The Fight in the Cyber War Today

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688 Information Operations Wing
Commander

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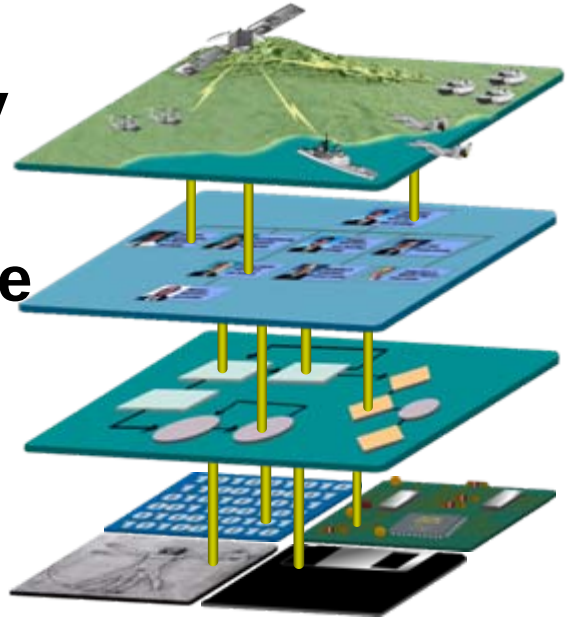
"Perfection is not attainable, but if we chase perfection we can catch excellence"
(Vince Lombardi)

Senior Leader Views

- **Senior Leader View**
  - **“Information technology enables almost everything the U.S. military does” Deputy Secretary of Defense William Lynn III**
  - **“Cyberspace pervades everything we do, in every domain, and extends from your workspace to the battlespace.” Secretary of the Air Force Michael B. Donley**
  - **Cyber Domain Essential to Dominance**
  - **Definition of “Integration and Sustainability”**



Environment

Vulnerability

Risk

Network Traffic

- 90 Trillion Emails Sent in 2009
- 81% Spam – 200 Billion Spam Emails/Day
- 80% of HTTP Bandwidth is App-Based not Browser-Based

Vulnerability

Risk

DoD Global Information Grid

- 7,000,000 DoD Computers Worldwide
- 1,000s of Warfighting and Support Applications

Malware

- 10 Million Pieces of New Malware Cataloged First Half of 2010
- Daily Production of Malware Increased from 100 in 2008, 500 in 2009 to 3,300 in 2010

Threat

Future

Battle Damage Assessment

- Average Cost of Network Intrusions Per Year $3 Million
- Pentagon Spent $100 Million in the Last 6 Months Responding to and Repairing Cyber Attack Damage

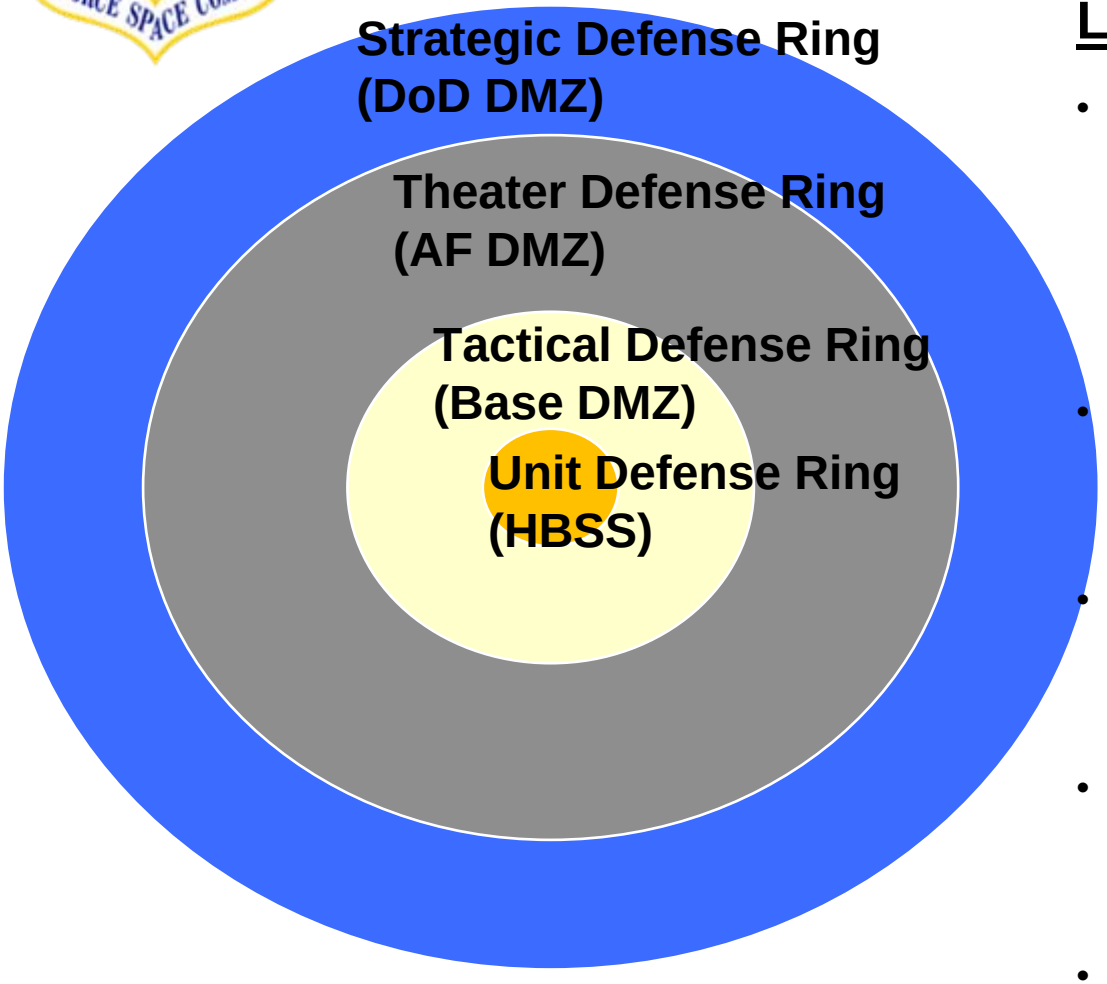
Threat

Future

People*Threat*People*Threat*People*Threat*People*Threat*People*Threat*People*Threat*

People*Threat*People*Threat*People*Threat*People*Threat*People*Threat*People*Threat*

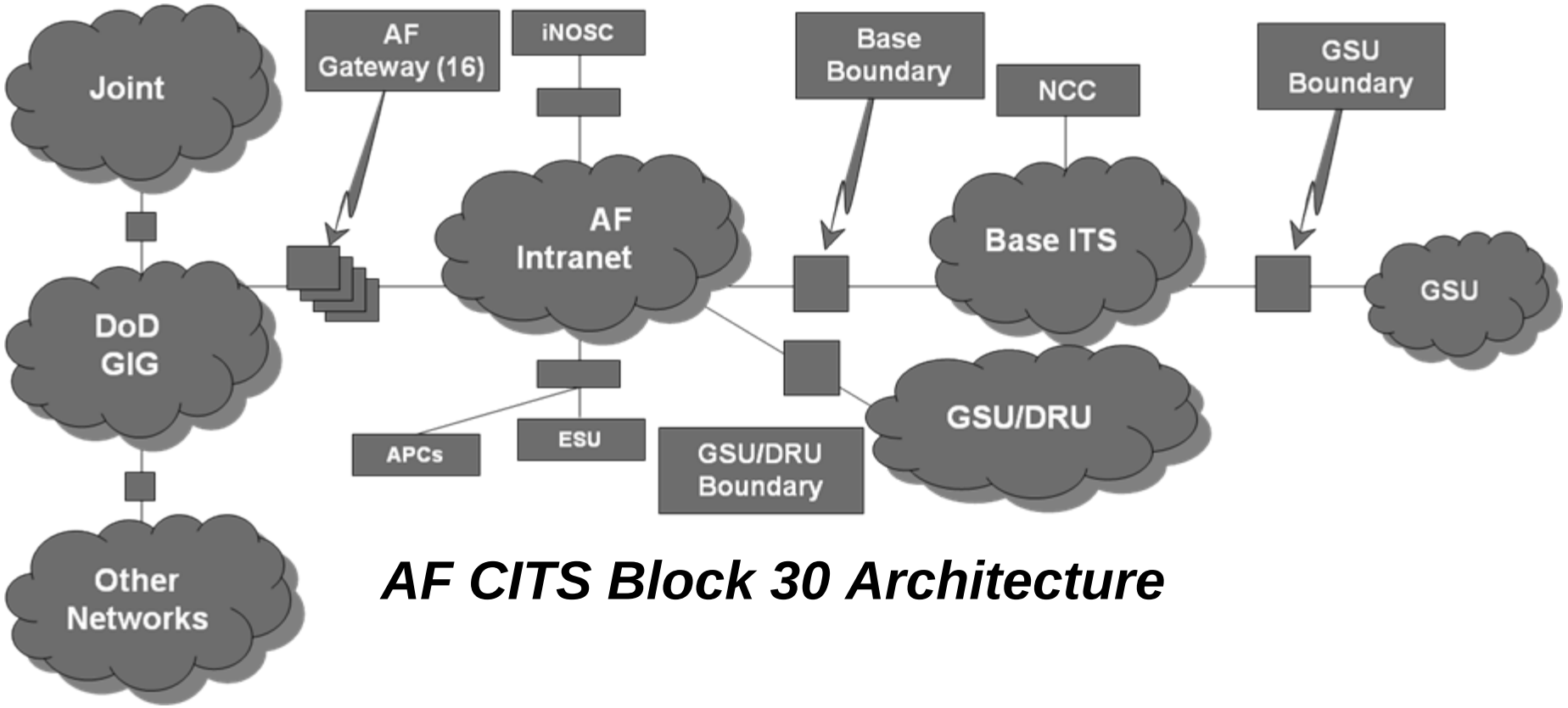
Current Cyberspace Layered Defense Thinking



Layers of Defense

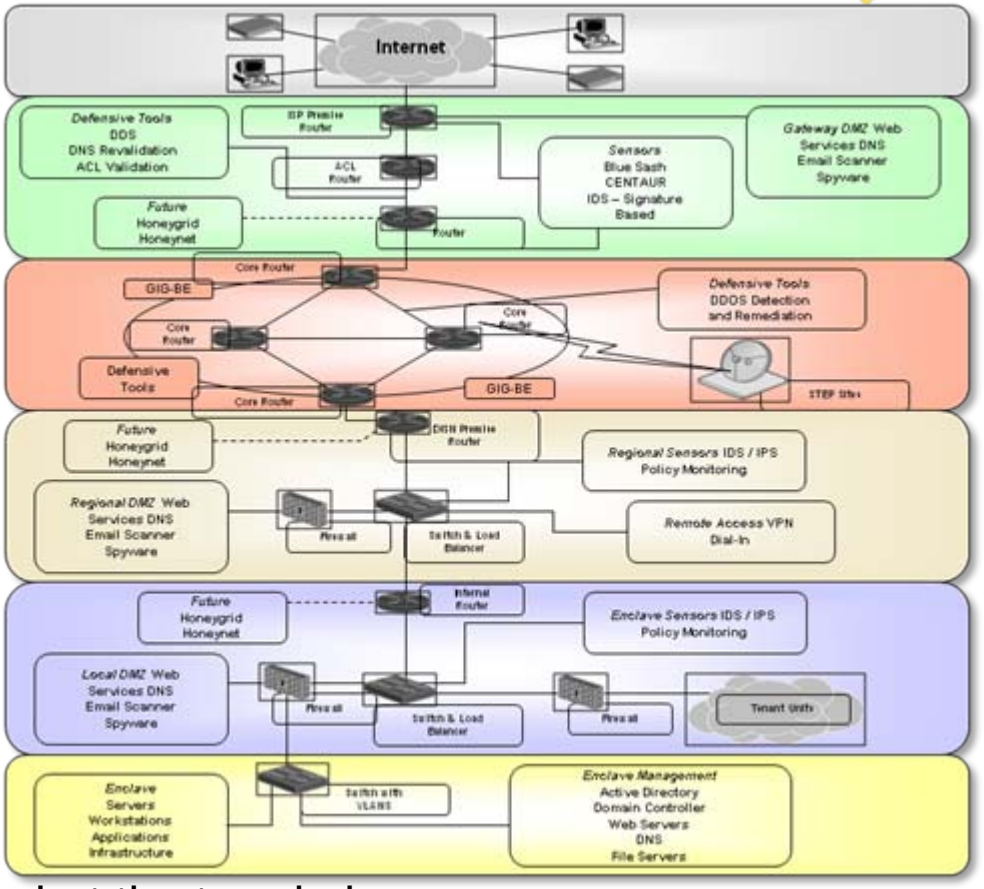
- **Unlike "traditional" air defenses, must protect against outside & inside threats**
  - **Attacks can be initiated from outside or inside the network**
- **Strategic Defense Ring**
  - **DoD DMZ under DISA C2 to protect GiG**
- **Theater Defense Ring**
  - **AF DMZ under AF C2 to protect AFNet**
- **Tactical Defense Ring**
  - **Base DMZ under AF C2 to protect individual base**
- **Unit Defense Ring**
  - **Individual system protection (ie HBSS) under AF C2 to protect against insider threat**

What Does This Look Like in our AF?



AF CITS Block 30 Architecture

Defense in Depth akin to "Political Maps"



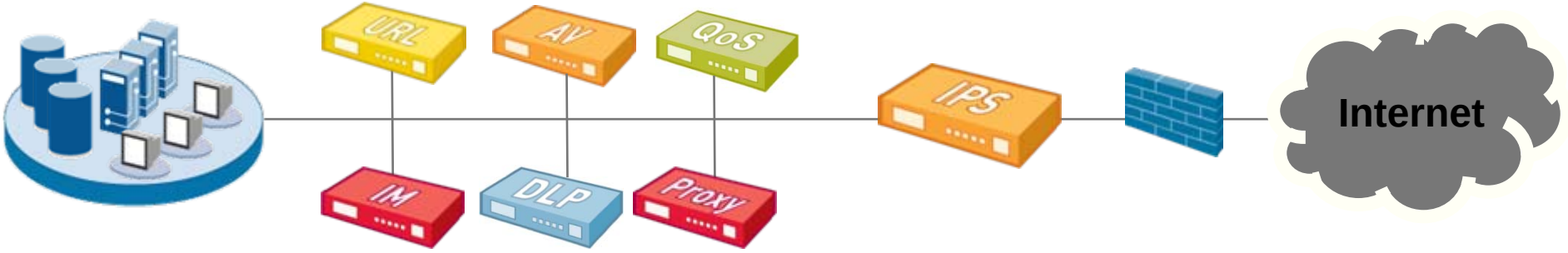
Political Maps:

- Gives general 2 dimensional orientation
- Contains no topographical info-can't tell what the terrain is

Defense in Depth:

- Addresses the path of data in & out of the net (network layers 2,3 & 4)
- Tells us nothing about what happens after data arrives (network layers 5 & above)

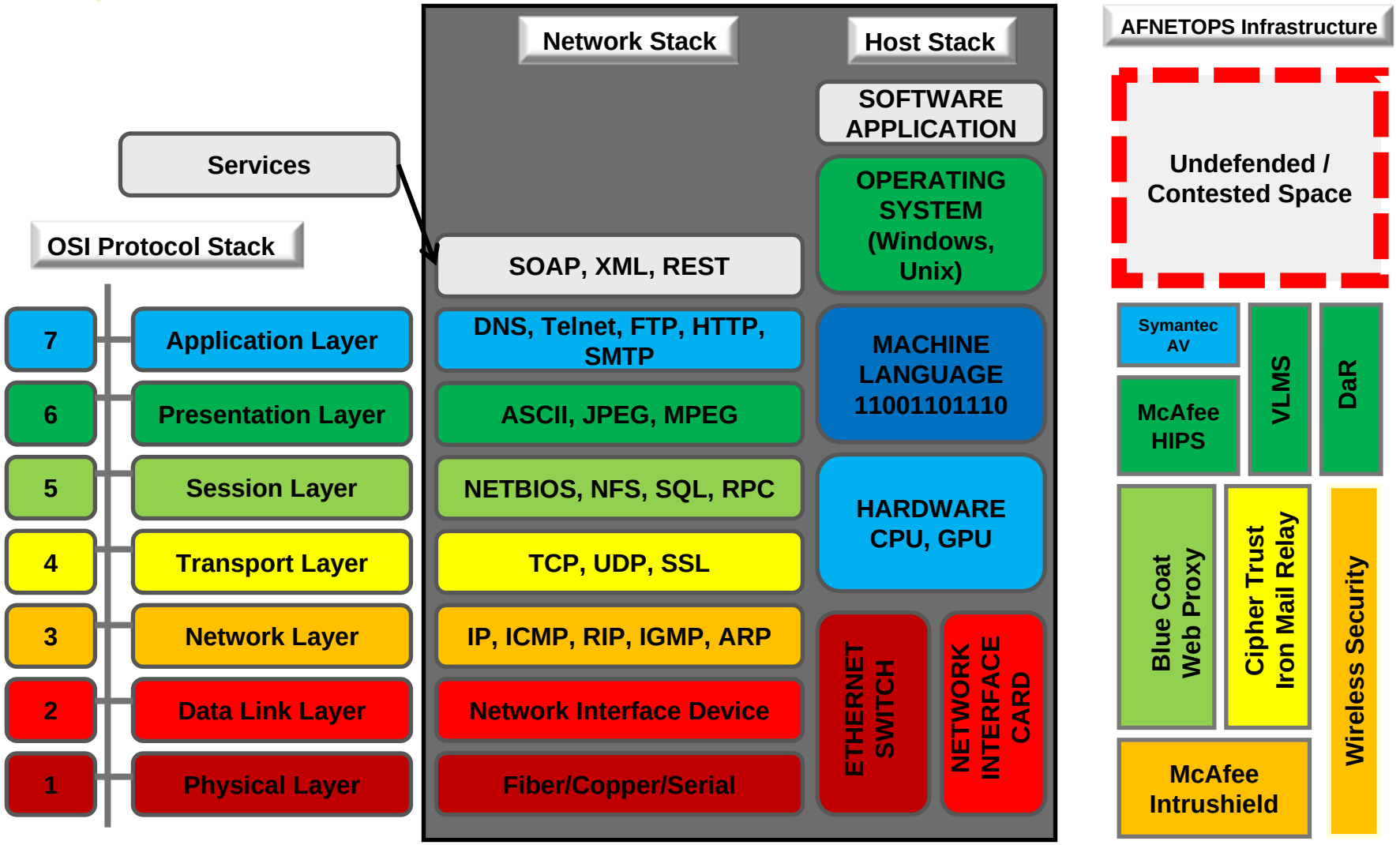
The Fix?
Sprawl Is Not The Answer…



- State of current practice is to spread out the load:
  - Adding proxies (doesn't solve the problem)
  - Firewall "helpers" (limited view of traffic)
- All this structure is costly to buy, maintain, and operate

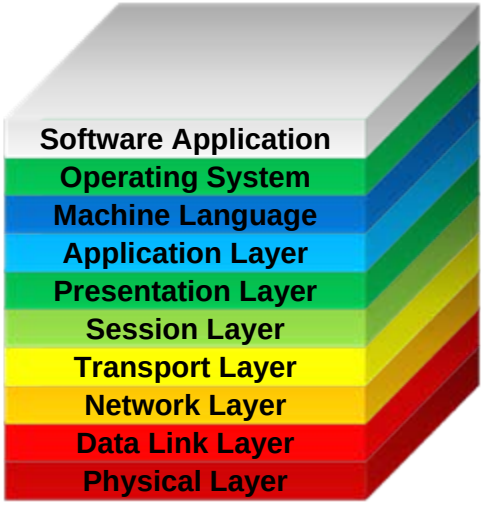
Point Solutions…add complexity and will not scale

Where are we Putting our Defenses Today?



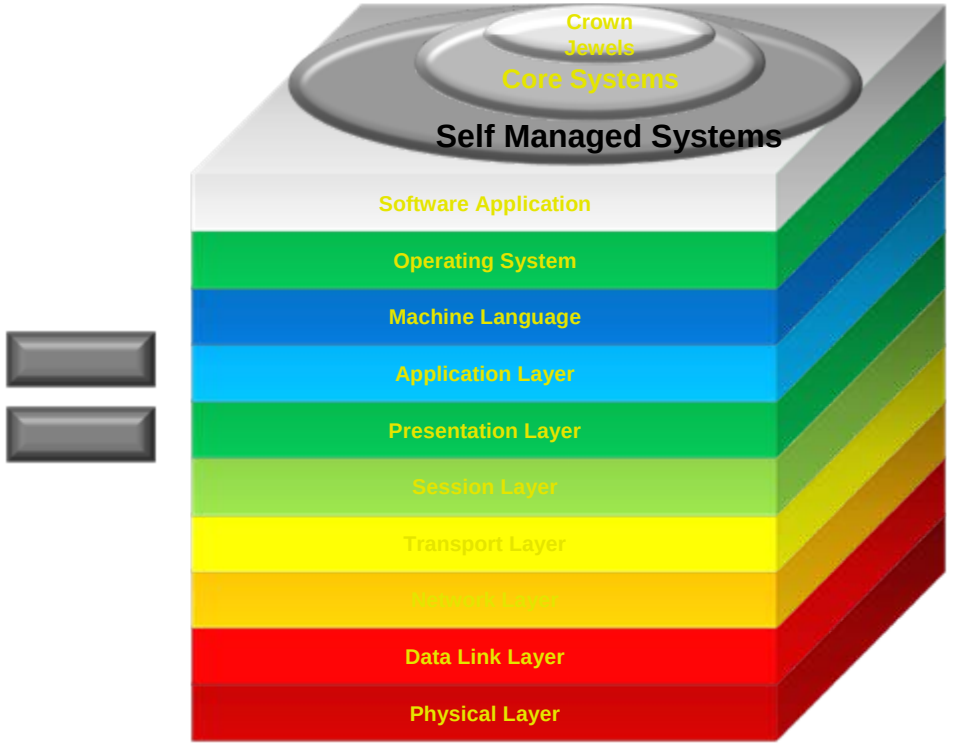
How do we Implement?

- **Firewalls are effective at Layers 2, 3 & 4 - need to address the higher layers**
- **Need to implement *more* real-time code/packet inspection technology to address the entire cyber terrain:**
  - **Application Identification: *Identify the application***
    - ***Application Protocol Detection/Decryption/Decoding***
    - ***Heuristics & Signatures***
  - **User Identification: *Identify the user***
    - ***Fingerprinting***
    - ***Detect Malware Beacons***
  - **Content Identification: *Scan the content***
    - ***Identify and block data ex-filtration***
    - ***Identify and block malware***



Need to Apply Protection Equally to External and Internal Threats

What should replace Defense in Depth?
A New Cyber 'Terrain' Map

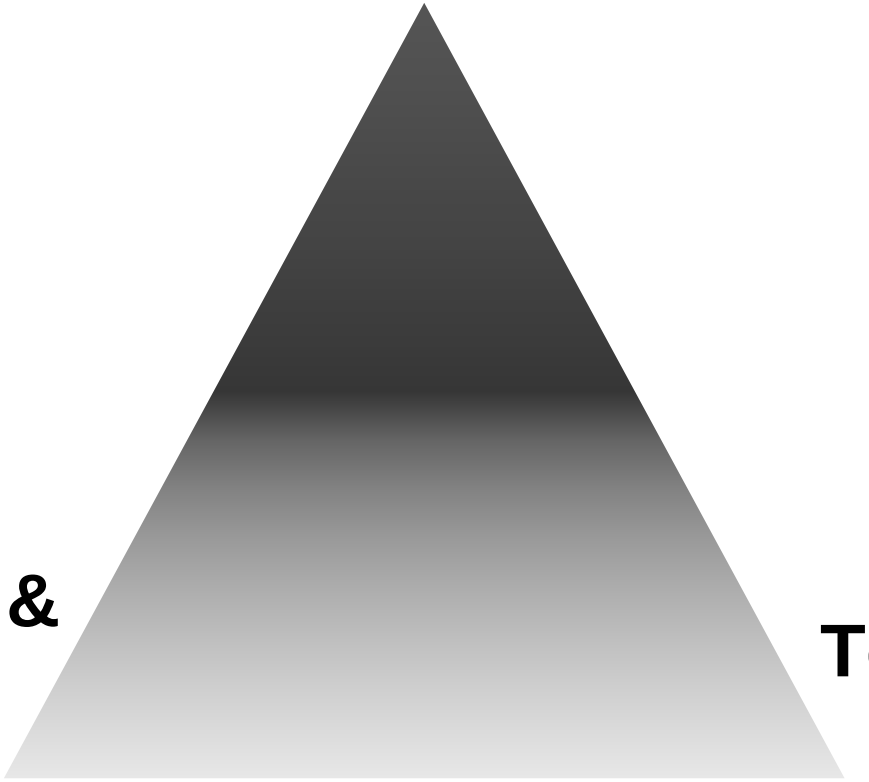


Cyber 'Terrain' Map:

- **Addresses both the path of data in and out of the net (network layers 2, 3, & 4) as well as the what happens after data arrives (network layers 5 & above)**

Triangle of Sustainment

Talent Management



Organization & Processes

Technology

Organization & Processes

- 24th Air Force & Associated Wings
- COCOM, MAJCOM & Base Presence
- Identified our Assets (Map the Net)
- 40 Assessments and 80 Tests

Talent Management

- **73 Air Force Specialty Codes**
- **Cyber Warrior Training**
- **Supported 15 Major Exercises**
- **Total Force**

Technology

- **Deployed Information Operations Platform**
- **Delivered 129 Capabilities**
- **Remote Assessments**
- **Cyber Modeling and Simulation**

Protecting and Advancing the Cyber Domain

688 IOW Built for the Fight

- Cyber Focused Exercises
- Partnership with Industry
- Industrial Control System Host Based Security System Tactics
- Real-Time Net-A/Net-D Capabilities
- Emissions Security
- Mission Qualification Training
- Hunter Team Concept

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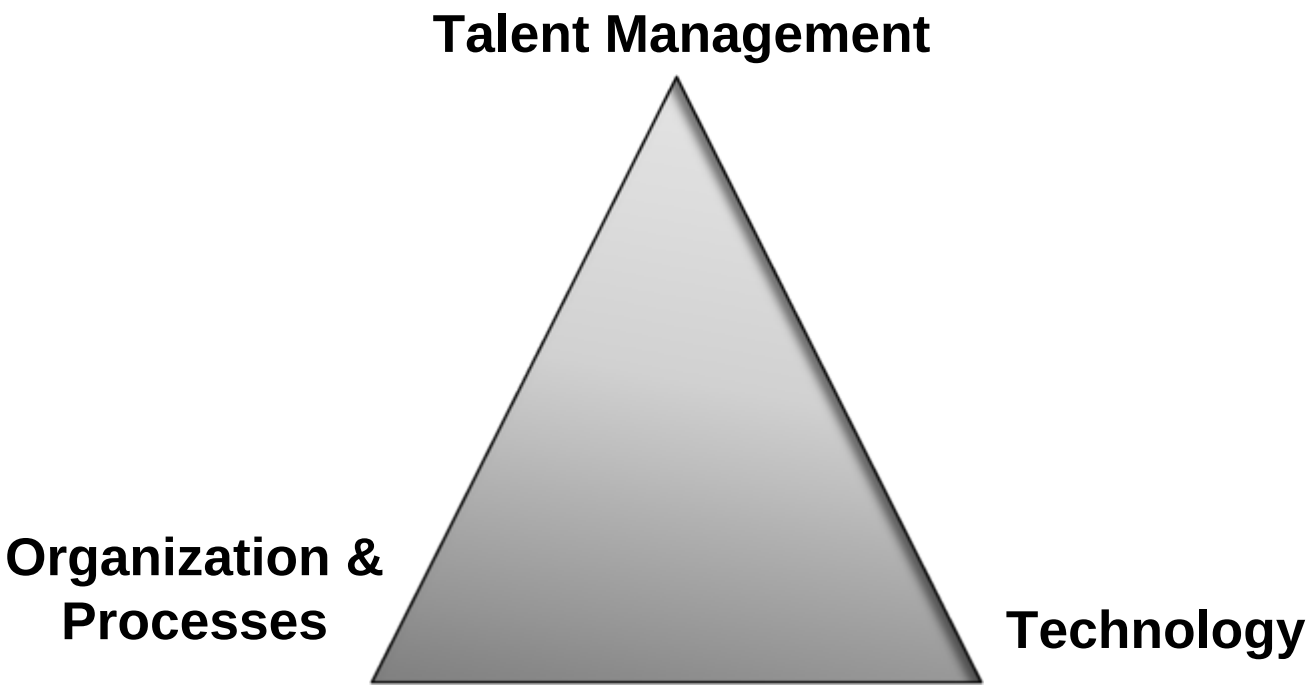
Summary

- Cyber Domain Critical to the War-Fighting Effort
- Importance of Cyber Integration & Sustainment
- 688 IOW Armed and Ready



Questions

BACKUP

Protecting and Advancing the Cyber Domain

Integration

Assessments

Innovation

Training

Operational Engineering

Test/Evaluation

Tactics

Real-Time Ops Support

Integration

- National Capital Region
- Cyber Focused Exercises
- Total Force

Protecting and Advancing the Cyber Domain

Integration

Assessments

Innovation

Training

Operational Engineering

Test/Evaluation

Tactics

Real-Time Ops Support

Innovation

- Cooperative Research and Development Agreements
- Partnership with Industry
- National and Air Force Laboratories

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Protecting and Advancing the Cyber Domain

Integration

Assessments

Innovation

Training

Operational Engineering

Test/Evaluation

Tactics

Real-Time Ops Support

Operational Engineering

- Continued Progress on ICS
- Map the Net
- Radio Frequency Interference Mitigation

Protecting and Advancing the Cyber Domain

Integration

Assessments

Innovation

Training

Operational Engineering

Tactics

Test/Evaluation

Real-Time Ops Support

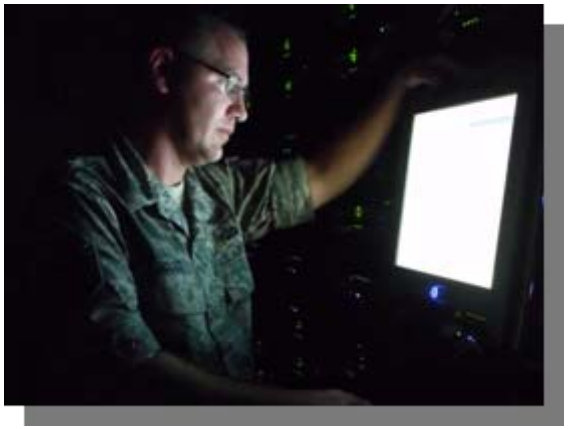
Tactics

- Establish New Pools of Expertise
- Integrate CNO throughout AFTTP
- Publish AFTTP 3-1.NWO

Protecting and Advancing the Cyber Domain

Real-Time Ops Support

- Real-Time Net-A/Net-D Capabilities
- Information Operations Platform
- ACCM HBSS Module



Protecting and Advancing the Cyber Domain

Integration

Assessments

Innovation

Training

Operational Engineering

Test/Evaluation

Tactics

Real-Time Ops Support

Test and Evaluation

- Operationally Test AF Cyber Capabilities
- Build Relationship with External Partners
- Emissions Security

688th Information Operations Wing

Integration

Assessments

Innovation

Training

Operational Engineering

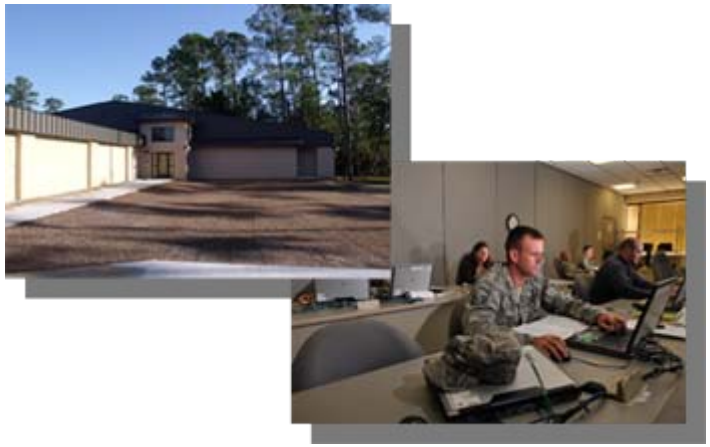
Test/Evaluation

Tactics

Real-Time Ops Support

Training

- Expand MQT Course Builds
- Build Weapons Instructor Prep Course
- Collaboration with AFIT and AETC on Life-Cycle Training



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Assessments

- Partnering
- System Vulnerability Missions
- Hunter Team Concept

For Internal Threats: Anti-Exfiltration

Internet

DoD GIG

AF GIG

Base Network

Stop Exfil of:

- C2 from implants
- User Data
- Operational Data

Real-Time Code Inspection

Application Security

Anti-Virus

HIPS

Web Proxy

Mail Relay

IDS/ IPS

Fire-Walls

SOFTWARE APPLICATION

OPERATING SYSTEM (Windows, Unix)

MACHINE LANGUAGE 11001101110

HARDWARE CPU, GPU

Ethernet Switch

Network Interface Card

For External Threats: IPS at All Layers

Internet

DoD GIG

AF GIG

Base Network

IPS at all layers in the network "Topography"

Real-Time Code Inspection

Application Security

Anti-Virus

HIPS

Web Proxy

Mail Relay

IDS/ IPS

Fire-Walls

SOFTWARE APPLICATION

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