COURSE TITLE: INNOVATION IN FINTECH

LECTURE: VALUE PROPOSITIONS

Lecturer Radjabov Jamsher

Data Management Improvement Process

Select Industry or Government Function

Scope Industry Segment or Government Function

Identify Forms and Paperwork Processes Within Segment or Function

Select Forms and Processes to Be Addressed

Harmonize and Reduce

- **Determine Core Data Elements and Business Rules**
- **Harmonize Data Elements and Business Rules; Coordinate With Industry Standards**
- **Finalize and Publish XML Schema for Data Elements, Business Rules and Presentation Formats**

Work With:

- Business and Industry Associations
- Industry Solutions Vendors
- Federal, State and Local Governments
- Customer Agents
- Industry XML and Data Standards Bodies

Publish Data Routing Processes

Create Harmonized Forms

Customer Agents

Private Industry Solutions, Systems, Services and Software Modules

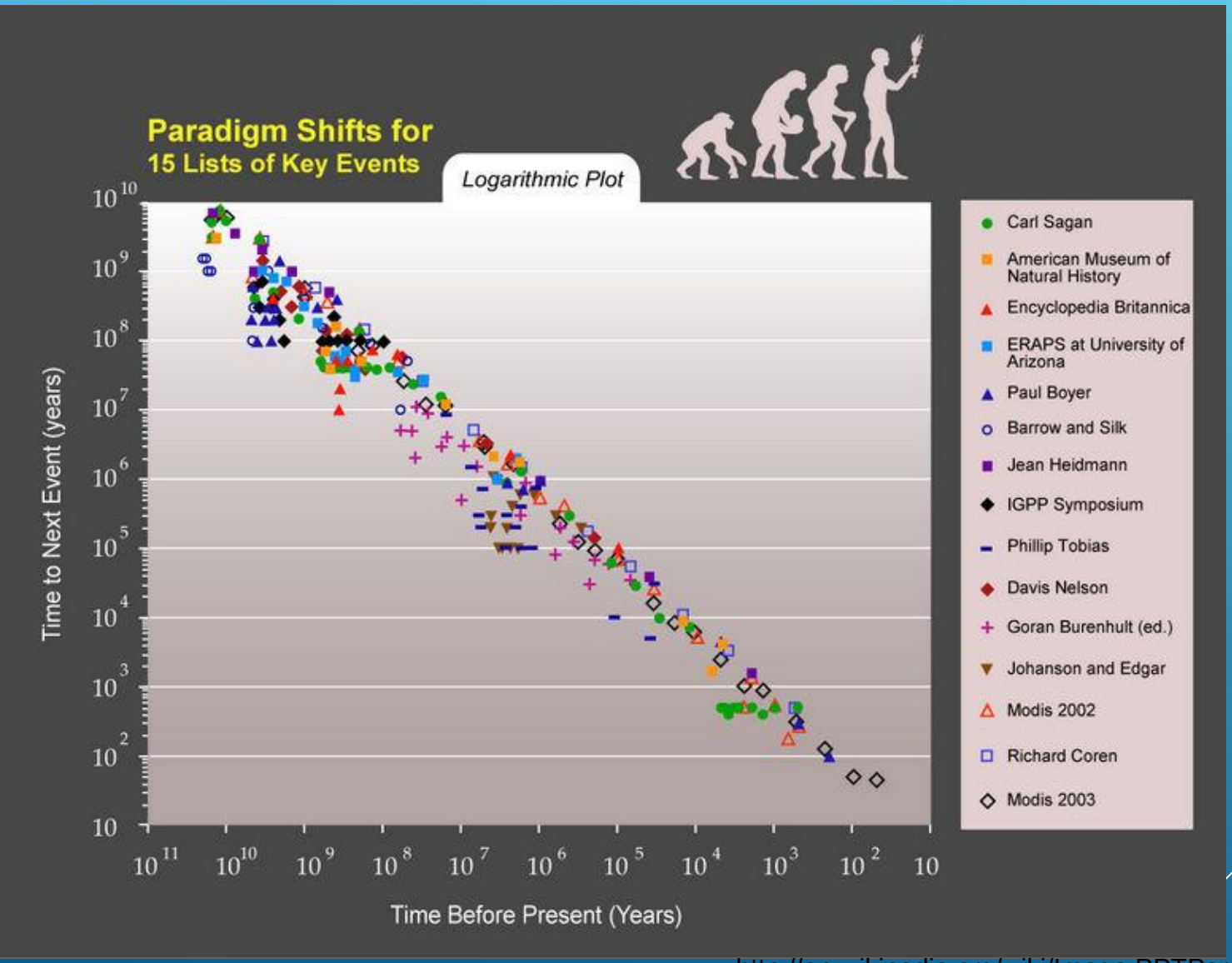
Agency Processing, Applications, Databases and Legacy Systems

THE NEXT 50 YEARS

- Devices per chip continue to double every 12 months.
- The pace of change continues to accelerate.
- 100 years happens in 20 at the current rate.*
- Use to ubiquity.
- Distinctive to disposable.
- Peripheral to integral.

*Ray Kurzweil, *The Age of Spiritual Machines*

THE PACE OF CHANGE IS ACCELERATING



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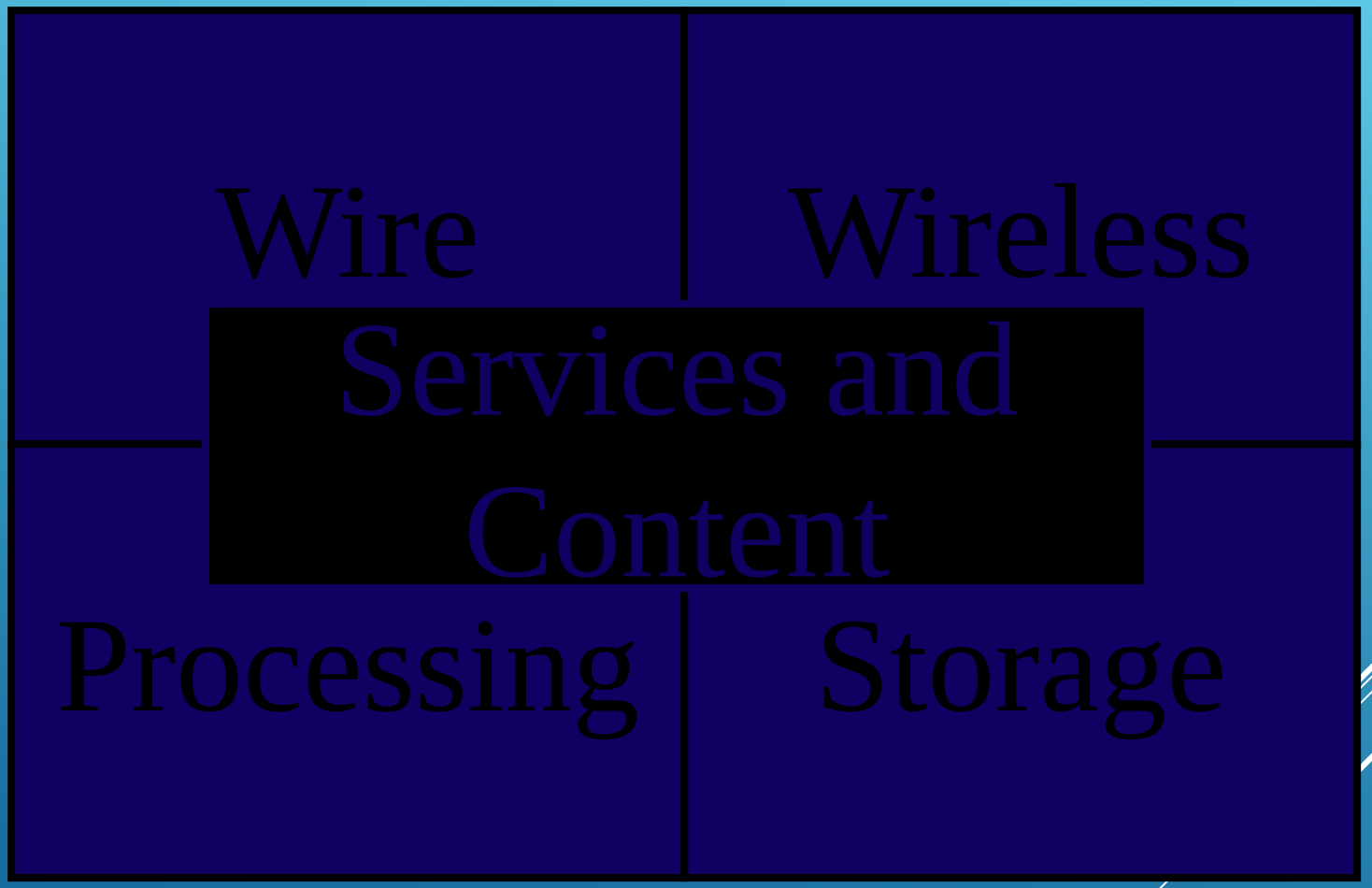
FOUR WAYS TO IT



UNIVERSAL **ACCESS**

- Anyone, anywhere, anytime will be able to instantaneously talk, write and send visual and audio information to anyone else.
- IP replaces Esperanto.
- Please put my universal translator engine in my cell phone in my ear rather than a Babel Fish…

The Digital Majority

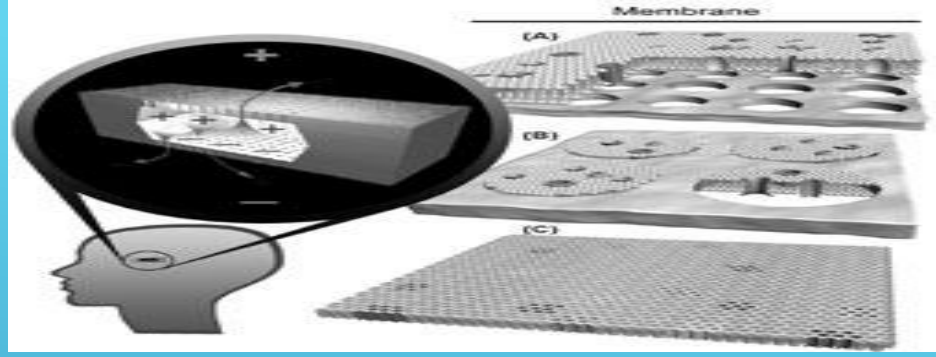
Watch the Third Screen

Like Starbucks' relentless attempts to sell itself as the "third place," the wireless industry is trying to sell itself as the "third screen."

2010:

- **500 Million Broadband Users**
- **2.3 Billion Cell Phones**

SPARE PARTS



Availability dates:

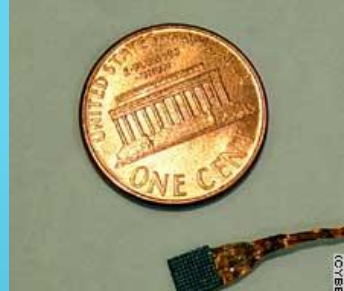
- Artificial Brain Cells 2017
- Artificial Brain 2035
- Artificial Eyes 2010
- Artificial Eye Implant 2024
- Permanent Mechanical Heart 2010
- Synthetic Muscles 2019
- Lungs And Kidneys 2015

DATA: BRITISH TELEPHONE LABS in Business Week, March 200 and in The Register, February 2005

- Over 100,000 Cochlear Ear Implants
- Bionic limbs moved by thought
- Exoskeletons
- Limbs, joints and bones
- Carbon nanotubes

Figure 1. The internal component of the cochlear implant

NOW PICKING UP A SPARE…



- A BrainGate, enabled paralyzed Matthew Nagle, to move a computer cursor, change TV channels and operate fingers on a prosthetic hand.
- Long-term goal of the study was to develop brain computer interfaces (BCIs).

BRAIN COMPUTER INTERFACE

UNLOCKING ERIC

- Eric Ramsey has been "locked-in" since 1999. “A locked-in patient is somebody who is basically alert and intelligent, but they cannot communicate.”
- “His thinking brain is intact, but he cannot move, he can hardly move his eyes, he cannot speak, he gets spasms from time to time."
- They are presently detecting the pattern of firing in signals and the pattern is associated with particular phonemes or word sounds that he is trying to produce. They have done that mapping and are trying to detect them and send them back to him, so that he can actually produce the phonemes or sounds of words. The result will be a computer synthesizing Eric's attempts to speak.

MORE THAN THE SUM OF OUR PARTS

- Beyond alleviating the effects of disabilities, normal functioning humans could upgrade to improve intelligence, sensory awareness or simply to counter the effects of aging.
- Disability becomes ability?
- Ampl-ability (ability becomes amplified)?
- Eubility (good things beyond human ability)?
- Malability (things we wish humans could never do)?

COMPUTER **TIPPING POINT**

- Computers reach the speed of 20 quadrillion instructions per second, equal to the human brain
  - In accordance with Moore's law, we expected to reach the computational capacity of the human brain---20 million billion neuron connection calculations per second (100 billion neurons times an average of 1,000 connections to other neurons times 200 calculations per second per connection)---in a super computer by 2010 and in a standard personal computer by the year 2020.

KURWEIL'S **VISION**

- By the year 2040 a super computer reaches the collective brain speed of all the human brains alive.
- By 2050 global brain speed is available on a $1,000 laptop.

- Cumulative machine intelligence becomes larger than cumulative human intelligence.
- GNR (Genetic, Nanotechnology and Robotics) combine to remake civilization as we know it.

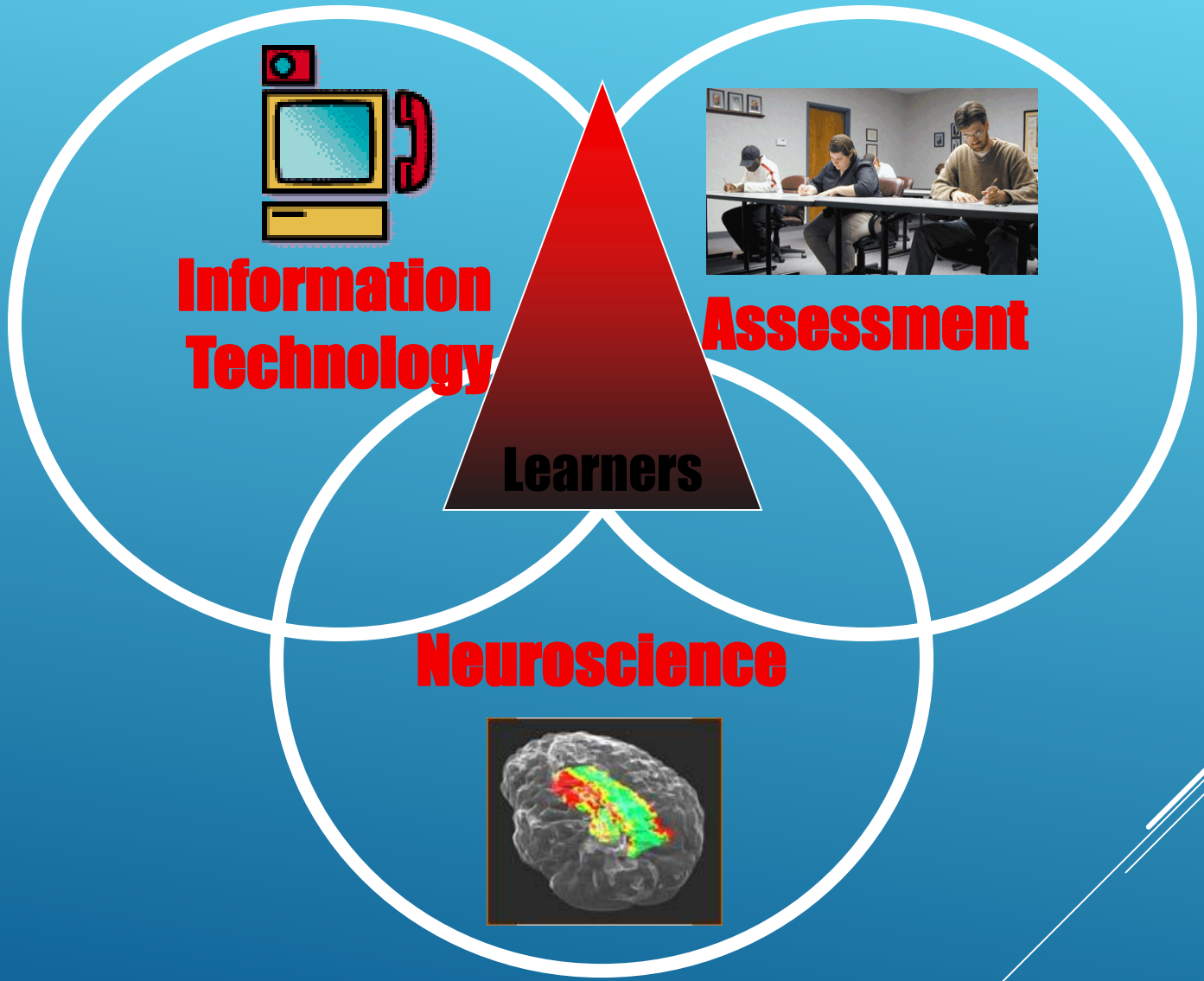
BEFORE YOU **RETIRE OR DIE**

- Non-invasive brain scanning capabilities are growing exponentially.
- Reverse engineering of the brain and other software techniques make machines more than human in many ways.
- "Will I dream, Doctor?"

HI, **HAL**

NIBIB
NATIONAL INSTITUTE OF BIOMEDICAL IMAGING AND BIOENGINEERING

CONVERGENCE IN LEARNING



Diagnosis, Response and "Treatment"

INHERENT IT ADVANTAGES IN EDUCATION?

- Customization and individualization
- Democratization of access, content and tools
- Non-linearity
- Place indifference
- Availability of changeable content
- The elimination of rote tasks in teaching and learning

INHERENT IT ADVANTAGES IN EDUCATION?

- More time to focus on only that which a human can do well
- Instant access human knowledge in all forms
- Overlaying data on our experiences
- Sharing
- Collaboration
- Input and outcome analysis

ARE WE TAKING ADVANTAGE OF THE INHERENT ADVANTAGES OF IT IN EDUCATION?

Ummm...No

WHAT IS MOST OUT OF WHACK?

- The Carnegie Unit credit hours
- Linearity
- Grades
- Subjects
- Learning to remember rather than learning to learn
- Education is expected to cure all with out concomitant resources

WHAT IS MOST OUT OF WHACK?

- Assessment is misapplied with too many high-stakes low-yield tests and not enough low-stakes

  high-yield tests.
- The policy response is inadequate to the amount of change, the size of the challenge and the importance of the outcome.

COURSEWARE

- 1: Each academic program has an articulated curriculum.
- 2: Each class has specified goals

  and objectives.
- 3: Standards and the method of assessment are agreed upon.
- 4: Student achievement level and learning style are assessed.

MORE COURSEWARE STEPS…

- 5: Learning and instruction plan is customized and matched to goals, objectives and student learning style.
- 6: Search for, acquire and develop courseware to meet the learning and instruction plans.
- 7: Training in the use of the courseware and courseware tools is delivered.

FINAL COURSEWARE STEPS

- 8: Courseware is delivered.
- 9: Continuous assessment based on standards is used to determine level of achievement of goals and objectives.
- 10--Results of the assessment are fed back into the curriculum articulation and writing process.
- Repeat the cycle.

COURSEWARE LAYERS

- Experience, Information and Knowledge
- Objects
- Modules
- Units
- Courses or Competencies
- Degrees, Certificates and Documented Achievement

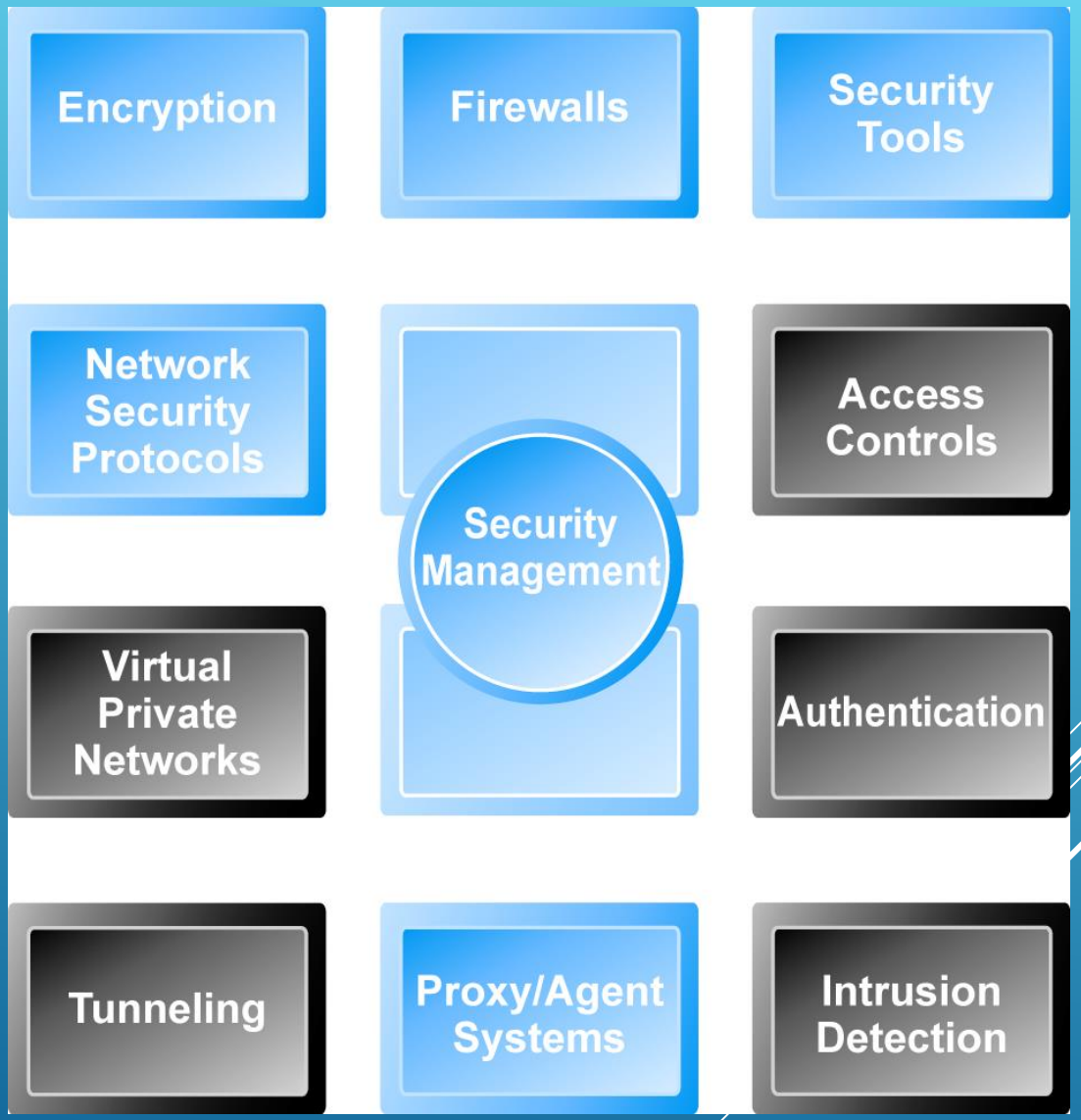
MOST COMMON SECURITY THREATS

- Denial of service (DoS) attack
  - Hackers flood site with useless traffic to overwhelm network
- Distributed denial of service (DDoS) attack
  - Hackers use multiple computers to attack target network
- Sniffing
  - Eavesdropping program that monitors information traveling over a network
- Insider jobs
  - Single largest financial threat
- Poorly designed server and client software

TECHNOLOGY SOLUTIONS

- Protecting Internet communications (encryption)
- Securing channels of communication (SSL, S-HTTP, VPNs)
- Protecting networks (firewalls)
- Protecting servers and clients

TOOLS AVAILABLE TO ACHIEVE SITE SECURITY



ENCRYPTION

- Encryption
  - Transforms data into cipher text readable only by sender and receiver
  - Secures stored information and information transmission
  - Provides 4 of 6 key dimensions of e-commerce security:
    1. Message integrity
    2. Nonrepudiation
    3. Authentication
    4. Confidentiality

SYMMETRIC KEY ENCRYPTION

- Sender and receiver use same digital key to encrypt and decrypt message
- Requires different set of keys for each transaction
- Strength of encryption
  - Length of binary key used to encrypt data
- Advanced Encryption Standard (AES)
  - Most widely used symmetric key encryption
  - Uses 128-, 192-, and 256-bit encryption keys
- Other standards use keys with up to 2,048 bits

PUBLIC KEY ENCRYPTION

- Uses two mathematically related digital keys
  1. Public key (widely disseminated)
  2. Private key (kept secret by owner)
- Both keys used to encrypt and decrypt message
- Once key used to encrypt message, same key cannot be used to decrypt message
- Sender uses recipient's public key to encrypt message; recipient uses his/her private key to decrypt it

Reference

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