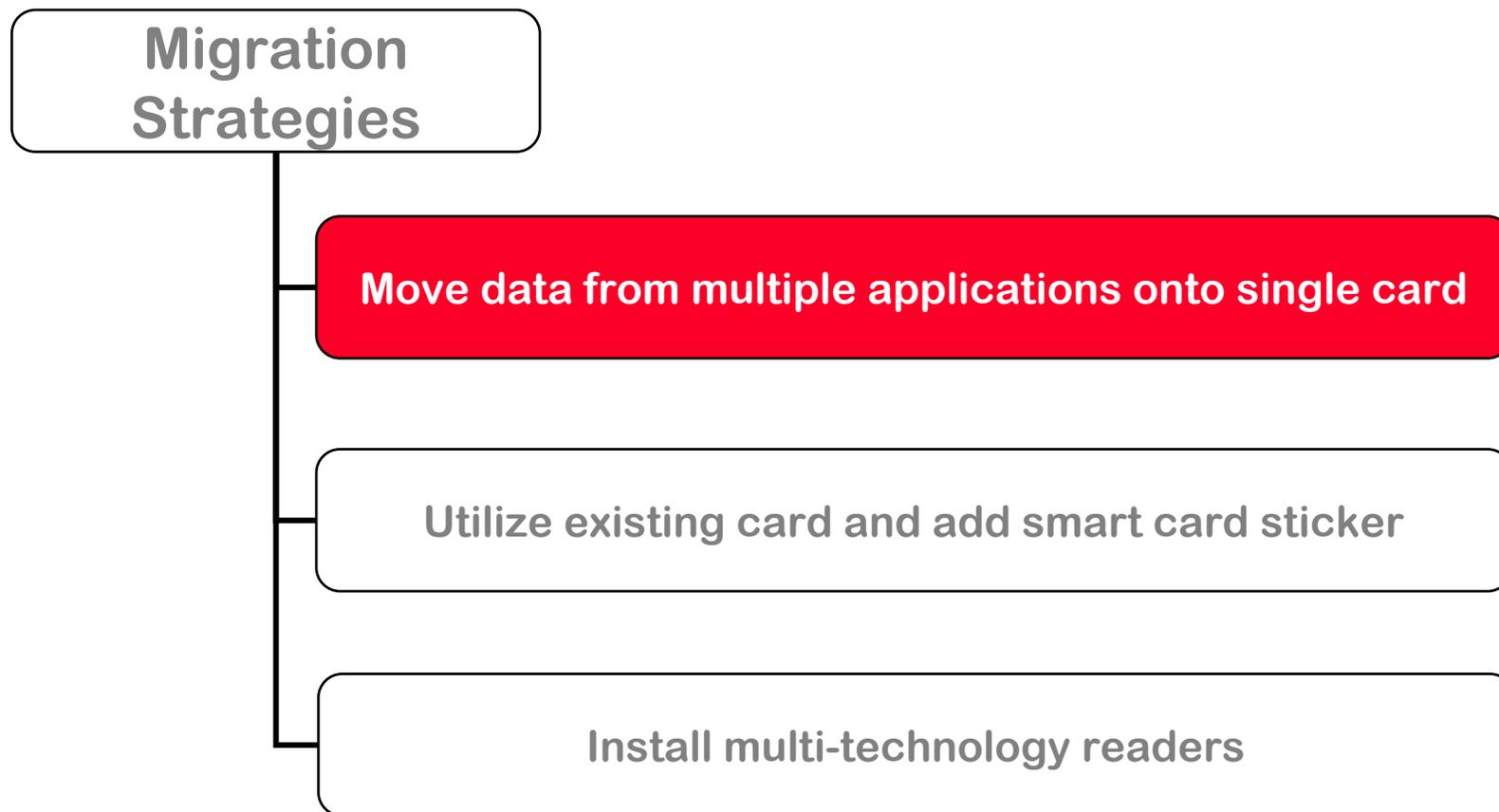
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Migration Strategies

Migration Strategies

- Move data from multiple applications onto single card
- Utilize existing card and add smart card sticker
- Install multi-technology readers

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Migration Strategies (cont.)

- **The following slides illustrates the three major migration strategies**
  - **Note that hybrid solutions combining elements from the different migration strategies are possible**

Migration Strategies

Migration Strategies

Move data from multiple applications onto single card

Utilize existing card and add smart card sticker

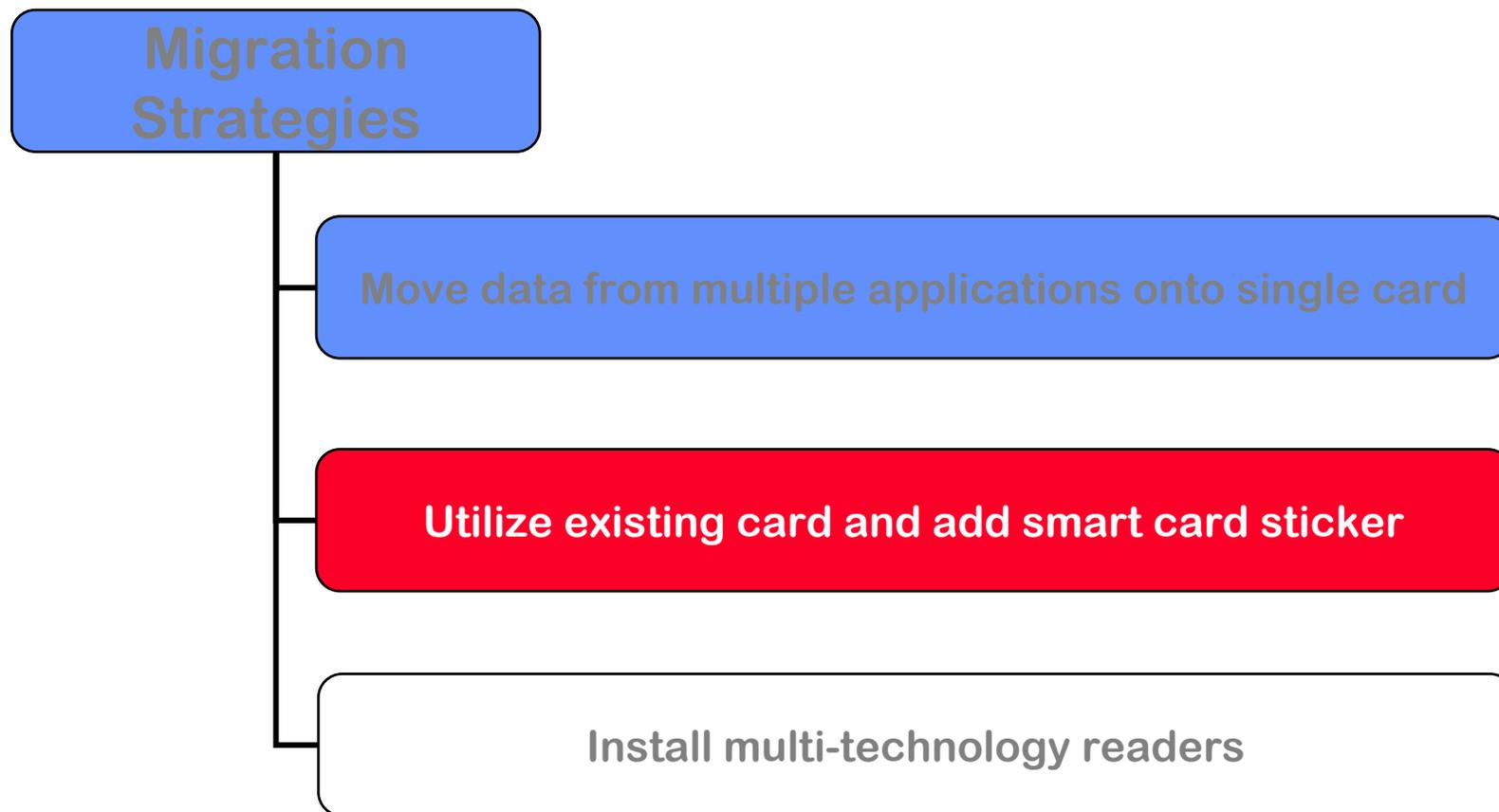**Install multi-technology readers**

Migration Strategies: Use a Multi-Technology Card

- **Method is to utilize the existing technologies for existing applications and put them on a single card**
- **Each legacy application utilizes the same technology that was used before**

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Migration Strategies: Use a Multi-Technology Card
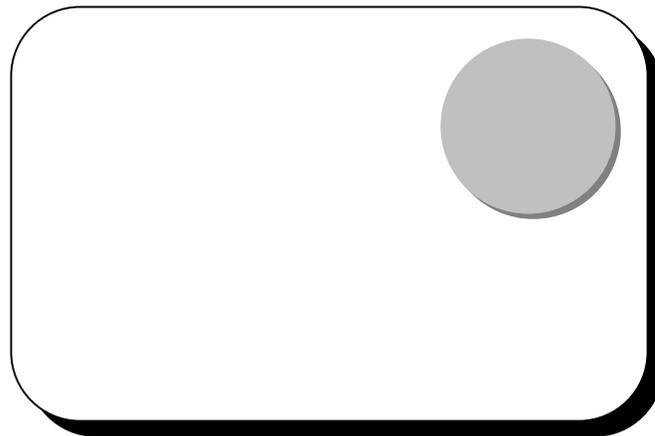
- **Advantages**
  - **Most aesthetic looking card**
  - **Most secure card**

- **Disadvantages**
  - **Most expensive card**
    - **Each technology contributes to manufacturing and cosmetic fallout**
  - **Reduced field-reliability due to multiple technologies**
    - **Some combination of technologies weaken card structure**
    - **Additional cost to re-badge due to failure**

Migration: Use existing card w/smart sticker

Migration Strategies

- Move data from multiple applications onto single card
- Utilize existing card and add smart card sticker
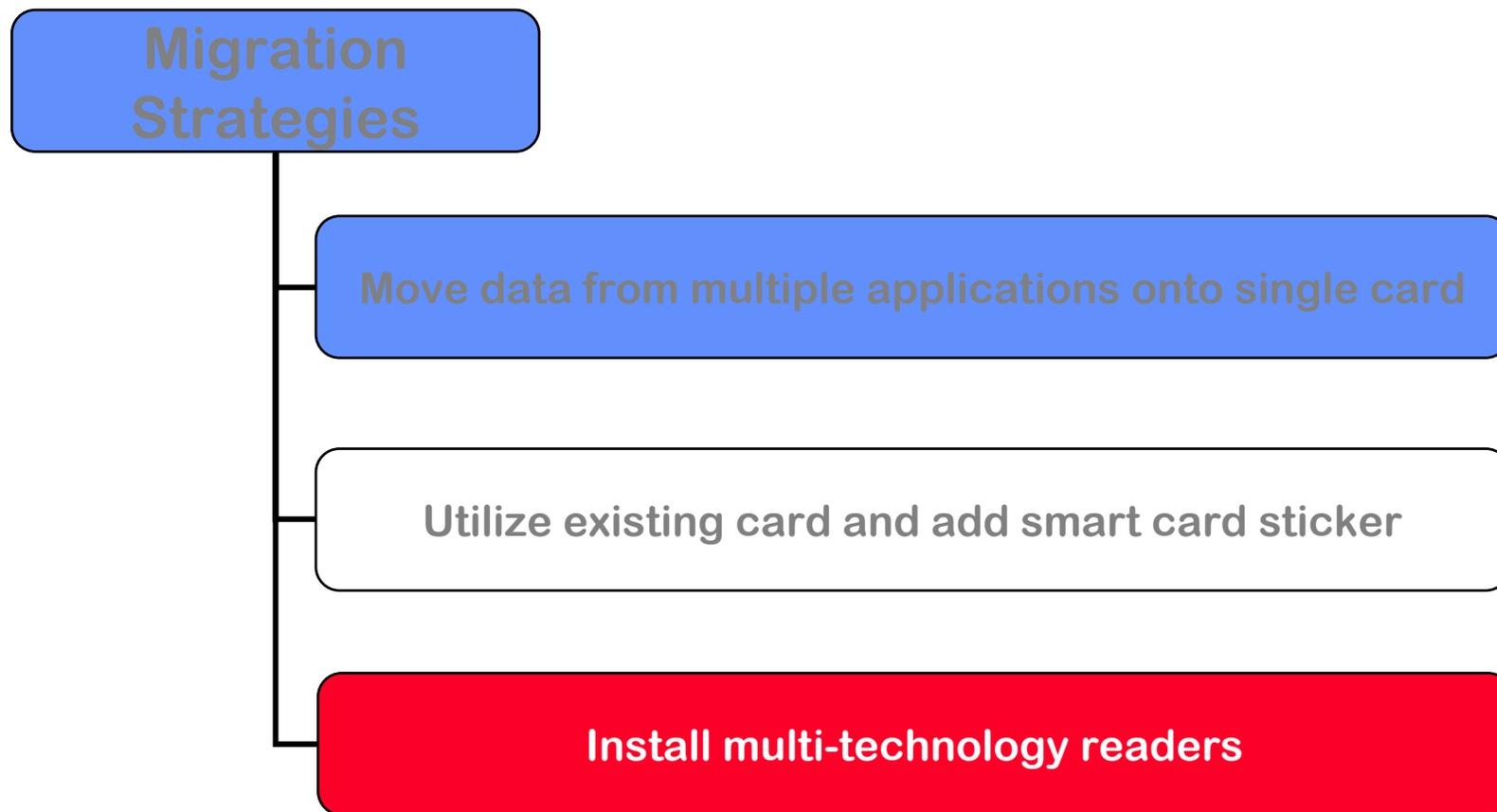- Install multi-technology readers

- **Several companies make a smart card "Sticker"**
- **Sticker contains antenna and chip just like a card**
- **Sticker utilizes a permanent adhesive for easy affixing to existing card**

Migration: Use existing card w/smart card sticker

- **Advantages**
  - **Much lower cost because existing card is not thrown out**
  - **No migration of existing information from legacy applications**

- **Disadvantages**
  - **Not as aesthetic as a single card**
  - **Slightly reduced range due to smaller antenna**
  - **Location of patch important so card still works in existing readers (like magstripe)**
  - **Some organizations (Gov't, etc.) do not allow anything to be affixed to a card**
  - **Possible security issue if sticker is removed from card**
    - ◆ **Patch is designed to self destruct when removed**
    - ◆ **Electronic anti-tamper mechanisms available**

Migration Strategies

Migration Strategies

- Move data from multiple applications onto single card
- Utilize existing card and add smart card sticker
- **Install multi-technology readers**

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- **Multi-technology readers are capable of reading two different technologies**
  - Prox and Contactless Smart Card
  - Contact and Contactless Smart Card
  - Prox and Magnetic Stripe
- **Multi-technology readers may have multiple output protocols and interfaces**
  - Wiegand
  - Clock & Data
  - RS232
  - Etc.

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Migration Strategies: Use Multi-Technology Readers

- ## Advantages
  - **No changes to cards**
  - **No card re-badging**

- ## Disadvantages
  - **Typically most expensive migration strategy**
    - **Cost of readers are higher**
    - **Readers available from only a few vendors**
    - **Not all technology choices available**
 - **Reader obsolescence occurs faster**

Optimum Migration Strategy

- **Optimum strategy is to migrate all legacy applications to just contactless smart card solution utilizing separate application areas**
  - **Single technology card is most cost effective and reliable**
- **Biggest stumbling block is**
  - **Retrieving data from legacy application and moving it to contactless smart card**
  - **Emulating legacy protocol and physical interface**
- **Can use all of the previous migration methods discussed for interim**

Moving Data From Legacy Applications

- **Best method is to electronically move data under computer control**
  - No human typing errors
  - Can automate process
  - Very convenient,complete process can take less than 30 seconds
- **Can almost always retrieve legacy data using its legacy reader interfaced to a PC**
  - Security and internal formats need not be known since legacy reader already knows how to read card
  - Even if reader is proprietary, output data can usually still be captured at a PC
  - Ideal method to move legacy applications where vendor has gone out of business or is uncooperative

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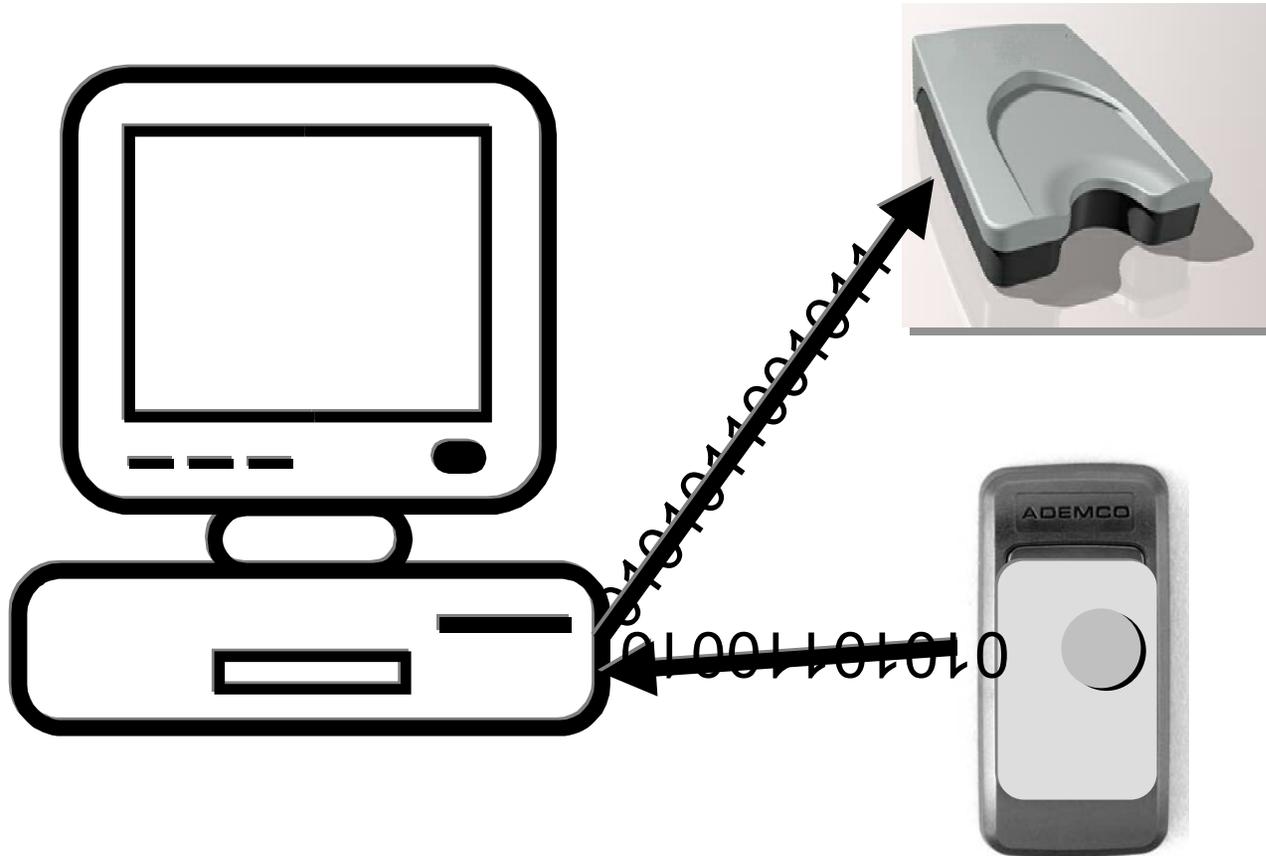
Step 4: Affix sticker to existing 125 kHz Prox card

Integrated Card Issuing

- **If legacy data is already stored in a database:**
  - **Can use a Dye-Sub Printer w/Smart Card Encoding to automate process**
    - **Unattended batch processing possible**
    - **Issue and personalize cards on demand**

"Wedge" Readers

- **Many times a keyboard "wedge" reader can be used with a contactless smart card reader instead of original legacy reader**
  - **Advantage is original PC application does not have to be changed at all!**
- **If legacy application already uses a wedge reader then it is a no-brainer to retrieve legacy data into a PC and rewrite into a contactless smart card**

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