

**MIS 3534 Fall 2016 –  
Strategic Management of  
Information Technology  
*Week 4 – Enterprise Architecture***

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***Sep. 26<sup>th</sup>, 2016***

## Today, we will discuss ...

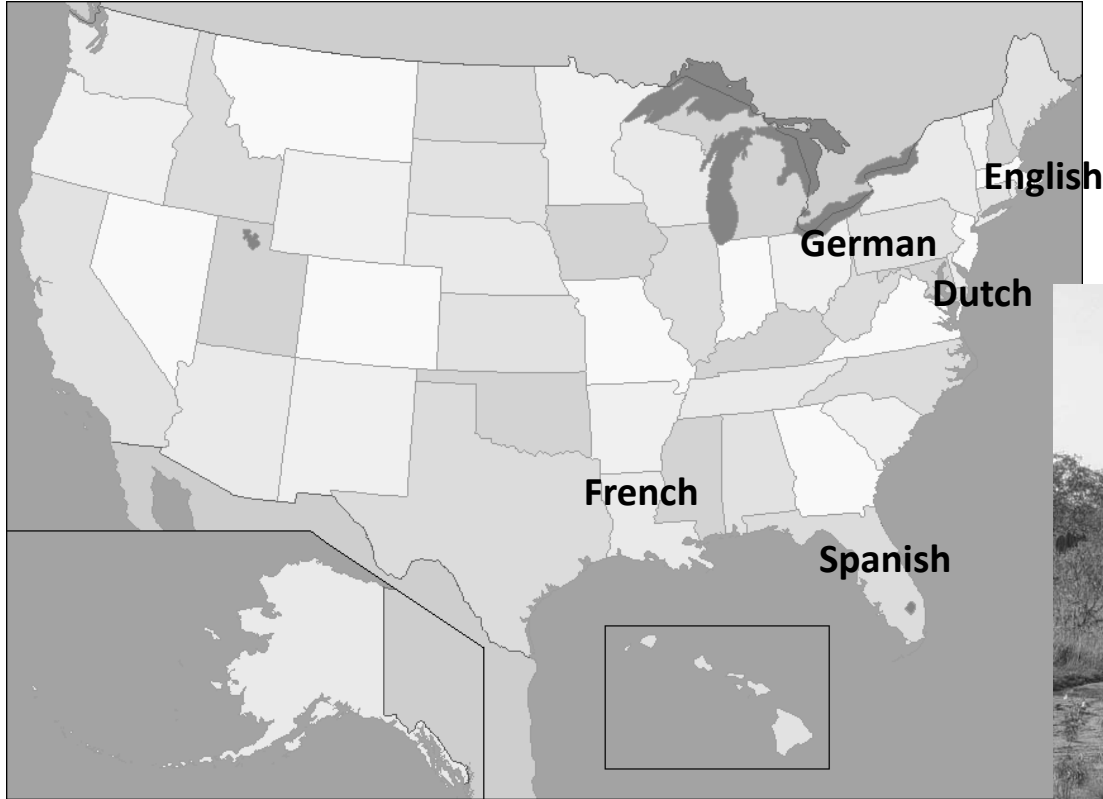
- What are the nature of the tradeoff between standard and freedom in regard to enterprise IT architecture in a multi-divisional organization?
- What are the considerations in IT standard and platform?

## Standard in Our Life (1/2)

- What kind of standards do we enjoy in our daily life?
- Why do we need them? What if we don't have standards?



# Standard in the United States



[http://www.yourchildlearns.com/us\\_map.htm](http://www.yourchildlearns.com/us_map.htm)  
<http://www.development.lk/news.php?news=948>  
<http://www.wisegeek.com/what-is-an-ac-power-plug.htm>

## Standard in Europe (1/2)



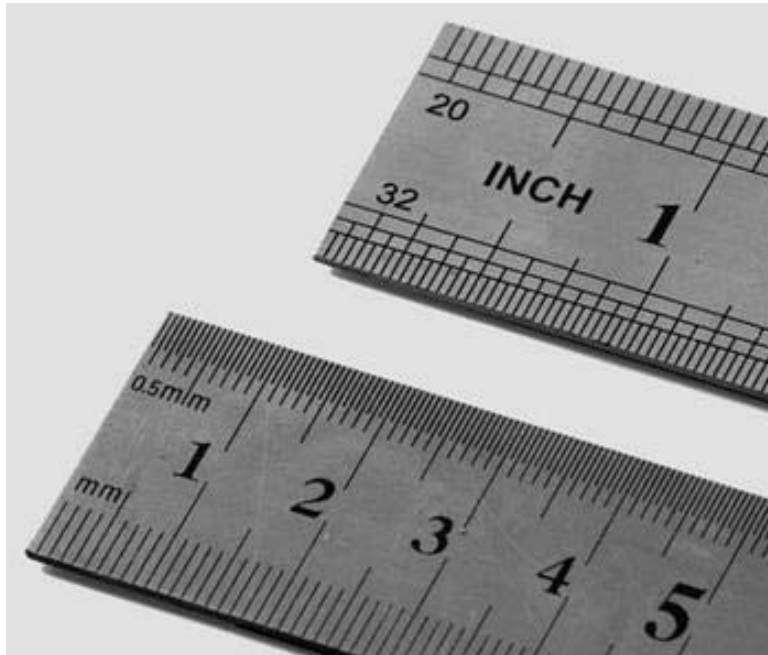
- Why do many European nations use Euro as a common currency?
- Why do the U.K. and some others refuse to adopt Euro?

<http://flagpedia.net/currency/euro>  
<http://www.iglobalexports.com/internationalblog/tag/euro-map/>

## Standard in Europe (2/2)

- European nations have adopted Euro as a standard currency system to streamline trades/movement of goods and services amongst the nations.
- Some other nations have not adopted Euro because they do not want to lose *control and flexibility* in finance and monetary policies.
  - Greece is hard to get out of its current financial woos because it does not have a control of currencies and macrofinances.

# Why not Metric System in the United States?



### For example:

1 kilometer (km) = 0.62 mile (mi)  
 1 kilometer (km) = 3280.8 feet (ft)  
 1 meter (m) = 3.28 feet (ft)  
 1 centimeter (cm) = 0.39 inch (in)  
 1 millimeter (mm) = 0.039 inch (in)  
 1 inch (in) = 2.54 centimeters (cm)  
 1 inch (in) = 25.4 millimeters (mm)  
 1 foot (ft) = 0.30 meter (m)  
 1 yard (yd) = 0.91 meter (m)  
 1 yard (yd) = 0.00091 kilometer (km)  
 1 mile (mi) = 1.61 kilometers (km)

### The fraction would be:

|  |   |
|--|---|
| $\frac{1 \text{ kilometer (km)}}{0.62 \text{ miles (mi)}}$ | $\frac{\text{(numerator)}}{\text{(denominator)}}$ |
|--|---|

- The United States is sticking to the English system because the costs of converting everything to the Metric system outweigh the potential benefits from adopting it.

# Why do wall street bankers and soldiers wear uniforms, and why don't silicon valley geeks?



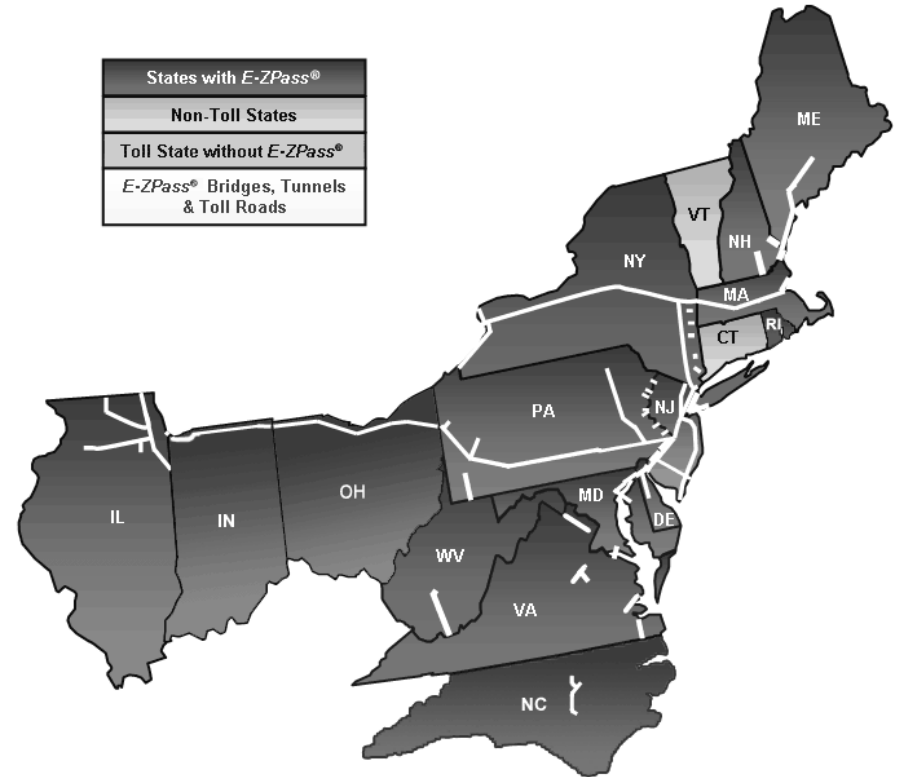
<http://www.telegraph.co.uk/finance/financialcrisis/4593262/Wall-Street-bankers-forced-to-eat-humble-pie.html>  
<http://www.demotix.com/news/490138/greek-military-parade-thessaloniki#media-490223>  
<http://www.timesfreepress.com/news/2012/sep/10/silicon-valley-isnt-sharing-facebooks-misery/>



## Standard in Our Life (3/3)

- What are the benefits from a standard?
  - Standards are one of the most essential foundations for orders in our daily lives.
- What would be the costs in having a standard? By having a standard, we are losing what?
  - Standards restrain *flexibility and control* of everyone subject of the standards.
  - Standards may also stifle innovation by limiting the behaviors and thoughts of subjects.

# Why E-ZPass?



- Why do states adopt E-ZPass for a common standard payment system?

<http://www.kofytv.com/autos/?id=124697138&feed=bim>  
<https://www.ezpassnj.com/en/about/facilities.shtml>



- Why do the transit agencies in the DC area adopt SmarTrip for a common standard payment system?
- What would be the reasons that a transit agency does NOT adopt SmarTrip?

## **SmarTrip – Standard Payment System**

- By joining in SmarTrip, the transit agencies can save costs in operating their own payment system.
  - Consumers do not need to deal with multiple payment means. The transit agencies can have a large customer base.
- By joining in SmarTrip, the transit agencies lose some part of control in managing payment systems.
  - Suppose that one agency wants to introduce a new discounted fare for students. It would have to coordinate with other agencies.
  - It would be slower and inefficient to implement the discount than when it has a separate payment system.

# IT Complexity at IVK and Trinity (1/2)

- Why have IT systems at IVK and Trinity (before the Genesis Strategy) gotten so complex?

| Operating Units                           | Eastern Division  |                                 |                  |                |                   |                   |                   |                   |                  |                  | Western Division                |                   |                      |                  |                   |                  |                                   |
|---|-------------------|---------------------------------|------------------|----------------|-------------------|-------------------|-------------------|-------------------|------------------|------------------|---------------------------------|-------------------|----------------------|------------------|-------------------|------------------|-----------------------------------|
|   | Silver Spring, MD | Columbus, OH                    | Fort Huron, MI   | Clemens, MI    | Fontiac, MI       | Livonia, MI       | Ann Arbor, MI     | Battle Creek, MI  | Grand Rapids, MI | Muskegon, MI     | South Bend, IN                  | Clinton, IA       | Dubuque, IA          | Mason City, IA   | Sioux City, IA    | Boise, ID        | Fresno, CA                        |
| <b>Patient Administration</b>             |                   |                                 |                  |                |                   |                   |                   |                   |                  |                  |                                 |                   |                      |                  |                   |                  |                                   |
| Registration                              |                   |                                 |                  | HBOC Plus 2000 |                   | HBOC Series       | HBOC Health-Quest |                   | SMS Med Series-4 |                  | HBOC STAR                       |                   |                      | SMS Med Series-4 |                   |                  | HBOC STAR                         |
| Patient Accounting                        | HBOC STAR         |                                 | SMS Med Series-4 |                | HBOC Health-Quest |                   |                   |                   |                  |                  |                                 |                   |                      |                  |                   |                  |                                   |
| Medical Records                           |                   |                                 |                  |                |                   |                   |                   |                   |                  |                  |                                 |                   |                      |                  |                   |                  |                                   |
| DRG Grouper                               |                   | 3M                              | 3M               | Quadramed      |                   |                   |                   |                   |                  |                  | 3M                              |                   |                      |                  |                   | Quadramed        | 3M                                |
| APC/APG Grouper                           |                   |                                 |                  |                | HSS               |                   | HSS               |                   |                  |                  |                                 |                   |                      |                  |                   |                  |                                   |
| <b>Enterprise Resource Planning (ERP)</b> |                   |                                 |                  |                |                   |                   |                   |                   |                  |                  |                                 |                   |                      |                  |                   |                  |                                   |
| General Ledger                            | People Soft       |                                 |                  |                |                   | Global            |                   |                   |                  |                  | People Soft                     |                   |                      |                  |                   |                  | People Soft                       |
| Payroll/Human Resources                   |                   |                                 | SMS Med Series-4 | GEAC           |                   | Genidian          | GEAC              |                   |                  | SMS Med Series-4 |                                 |                   |                      | SMS Med Series-4 |                   |                  |                                   |
| A/P                                       |                   |                                 |                  |                |                   |                   |                   |                   |                  |                  |                                 |                   |                      |                  |                   |                  |                                   |
| Materials Management                      | HBOC              |                                 |                  |                |                   | Global            |                   |                   |                  |                  | HBOC                            |                   |                      |                  |                   |                  | HBOC                              |
| Cost Accounting                           |                   | Self Developed (Analysis & DSS) |                  | TSI Mainframe  |                   |                   | TSI Mainframe     |                   | TSI AS400        |                  | Self Developed (Analysis & DSS) |                   | TSI AS400            |                  |                   |                  | Self Developed (Analysis & DSS)   |
| Contract Management                       |                   |                                 |                  |                |                   |                   |                   |                   |                  |                  |                                 |                   |                      |                  |                   |                  | SARMC<br>McKesson<br>HBOC         |
| <b>Clinical Systems</b>                   |                   |                                 |                  |                |                   |                   |                   |                   |                  |                  |                                 |                   |                      |                  |                   |                  |                                   |
| Physician Order Management                |                   |                                 |                  |                |                   |                   |                   |                   |                  |                  |                                 |                   |                      |                  |                   |                  | Eclipsys                          |
| Order Entry                               | HBOC STAR         |                                 | SMS Med Series 4 | HBOC Plus 2000 | TDS               | HBOC Series       | TDS               |                   | SMS Med Series-4 |                  | HBOC STAR                       |                   |                      |                  |                   | SMS Med Series 4 | HBOC STAR                         |
| Results Reporting                         |                   | In-house/3M                     |                  | CWS            |                   |                   |                   |                   |                  | CWS              |                                 | Cerner            |                      |                  |                   |                  | In-House                          |
| ADEs                                      |                   |                                 |                  |                | Cerner            |                   | Cerner            |                   | Cerner           |                  |                                 |                   | Cerner               |                  |                   |                  |                                   |
| Clinical Documentation                    | Eclipsys          | HBOC Care Manager               |                  |                | TDS               | HBOC Care Manager | TDS               |                   |                  |                  |                                 |                   |                      |                  |                   |                  | Eclipsys<br>LifeServ<br>Petronics |
| Laboratory                                | HBOC STAR         | Cerner Pathnet                  | Cerner Pathnet   | Sunquest       | Classic           | HBOC ALG          | Classic           | Cerner Millennium | Classic          | Classic          | Cerner Pathnet                  | Cerner Millennium | United Clinical Labs | Sunquest         | Cerner Millennium | Sunquest         | HBOC STAR                         |
| Pharmacy Hospital                         |                   |                                 | Cerner MsMeds    | Cerner MsMeds  | Cerner MsMeds     | HBOC Series       | Cerner MsMeds     | Cerner MsMeds     | Cerner MsMeds    | Cerner MsMeds    | HBOC STAR                       | Cerner MsMeds     | Cerner MsMeds        | Cerner MsMeds    | Cerner MsMeds     |                  | Medware<br>WORX                   |
| Surgey Management                         | RES-Q Healthcare  | Per-Se' ORSOS                   |                  |                |                   |                   | Ormi-server       |                   |                  |                  | Medline Systems                 |                   | Ormi-server          |                  |                   |                  |                                   |
| Patient Scheduling                        |                   |                                 |                  |                |                   | HBOC Pathways     |                   |                   |                  | HBOC Pathways    |                                 |                   |                      |                  |                   |                  | HBOC Pathways                     |
| Radiology                                 | HBOC STAR         |                                 | IDX              | ADAC MARS II   | HBOC Series       | ADAC MARS II      |                   |                   |                  |                  | HBOC STAR                       |                   |                      | ADAC MARS II     |                   | Per-Se' Consort  | HBOC STAR                         |
| Transcription                             | Softmed           | Dobey                           |                  | Softmed        |                   | Dobey             | Softmed           | Medrite           |                  | Softmed          |                                 | Dixtape           |                      | Softmed          |                   | SARMC            | Softmed                           |

## IT Complexity at IVK and Trinity (2/2)

- The IT systems at IVK have gotten complex
  - because the business units (BUs) have been able to adopt any kind of technologies they wanted.
  - The BUs adopted the technologies not for the overall company's interests, but for its self interests.
  - The IT groups had have little power to contain this proliferation of IT complexity.

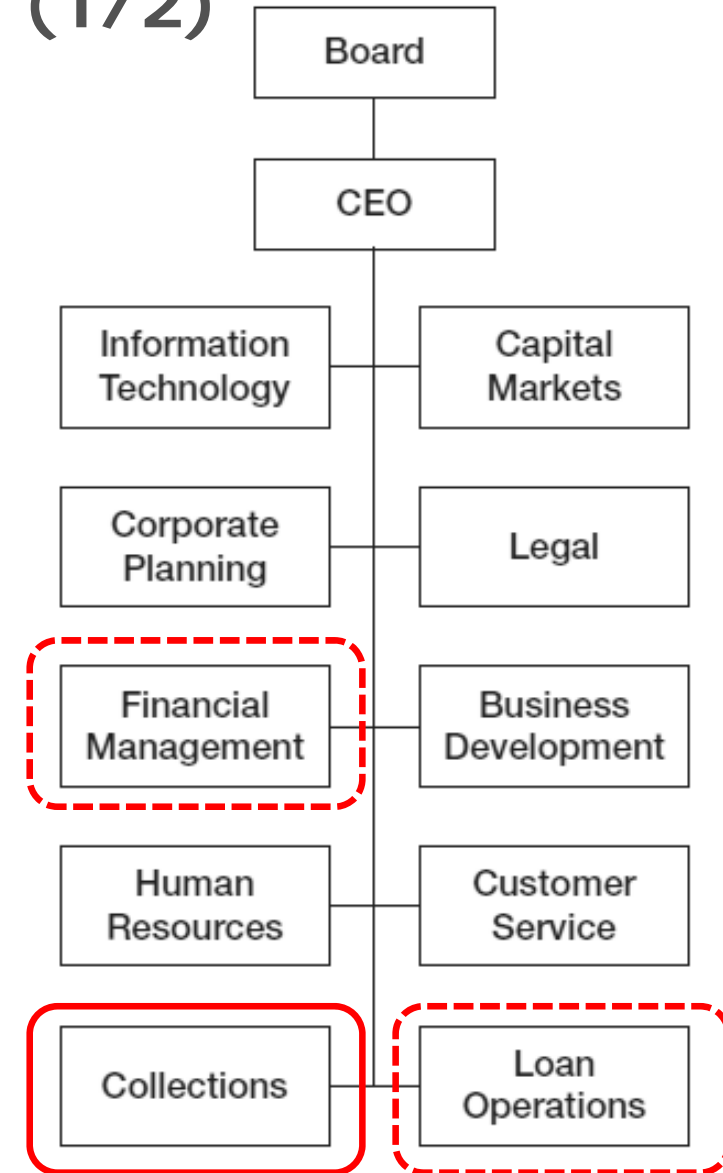


## Benefits of Standardization

- When there is freedom, employees and business units are using different kinds of ITs, whatever they want.
  - Some employees want to use PC/Blackberry and others want Mac and iPhone.
  - Some business units are using Oracle database, while others are using Microsoft SQL.
  - Some regional sales offices are using SAP ERP, while others are using Salesforce.com, a cloud-based CRM software.
- What are the problems in this case?

## Coupling between IT Systems (1/2)

- What does it mean by coupling in IT systems?
- Can the collections system at IVK be up-and-running without communicating with the loan operation system or the financial/accounting system?
- What if each of the systems uses different operating systems, different databases, and different data format?
  - What does IVK can do?





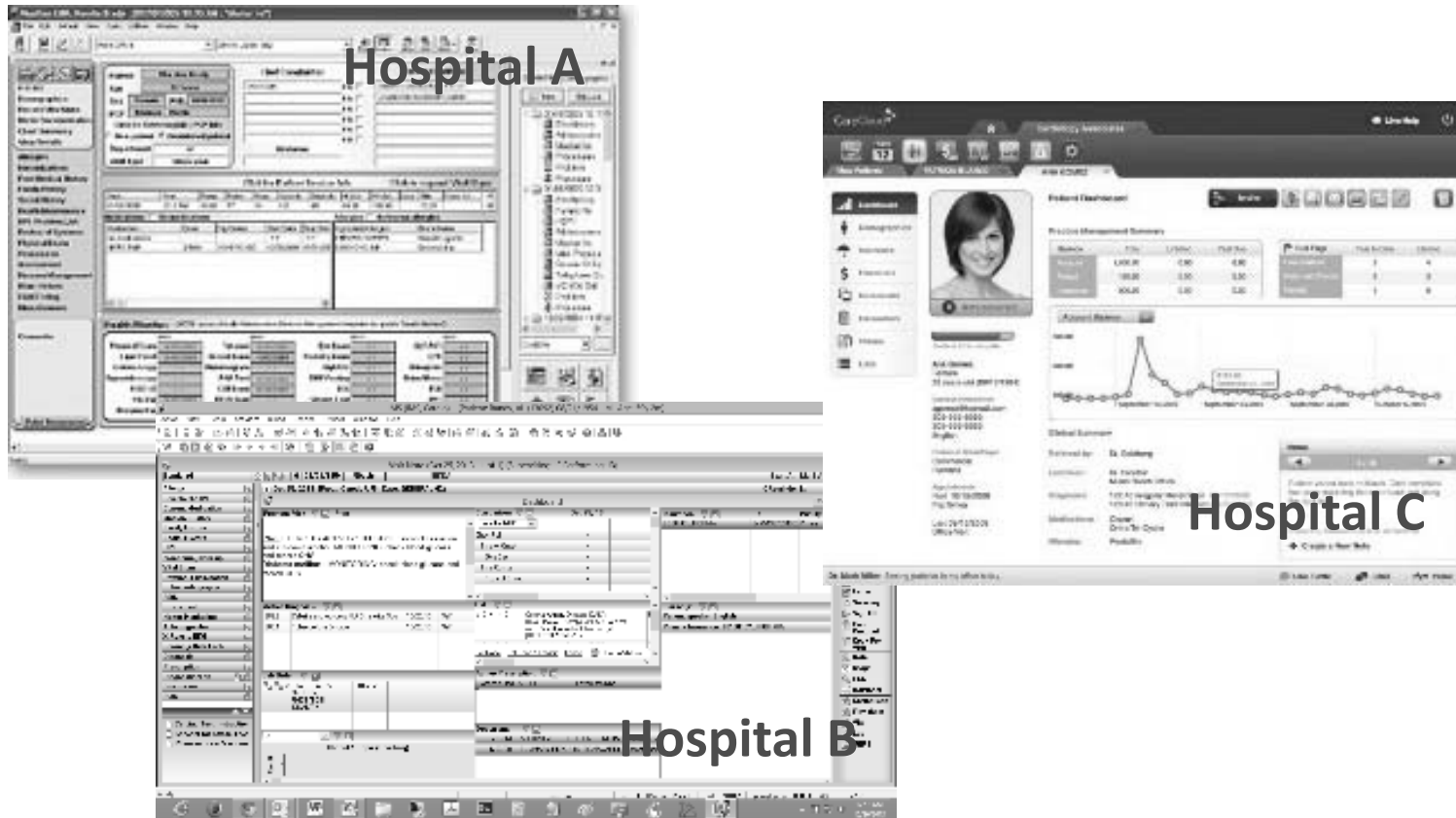
# Common Digital Platform

- What would happen if each hospital uses a different kind of EMR?



# Common Digital Platform

- What if a patient at Hospital A needs to get a lab test at Hospital B and meet a specialist at Hospital C?



## Coupling between IT Systems (2/2)

- No system in an organization operates alone.
- Even with different underlying technologies, each system can still function and communicate, but not in an effective, real-time manner.
  - With incompatible technologies, two systems have to have a bridge or a converter acting as a translator between the two.
  - A converter is expensive to develop and maintain but does not add any value to the system.
  - In hospitals, a converter can create a life-threatening error!

## Costs of Standardization (1/3)

- What if the CIO or the CEO forces
  - all employees to use PC and Blackberry, not Mac and iPhone
  - all business units to use Oracle database
  - all regional sales offices to use Salesforce.com, a cloud-based CRM software.
  
- What are the problems in this case?

# Costs of Standardization (2/3)

- What are the problems in this case?

| Operating Units                           | Silver Spring, MD    | Columbus, OH | Port Huron, MI | Mt. Clemens, MI | Pontiac, MI | Livonia, MI | Ann Arbor, MI | Battle Creek, MI | Grand Rapids, MI | Muskegon, MI | South Bend, IN | Clinton, IA | Dubuque, IA | Mason City, IA | Sioux City, IA | Boise, ID | Fresno, CA |
|---|----------------------|--------------|----------------|-----------------|-------------|-------------|---------------|------------------|------------------|--------------|----------------|-------------|-------------|----------------|----------------|-----------|------------|
| <b>Patient Administration</b>             |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Registration                              | McKesson HealthQuest |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Patient Accounting                        |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Medical Records                           |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| <b>Enterprise Resource Planning (ERP)</b> |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| General Ledger                            | PeopleSoft           |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Payroll/Human Resources                   |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| A/P                                       | Lawson               |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Materials Management                      |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| <b>Clinical Systems</b>                   |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Clinician Order Management                | CERNER CLINICALS     |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Results Reporting                         |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| ADEs                                      |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Clinical Documentation                    |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Laboratory                                |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Pharmacy                                  |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Surgery Management                        |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Radiology                                 |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |

# Costs of Standardization (3/3)

- Individual business units (hospitals) lose their control in their choice of technologies.
- Some business units may have a reason to use different technologies. With standards, they have to sacrifice flexibility they might need.
- Therefore, they will resist being imposed of the standards.

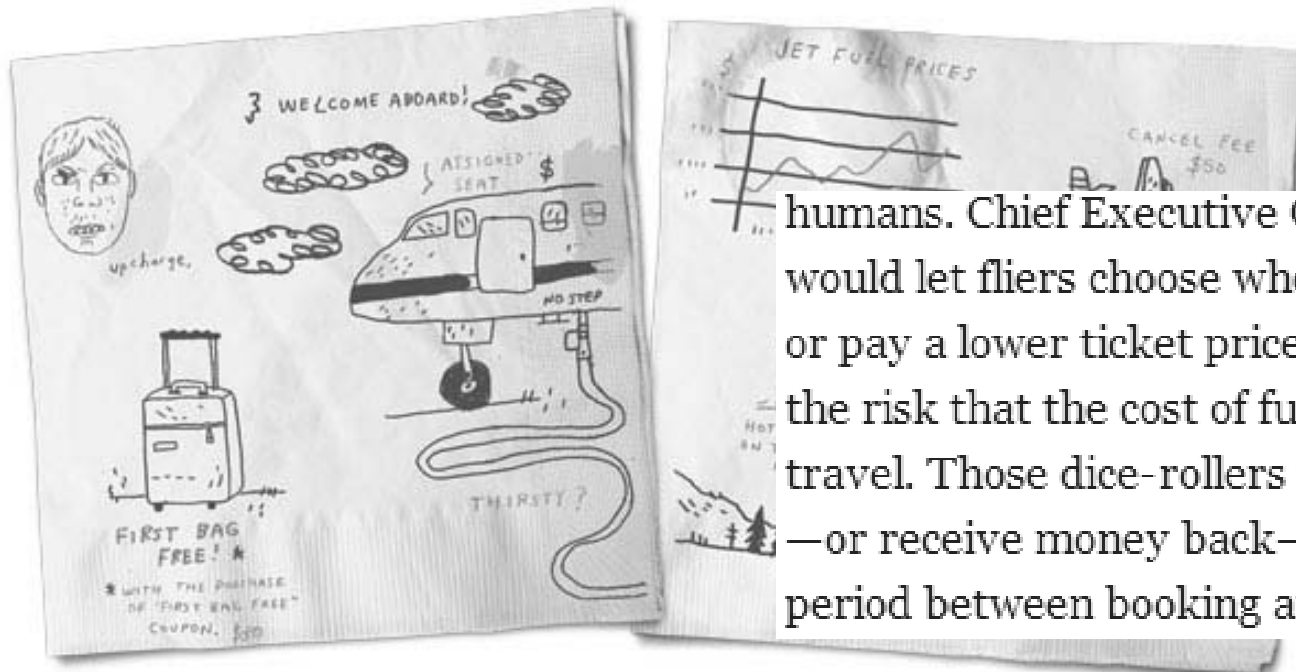
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|---|----------------------|--------------|----------------|-----------------|-------------|-------------|---------------|------------------|------------------|--------------|----------------|-------------|-------------|----------------|----------------|-----------|------------|
| <b>Patient Administration</b>             |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Registration                              | McKesson HealthQuest |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Patient Accounting                        | McKesson HealthQuest |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Medical Records                           | Cerner Profile       |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| <b>Enterprise Resource Planning (ERP)</b> |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| General Ledger                            | PeopleSoft           |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Payroll/Human Resources                   | PeopleSoft           |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| A/P                                       | Lawson               |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Materials Management                      | Lawson               |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| <b>Clinical Systems</b>                   |                      |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Clinician Order Management                | CERNER CLINICALS     |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Results Reporting                         | CERNER CLINICALS     |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| ADEs                                      | CERNER CLINICALS     |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Clinical Documentation                    | CERNER CLINICALS     |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Laboratory                                | CERNER CLINICALS     |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Pharmacy                                  | CERNER CLINICALS     |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Surgery Management                        | CERNER CLINICALS     |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |
| Radiology                                 | CERNER CLINICALS     |              |                |                 |             |             |               |                  |                  |              |                |             |             |                |                |           |            |

# Flexibility in IT at Enterprise Level (1/2)

Travel

## An Airline That Wants You to Pay for the Gas

**Bloomberg  
Businessweek**



humans. Chief Executive Officer Maurice Gallagher Jr. would let fliers choose whether to lock in a set, higher fare or pay a lower ticket price in exchange for shouldering the risk that the cost of fuel may increase before they travel. Those dice-rollers would pay an additional amount—or receive money back—if energy costs changed in the period between booking and flying. Says Gallagher: “We’ll

says Allegiant would need six to 12 months to build the technology into its website and potentially longer than



<http://www.businessweek.com/articles/2012-09-25/this-airline-wants-you-to-buy-the-jet-fuel>  
<http://www.sunshinefoundation.org/allegiantfamilies.html>

## **Flexibility in IT at Enterprise Level (2/2)**

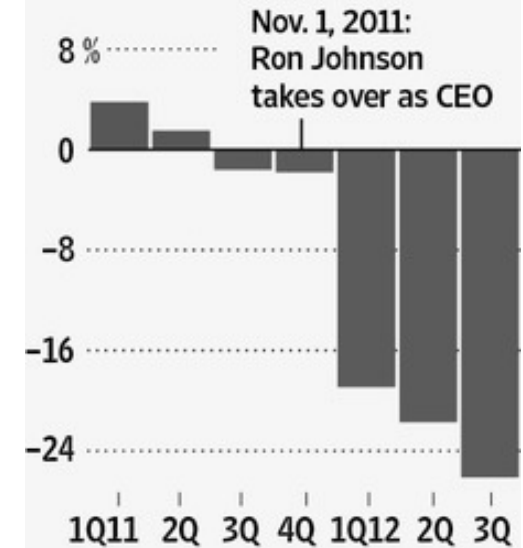
- IT Adventures Chapter 16
- A phone company in the 1990s had begun to offer a new “Friends and Family” calling plan that allowed people to call a specific handful of people for free; competitors, because of the evolved complexity of billing systems, had been unable to respond with similar plans for many months, and had lost big chunks of market share during that time.





### Out of Fashion

J.C. Penney's comparable store sales



Note: Fiscal year ends Jan. 26, 2013

Source: the company

The Wall Street Journal

## ● How would you save JCPenney?

[http://en.wikipedia.org/wiki/J. C. Penney](http://en.wikipedia.org/wiki/J._C._Penney)

<http://queenbee-insidethehive.blogspot.com/2012/11/jc-penney-digs-deeper-sales-hole.html>

# Can you save JCPenney with this complexity?



From: [www.cio.com](http://www.cio.com)

## **CIOs In Search of IT Simplicity**

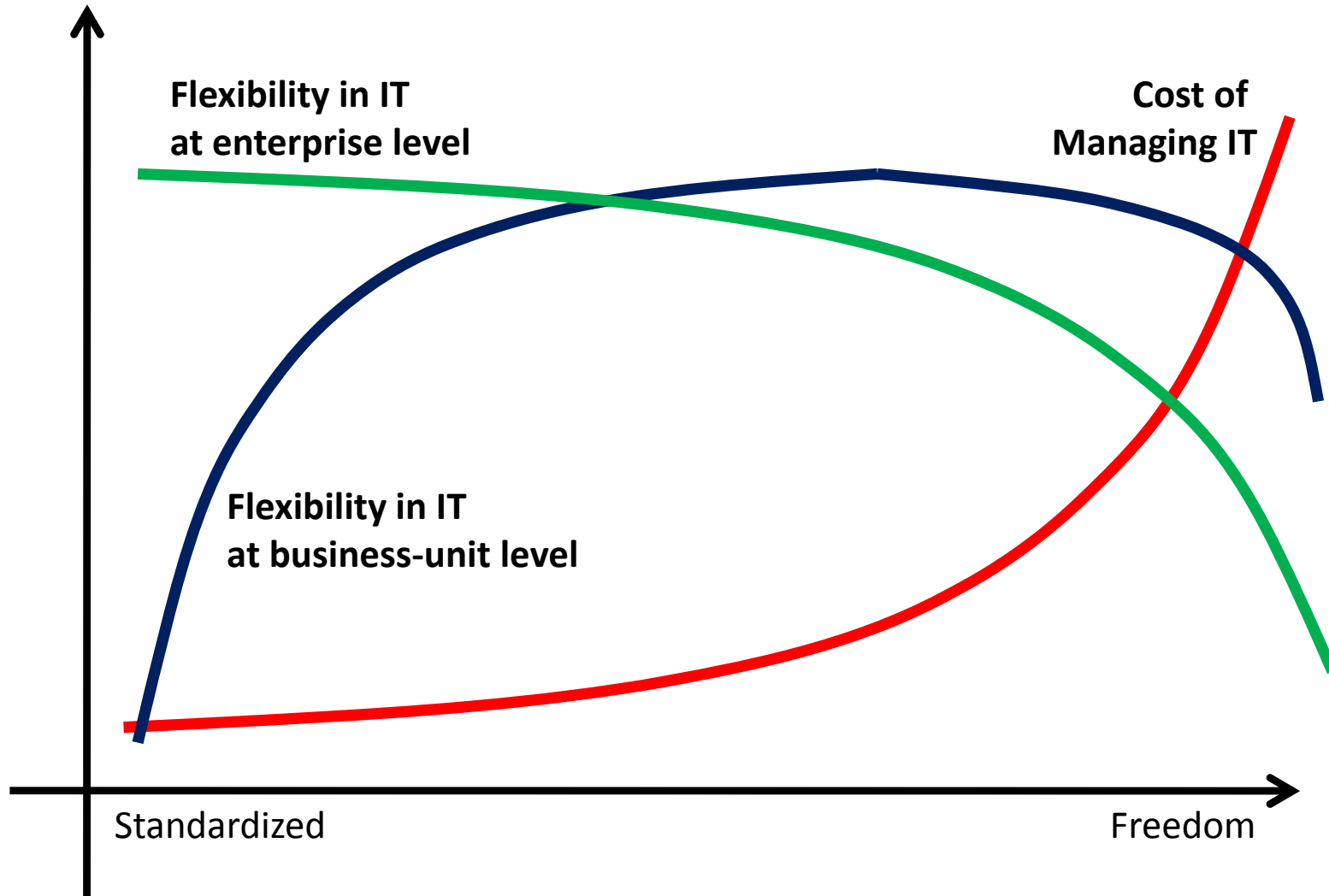
– Kim S. Nash, CIO

**June 28, 2012**

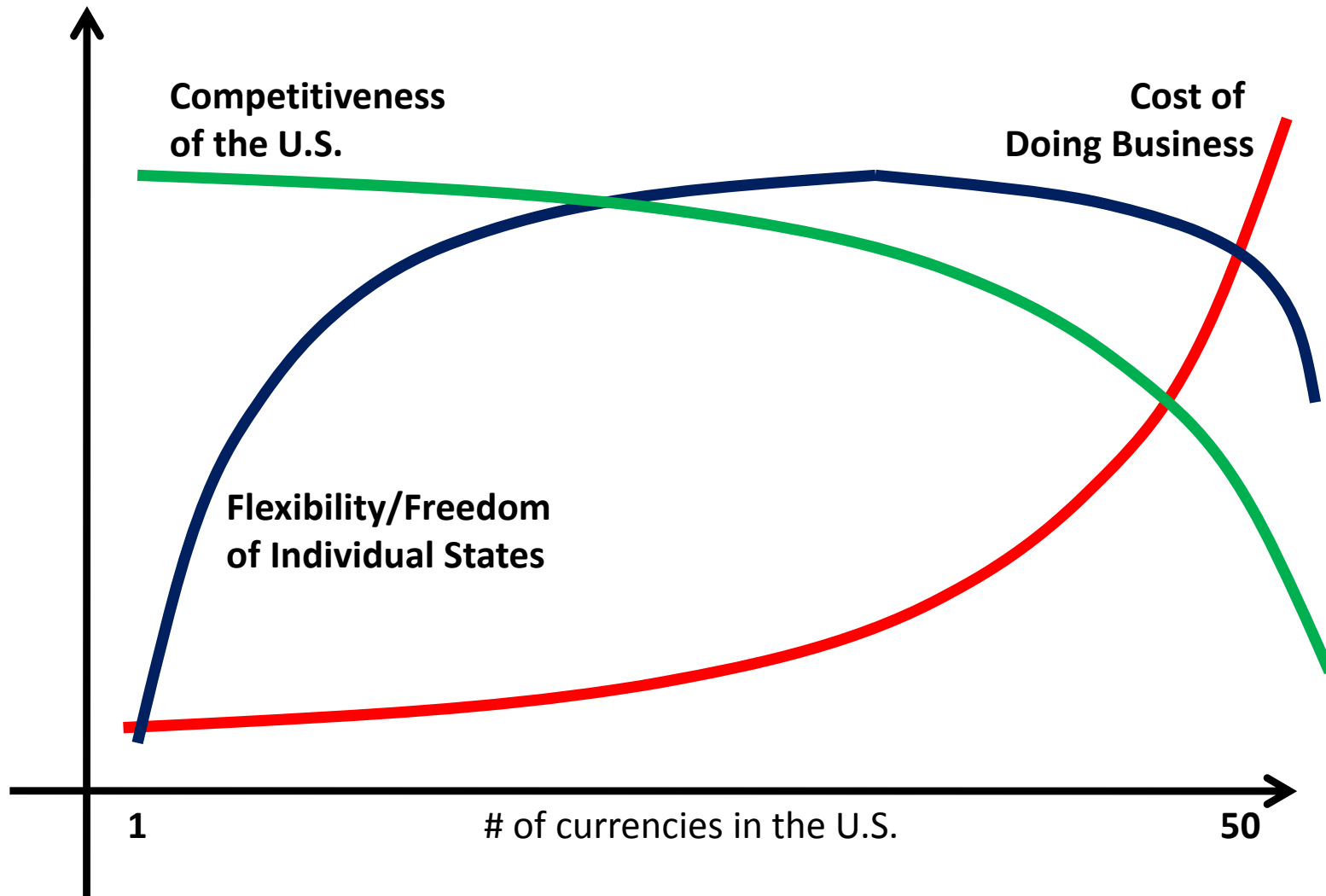
Complexity is slow, expensive and not secure. If systems are difficult to use, employees get flummoxed, wasting work time searching for functions or waiting for help. Multiply that lost time by thousands of employees, and entire companies slow down. When a new business opportunity or a chance to beat a competitor comes along, you can't move fast enough or don't have the funds to invest. (See "[CIOs Seeking System Interfaces That Are 'Apple-Simple'.](#)")

J.C. Penney's new COO Michael Kramer complained to Wall Street recently that he discovered the company runs 492 applications, 88 percent of which are custom. He thinks it should be running about 100 apps, total. "It's a mess," he said. The troubled retailer, which lost \$152 million last year on sales of \$17 billion, plans to simplify IT as part of a massive transformation project. "When you want to make a change in the business, it takes a lot of un-layering and putting back on," Kramer said. "That costs money."

# Tradeoff with Standard and Freedom (1/3)



# Tradeoff with Standard and Freedom (2/3)



## Tradeoff with Standard and Freedom (3/3)

- Imposing standards across the organization reduces costs in managing IT systems (better licensing/price, fewer staff, and fewer converters).
- Imposing the standards limits flexibility or innovation within individual business units.
  - Too much freedom, however, hurts flexibility of individual BUs since maintaining coupling between the systems becomes very expensive.
- Too much freedom also undermine strategic flexibility and agility from the overall enterprise perspective.