

Comparison of Software Business Activities and Management Practices Between the US Army and Leading Industry Companies



Presented by: Mr. Cenap Dada
US Army CECOM LCMC Software Engineering Center

732-532-1296

cenap.dada@us.army.mil

CECOM ——— PEO C3T ——— PEO-EIS ——— PEO IEW&S ——— CERDEC

CECOM LIFE CYCLE MANAGEMENT COMMAND

What We'll Cover...

- Background – why we did the study
- How we did the study
- What we found
- Conclusions

Background – Why Did We Do This Study?

- Army leaders have asked:
 - Why does Software cost so much?
 - Why do Systems' Software schedules slip?
 - Why don't we do software more like industry?
- We have made observations about the practices employed by successful commercial companies and there have been suggestions that we consider modifying our processes and adopt their practices.

What we did in response to these questions & observations! 

Compared the Types of Defense Systems

EMBEDDED SYSTEMS

C2 SYSTEMS

BUSINESS SYSTEMS



Smart Munitions



M1A2 Fire Control, Vetrronics



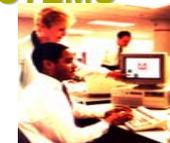
Firefinder



MCS-L



Logistics



\$ / Personnel

OPPORTUNITY TO LEVERAGE COMMERCIAL INVESTMENTS

SOFTWARE APPLICATIONS	CUSTOM	CUSTOM	COTS	CUS	COTS
SOFTWARE INFRASTRUCTURE	CUSTOM	COTS	CUS	COTS	COTS
HARDWARE PLATFORM	CUSTOM	COTS	CUS	COTS	COTS
QUALITY/ PROCESS	Right the 1st Time	MIX	Good Enough		
ENGINEERING	Tighter Constraints	MIX	More Flexible		
TECHNICAL STANDARDS	MIL	CML	MIL	CML	CML

- ⇒ Requires tailored strategies for each sector
- ⇒ Opportunities to leverage commercial investments; but may need investment in some areas
- ⇒ Differences suggest need to maintain close ties with domain SMEs
- ⇒ Broader similarities suggest need for unified enterprise approach

Determined the Orientation of Army's Core Business

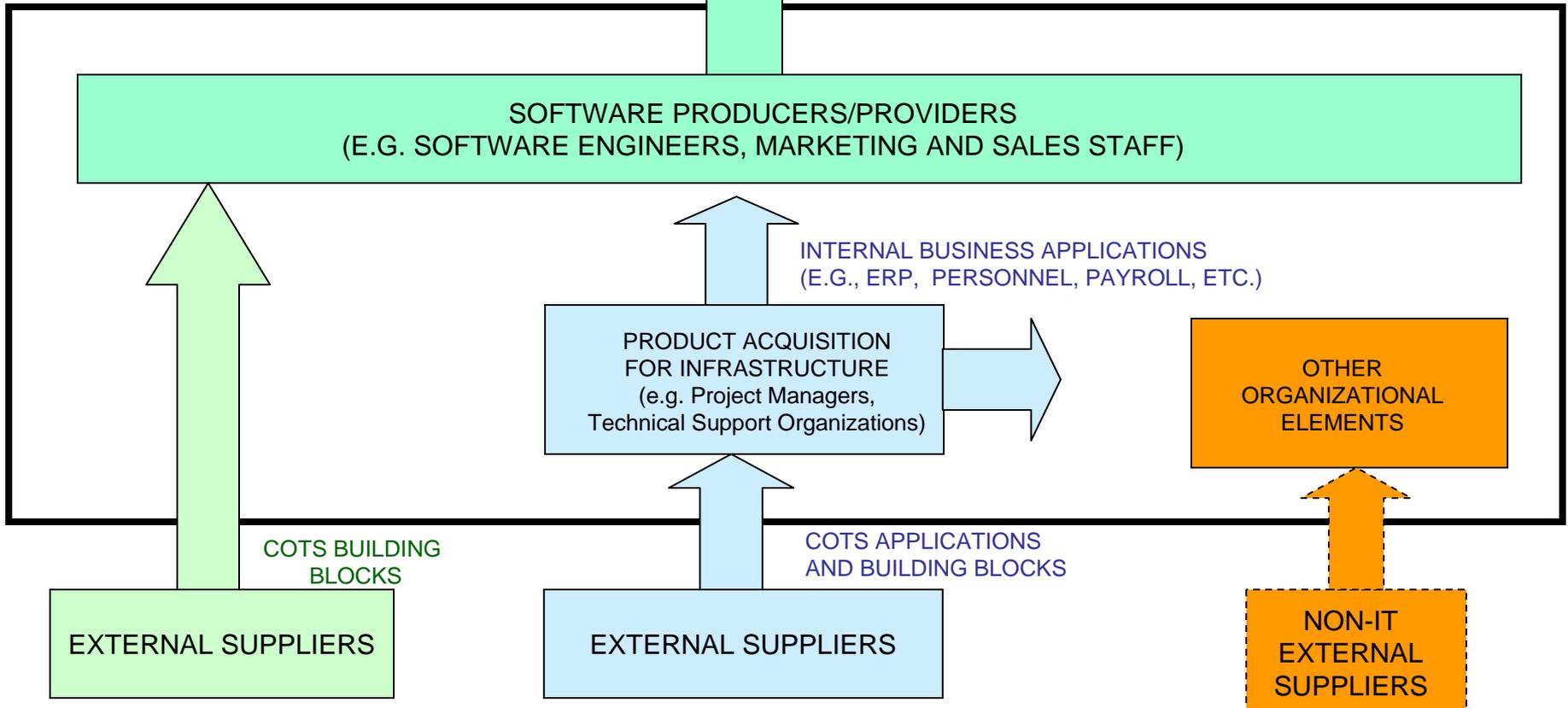
Products vs. Services

GENERIC MODEL FOR A PRODUCT-ORIENTED ORGANIZATION

PRODUCT

SOFTWARE-BASED PRODUCTS
(GENERIC AND APPLICATION-SPECIFIC)
PRODUCED IN RESPONSE
TO THE NEEDS OF MARKETS

ORGANIZATION: X



Determined the Orientation of Army's Core Business

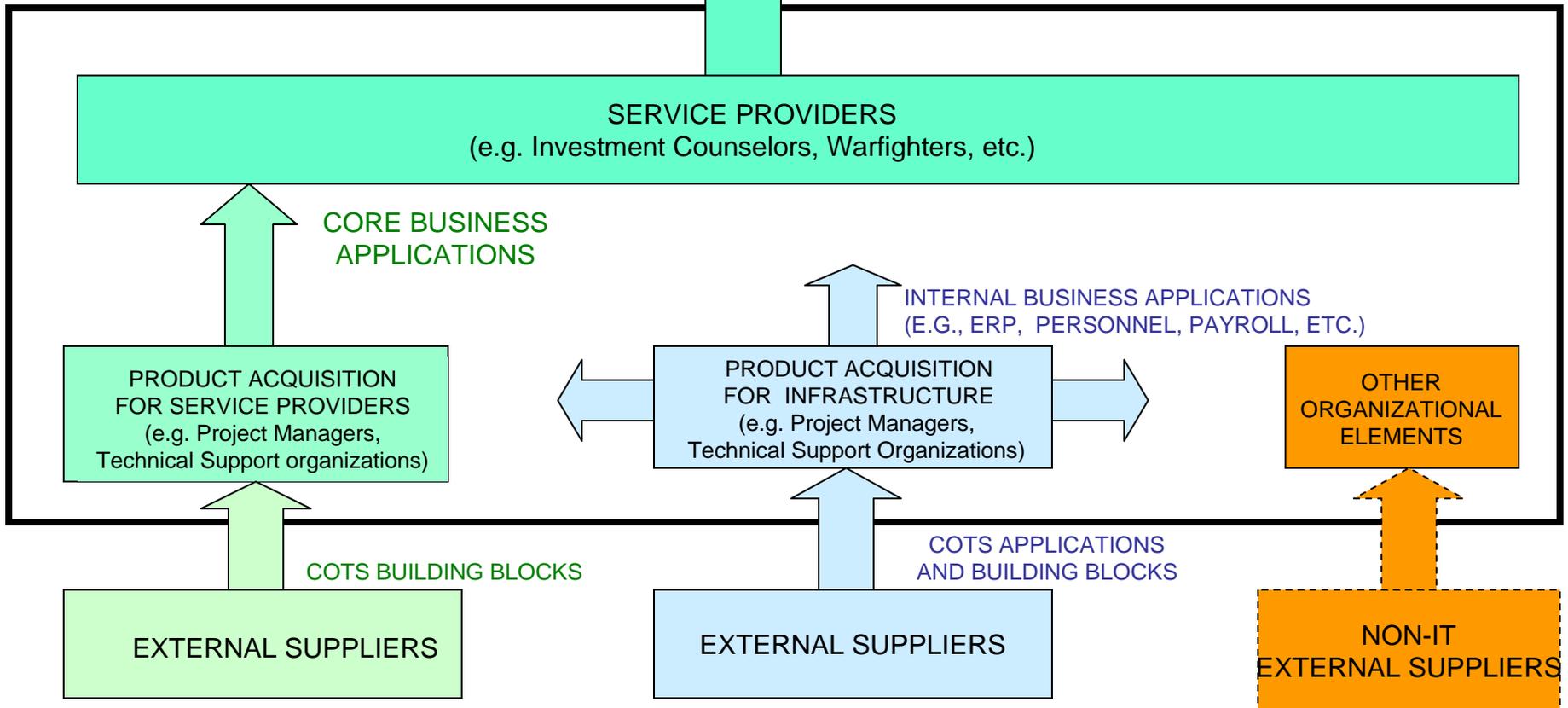
Products vs. **Services**

GENERIC MODEL FOR A SERVICE-ORIENTED ORGANIZATION

(E.G., FINANCIAL ADVICE,
WARFIGHTING, ETC.)



ORGANIZATION: X



Selected Companies for Survey



Products vs. Services

	MICROSOFT	MORGAN STANLEY	DoD/Army
CORE BUSINESS	SOFTWARE PRODUCTS	FINANCIAL SERVICES	WAR-FIGHTING, PEACEKEEPING, NATION BUILDING, DEFENSE SERVICES FOR AMERICAN PUBLIC
DRIVER OF CORE BUSINESS	SOFTWARE PRODUCT MARKET	GLOBAL FINANCIAL SERVICES MARKET	REQUIREMENTS (DEFENSE NEEDS)
ROLE OF SOFTWARE-BASED PRODUCTS	CORE BUSINESS	SUPPORT TO CORE BUSINESS	SUPPORT TO CORE BUSINESS
NATURE OF PRODUCTS	- GENERAL PURPOSE - BASED ON NEEDS OF SOFTWARE MARKET	- APPLICATION SPECIFIC - BASED ON NEEDS OF SERVICE PROVIDERS	- APPLICATION SPECIFIC - BASED ON NEEDS OF SERVICE PROVIDERS

OBSERVATION: CONSIDERING **PRODUCTS IN THE CONTEXT OF A BROADER CORE BUSINESS, THE ARMY IS MORE LIKE SERVICE-ORIENTED BUSINESSES THAN IT IS LIKE PRODUCT-ORIENTED BUSINESSES**

CONCLUSION: TO MAXIMIZE THE BENEFIT OF THIS **STUDY, WE NEED TO FOCUS IT ON **SERVICE ORIENTED** BUSINESSES**

Grouped Selected Companies

- Specifically chose companies that did not produce a significant amount of Government software.
- Provided a questionnaire and asked them to complete it before an Army team conducted an on-site interview.
- Conducted on-site interviews and discussions. In general, the site visits lasted a single business day.

	Embedded	Command & Control	Business
Product			Microsoft ----- SAS
Service	GM Powertrain Group	CitiGroup Investment Groups ----- FedEx	CitiGroup Global Consumer ----- GM ISS

Key Areas we Compared



- Management
- Funding
- Software Development and Sustainment
- Staffing and Outsourcing
- Processes Improvement
- Testing and Quality
- Software Reuse and Architectures

Similarities and Differences

Management:

- Companies have clearly identifiable “software champions” who viewed software as critical to its competitive edge while no such identifiable champion exists within the Army.
- Champions were highly visible and reported directly to the CEO and had the authority to establish policies and SW funding profiles.

Funding:

- Companies have adequate and stable SW budgets while the Army has unstable budgets.
- Companies SW sustainment cost ranged from 50-80% of the SW budget while the Army’s cost is only 10%.

Software Development and Sustainment:

- Companies system’s were long-lived systems (i.e., 10-30 years) while the Army buys a totally new system every 5-10 years.
- Software development methodologies are very similar w/r/t custom development, use of COTS, etc.

Similarities and Differences

Staffing and Outsourcing:

- Companies assign one group to oversee a product from cradle to grave while the Army may have a prime contractor develop a system and then transition its sustainment to another organization.

Processes Improvement:

- Both companies and the Army recognized the importance of documented and institutionalized processes.
- The companies surveyed had little, if any, knowledge of the CMMI process while the Army stresses it use.

Testing and Quality:

- There was an emphasis, especially within service-oriented companies, on extensively testing new SW releases before they are used it in a production environment while the Army emphasizes System & HW testing but not SW.

Similarities and Differences

Software Reuse and Architectures:

- Although software reuse has been a major focus within the both Army and DoD in recent years, there is not a significant emphasis on it within these companies.
- One company believes reusable components pose a “greater risk” because of dependencies on external, independent processes.
- There is little reuse across groups or projects and it is actually discouraged by one company because of the difficulty for one group to depend on another group within the company for critical parts

Conclusions



- In many ways, the Army is the same as Industry. We both use the same software engineering life-cycle practices in development of our systems. The differences are at the corporate level.
- The Army does AND does not do software like industry does – BUT for a reason – The Army is a SERVICE PROVIDER and not a software product manufacturer. As a service provider, the Army DOES do software like industry
- The Army, and DoD, can learn from industry in several areas:
 - More stable budgets for sustainment
 - A software “champion” at DA staff level that influences software development across the entire Army enterprise
 - More emphasis on sustainment of current systems to give increased capability as opposed to “waiting for the next new system”

Backups

ORIENTATION OF THE CORE BUSINESS SOME DEFINITIONS

TERM	DEFINITION
SERVICE	A VALUE-ADDED “ACTIVITY” THAT IS PERFORMED IN SUPPORT OF A CUSTOMER (e.g. investment counseling, health care, etc.)
PRODUCT	HARDWARE/SOFTWARE “ITEMS” THAT ARE PRODUCED BY A MANUFACTURING OR ENGINEERING PROCESS (e.g., A Blackberry wireless PDA, Microsoft’s WORD, etc.)
CORE BUSINESS APPLICATION	A SOFTWARE PACKAGE THAT DIRECTLY SUPPORTS THE PRIMARY BUSINESS OF AN ORGANIZATION (e.g., FedEx: Package Tracking Software, U.S. Army: Weapon System Software, etc.)
INFRASTRUCTURE APPLICATION	A SOFTWARE APPLICATION THAT SUPPORTS THE INTERNAL BUSINESS PROCESSES OF AN ORGANIZATION (e.g. a personnel system, a payroll system, an ERP package etc.)
COTS SOFTWARE BUILDING BLOCKS	SOFTWARE COMPONENTS THAT ARE CONFIGURED TO FORM THE FOUNDATION FOR CORE BUSINESS OR INFRASTRUCTURE APPLICATIONS (e.g., a COTS DBMS that becomes the information repository for data acquired by sensors and accessed by Command and Control Decision Aids)

FOR PURPOSES OF THIS SURVEY, WE WILL ONLY CONSIDER APPLICATION AREAS AND COMPANIES WHICH EITHER SELL OR USE SOFTWARE-BASED PRODUCTS