

AFSC/SW Supply Chain Risk Management Software Support Center



GSAW SCRM Workshop

Michael Williams
&
Alexander Wright



Agenda



- **Hosts Introduction**
- **Software SCRUM Introduction**
- **Background on Workshop**
- **Fields of Interest**
- **Question Exchange**
- **Breakout**
- **Wrap Up**
- **Next Steps and Get Involved**



INTRODUCTIONS



Hosts Introduction



- **Michael Williams**
 - **Aerospace Corporation**
 - **Computer Scientist**
 - **Systems Software Engineering and Cloud Computing Architecture**

- **Alexander Wright**
 - **Air Force Software Directorate**
 - **Computer Scientist**
 - **Software SCRUM SME**
 - **USAF & USSF Software Development**

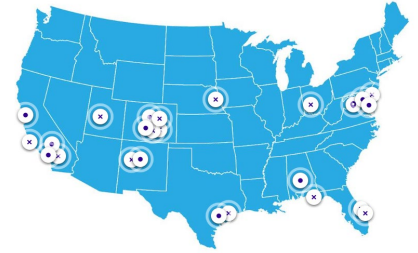




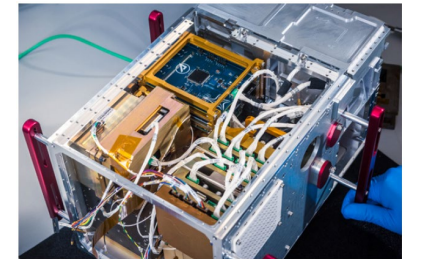
The Aerospace Corporation



- **The Aerospace Corporation acts as a trusted advisor to the U.S. government, supporting national security, civil, and commercial space endeavors. Aerospace aims to solve complex problems through agility, innovation, and objective technical leadership.**
- **Organizational Facts:**
 - Non-profit federally funded research and development center (FFRDC)
 - Over 4,600 employees
 - Headquartered in Chantilly, VA, with major facilities in El Segundo, CA, Albuquerque, NM, Colorado Springs, CO, and the Washington, D.C. region, with additional sites across the U.S.
 - Diverse workforce with over 800 Ph.D.s on staff, primarily focused on technical roles (over 75% of workforce)
- **Recent Achievements include:**
 - **Supporting National Security Space Programs**
 - Hit a major milestone by delivering GPS III-5 successfully to orbit, marking the first time a previously flown rocket booster was used for a national security space launch
 - **Promoting Commercial Space Solutions**
 - Launched the Commercial Space Futures office, enabling government customers to advance commercial solutions to accelerate U.S. space capabilities
 - **Driving Innovation**
 - Developed, prototyped, and launched the Slingshot CubeSat Platform, demonstrating modular and autonomous technologies for faster and more resilient satellite development
 - Advanced integrated cybersecurity for on-orbit spacecraft using onboard machine learning and signatures to detect and respond to anomalies, increasing options for threat mitigation



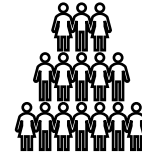
GPS III-5 launched aboard a SpaceX Falcon 9 from Cape Canaveral SFS. Credit: SpaceX



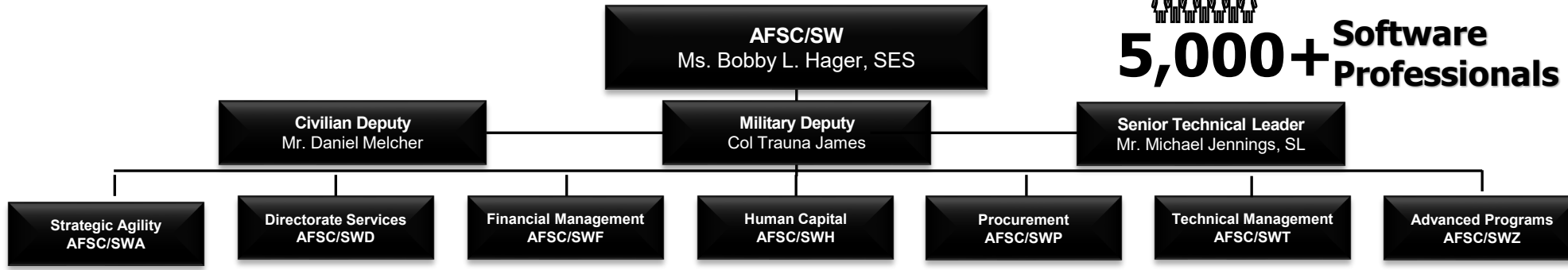
The Slingshot platform SatCat5 ethernet switch architecture provides high throughput and low-power consumption.



Software Directorate (AFSC/SW)



5,000+ Software Professionals



Production/Execution Organizations

Groups are incentivized and held accountable to focus on managing cost, schedule, and performance while producing to promise



Strategic Integration Leadership

Principal interface to organizational customers with a primary focus on strategic/high priority efforts

76th Software Engineering Group
Dr. Kristian Olivero

- Operational Flight Software for B-21, E-3, B-2, E-7, KC-46, B-52, B-1
- Platform Integration E-3
- Ground & Space Systems
- Mission Planning for E-3, E-8, B-2, B-52, B-1, NOMS/JOMS
- Diagnostic & Repair

309th Software Engineering Group
Mr. Jim Diamond

- Operational Flight Software for F-16, A-10, F-22
- Platform Integration F-16, A-10
- Sentinel
- Space and Missile Software
- Mission Planning F-16 and A-10
- Diagnostic & Repair

402d Software Engineering Group
Mr. Michael Doubleday

- Operational Flight Software for C-17, C-130, C-5, F-35, E-8, TDL/EW/Radar
- Command & Control/Intelligence/Space
- Electronic Warfare
- Mission Planning F-15
- Diagnostic & Repair

13 Missions



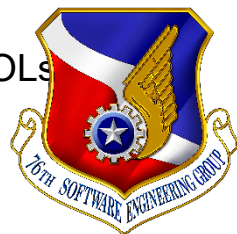


AFSC Software Enterprise

Organizational Facts

- 3 Air Force Groups united under a **single organization**
- Supporting the warfighter since **1978**
- **5,000+** software professionals
- **3** primary and **10** Operating Locations (OLs)
- Proven ability to expand **8% annually**
- FY23 annual revenue **\$1.04B**
- **11** AFLCMC supported PEOs
- **100+** active projects
- Robust **community, academic, and industry partnerships**

Develop, deliver, support, and sustain war-winning capabilities



Mission and Product Lines

- Embedded Weapon System Systems and Software Development
- Primary Product Lines:
 - Platform Integration
 - Mission Computing
 - Weapons
 - Air Vehicle Systems
 - Sensor Systems
 - Mission Support
 - Pilot Vehicle Interface
 - Business Systems

Primary Locations

Hill AFB	Ogden, UT
Tinker AFB	Oklahoma City, OK
Robins AFB	Warner Robins, GA

Operating Locations

Space Systems	Peterson SFB, CO
T-1A/T-25 Operating Wing	NAS-Pensacola, FL
NGA Partnering	Patrick SFB, FL
LMA Partnering	NAS-JRB Ft Worth, TX
ICBM Program Office Support	Offutt AFB, NE
Satellite Systems Launch Support	Vandenberg SFB, CA
Ground-Based Training	JBSA-Randolph, TX

Strategic Initiatives

- F-16, A-10, and E-3 Weapon System Integrator
- B-21 and E-7 Future Weapon System Integrator
- Open Architecture (i.e., Open Mission Systems)
- PRC2 First C-ATO of Development Toolchain in the AF
- Embedded with OEMs on next generation AF Weapons
- Partnering with AFRCO on DevSecOps Pipelines for Embedded Software
- Prototyped Kubernetes on F-16
- Prototyped in-flight software update for multiple platforms
- Leaders in Open Standards Implementations
- Leading DSOP Team 8 on Critical Embedded Systems
- Joint Simulation Environment (JSE)



SECAF



The Customers



C3 AND BATTLE MANAGEMENT

 BGen Luke C.G. Cropsey
 ABMS

RAPID CAPABILITIES OFFICE

 Mr. William D. Bailey
 RCO

SPACE RAPID CAPABILITIES OFFICE

 Dr. Kelly Hammett
 Space RCO



AFLCMC

BOMBERS

 DIRECTORATE
 BGen William Rogers
 WB

FIGHTERS & ADVANCED AIRCRAFT

 DIRECTORATE
 BGen Dale R. White
 WA

DIGITAL

 DIRECTORATE
 Mr. Steven Wert
 HB

AGILE COMBAT SUPPORT

 DIRECTORATE
 Ms. Lea T. Kirkwood
 WN

ARMAMENT

 DIRECTORATE
 BGen Jason E. Bartolomei
 EB

INTELLIGENCE, SURVEILLANCE, RECONNAISSANCE &

 SPECIAL OPERATIONS FORCES DIRECTORATE
 Col Joshua P. Williams
 WI

MOBILITY & TRAINING

 AIRCRAFT DIRECTORATE
 Mr. Kevin D. Stamey
 WL

JOINT STRIKE FIGHTER

 DIRECTORATE
 Lt Gen Michael Schmidt
 WJ

COMMAND, CONTROL, COMMUNICATIONS,

 INTELLIGENCE & NETWORKS DIRECTORATE
 MGen Anthony W. Genatempo
 HN

AFLCMC PROPULSION

 DIRECTORATE
 Mr. John R. Sneden
 LP

BUSINESS AND ENTERPRISE

 SYSTEMS DIRECTORATE
 Mr. Alvin F. Burse
 GB

PRESIDENTIAL & EXECUTIVE

 AIRLIFT DIRECTORATE
 BGen Jason E. Lindsey
 WV



AFNWC

NUCLEAR COMMAND, CONTROL

 AND COMMUNICATIONS
 Mr. Scott C. Hardiman
 NC3

STRATEGIC SYSTEMS

 MGen John P. Newberry
 SS



DoD Partners

DoD PARTNERS



SSC

ASSURED ACCESS TO SPACE

 BGen Kristin L. Panzenhagen
 AA

SPACE DOMAIN AWARENESS

 AND COMBAT POWER
 Col Bryon E.C. McClain
 SZ

MILITARY COMMUNICATIONS AND

 POSITIONING, NAVIGATION, AND TIMING
 Mr. Cordell A. DeLaPena Jr.
 CG

SPACE SENSING

 Col Robert W. Davis
 SN

BATTLE MANAGEMENT, COMMAND

 CONTROL, AND COMMUNICATIONS
 Ms. Shannon Pallone
 BC



Introductions

AROUND THE ROOM



LEXICONS



S-SCRM INTRODUCTION



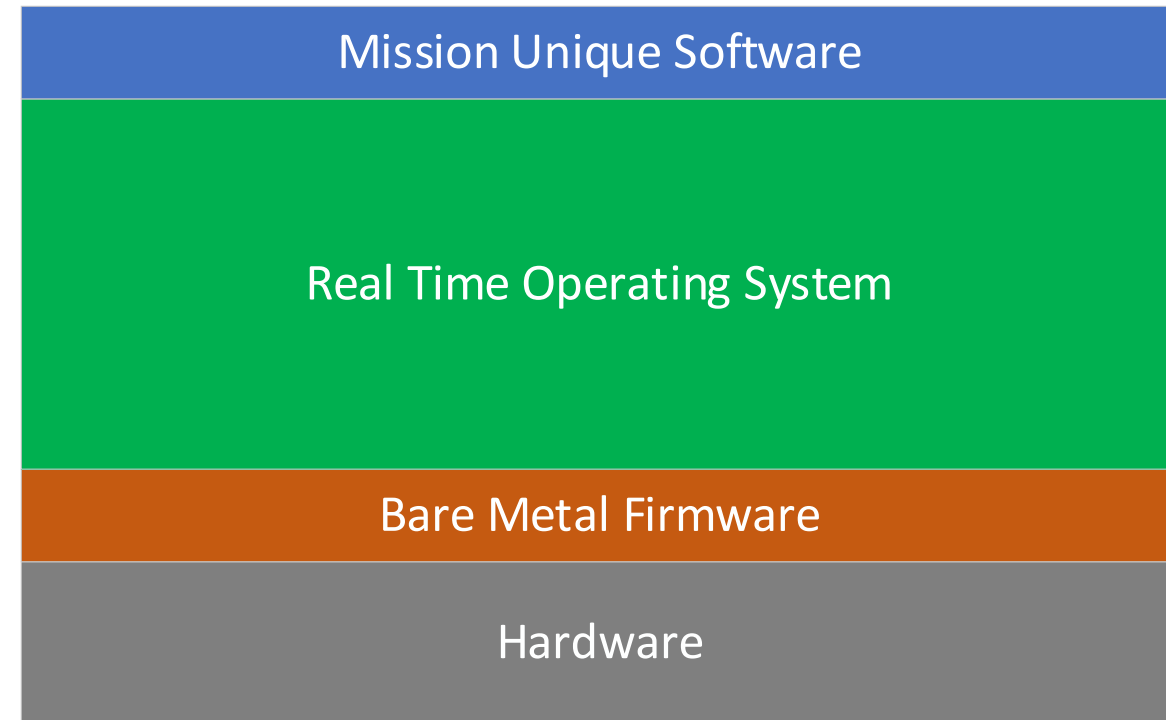
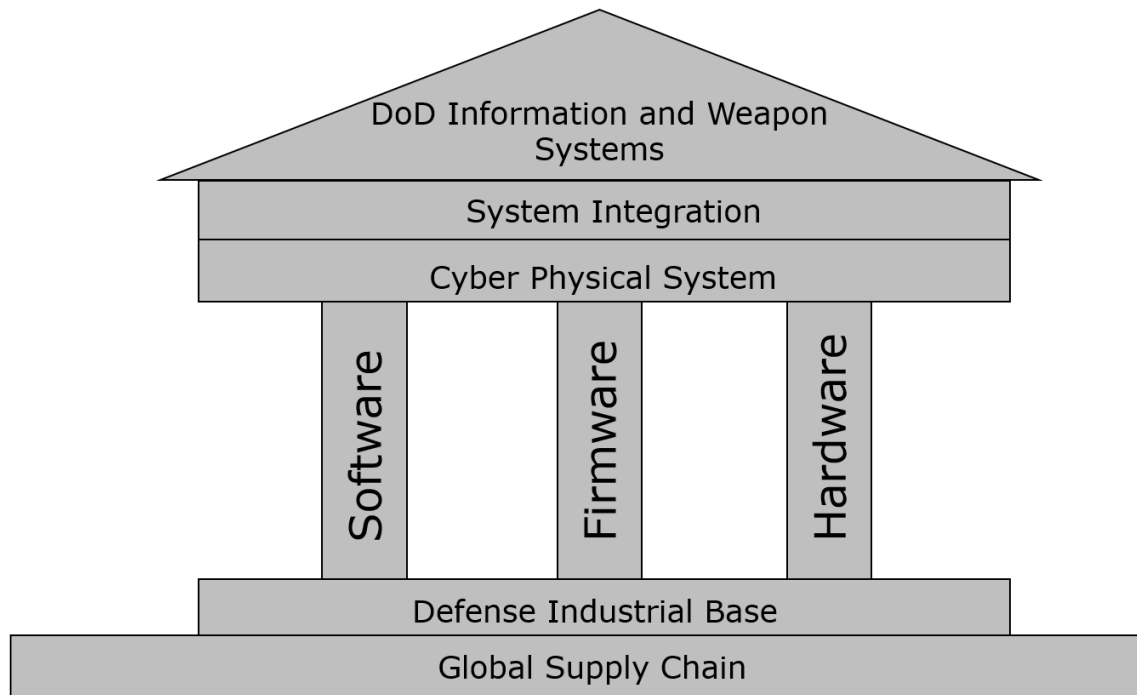
S-SCRM Introduction

- **What's it stand for?**
 - **Software Supply Chain Risk Management**
- **What is it about?**
 - **The Management of the risk around the software supply chain**
- **What does it cover?**
 - **All software to include firmware**



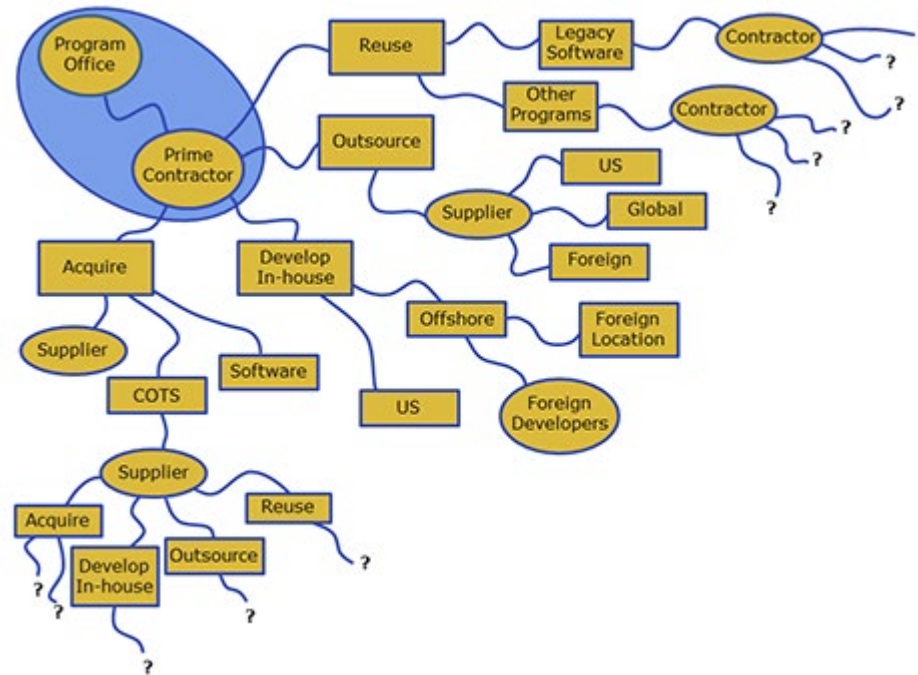


S-SCRM Introduction





The Software Supply Chain





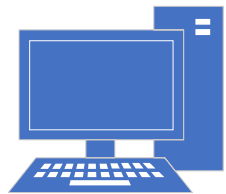
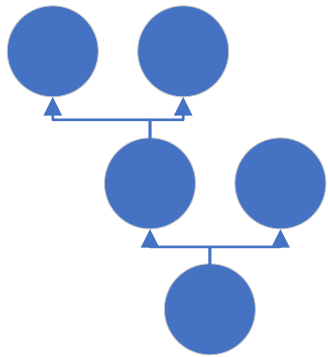
Software System Manifest

- **Software now includes all layers of computer systems**
 - **Infrastructure as Code – Instantiation of virtual machines and networks**
 - **Configuration as Code – Security hardening and software installation**
 - **Container Orchestration as Code – Scalable platform for hosting containers**
 - **Container Deployment as Code – Specify constellation of encapsulated apps**
 - **Framework/Runtime Dependency as Code – Libraries and dependencies used in building application**
 - **Apps (is code) – Delivered capability**

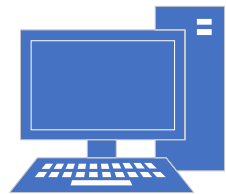
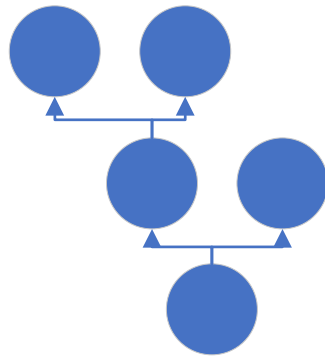
<Everything!!!> as Code - thousands of files with thousands of lines of code



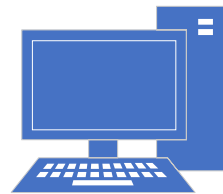
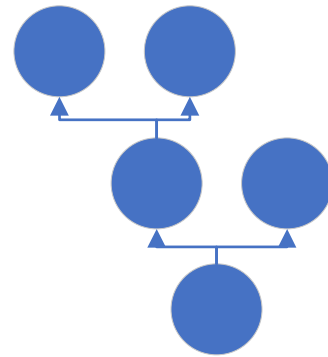
Ground System Layout



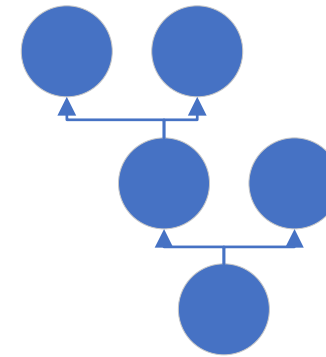
Operator's
Computer



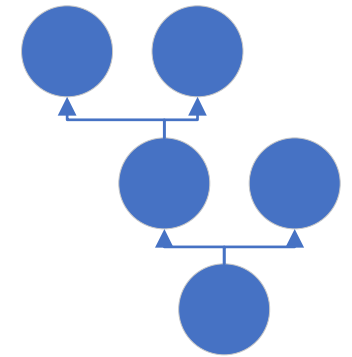
Operator's
Computer



Operator's
Computer



Storage
Server



Front End
Processor



WORKSHOP BACKGROUND

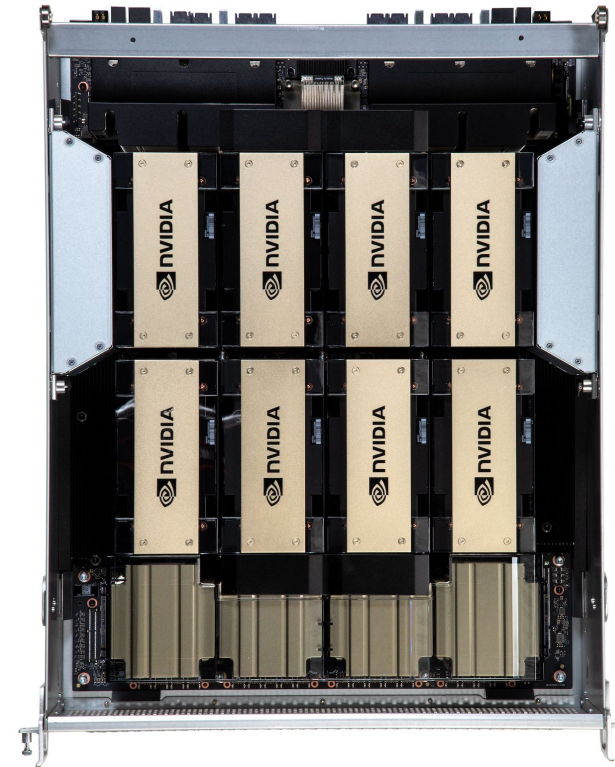


Supermicro CRADA

Supermicro Gaudi 2



Supermicro H100





CRADA Purpose

- **Demonstrate AI/ML solutions for Space Force needs**
- **SCRM Demonstration**
 - **Show an SBOM solution for AI/ML from model to firmware**
 - **Hardware and Software SCRM for AI/ML**
 - **SCRM demonstration for other IT fields**





Outcomes: Fields of Interest

SBOM Tool Development

- Generation
- Consumption

SBOM Industry Collaboration

- IT Industry
- Software Industry

SBOM & Configuration Management

- SBOMs beyond vulnerabilities
- Production before software

AI/ML SCRM

- Complexity beyond normal Software SCRM



WORKSHOP BREAKOUTS



Breakout Teams

- **SBOM Tool Development**
- **SBOM Industry Collaboration**
- **SBOM & Configuration Management**
- **AI/ML SCRM**



SBOM Tools Development

- **Not developing actual tools**
- **What needs and requirements do you have that current tooling does not meet?**
- **What is special about your environment that is not being met by current tooling?**
- **Are there any additional SBOM types that are not being supplied?**



SBOM Industry Collaboration



- **How can we get our global industry players to participate in SBOMs?**
 - **The generation of SBOMs**
 - **The sharing of SBOMs**
 - **The IP problem**
- **Who else should be involved?**
 - **ISACs**
 - **Industry groups**
- **How do we handle OEM software and firmware management**



SBOMs & Configuration Management



- **SBOMs are an asset management tool, not strictly a vulnerability management tool**
- **What do we need to get SBOMs integrated with Configuration Management?**
 - **What overlaps do they have?**
 - **Pro/con sheets**
- **How do we enable a software factory to deliver agile configuration management**



AI/ML SCRM

- **What differences exist between current software SCRM practices and AI/ML systems?**
- **Can SBOMs, or other kind of BOMs help with asset management tracking**
 - **HBOMs, DataBOMs, extensions to SBOMs**
- **Can SLSA and other frameworks be extended to include AI/ML SCRM or does it need its own?**



BREAKOUT



REJOIN



Keep the Conversation Going

- **Other DoD/Federal SCRM Communities**
 - **System Security Engineering (S2E) Forum**
 - Contact: Ms. Da-Verne Evans (daverne.l.evans.ctr@mail.mil)
 - Available for Federal and FFRDC employees **ONLY**
 - **NIST Software and Supply Chain Assurance Forum**
 - <https://csrc.nist.gov/projects/cyber-supply-chain-risk-management/ssca>
 - **Space ISAC SBOM Task Force**
 - Available to ISAC members and partners
 - **CISA SBOM Community**
 - TBD



Contacts



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