LeeWare Development Consulting

Systems Engineering - Project Portfolio

By Lee Evans, Principal Consultant

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Published by: LeeWare Development Consulting Chicago Office, June 2017.

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Understanding Systems Engineering

1.0 What is Systems Engineering?

1. Systems Engineering is an interdisciplinary approach and means to enable the realization of successful systems. It focuses on defining customer needs and required functionality early in the development cycle, documenting requirements, then proceeding with design synthesis and system validation while considering the complete problem:

    - How much will the solution cost?
    - When can it be delivered?
    - What kind of training will be required to use and support the system?
    - What will it take to build the system?
    - What are the performance requirements to support operations?
    - Testing
    - System disposal

2. Systems Engineering integrates all the disciplines and specialty groups into a team effort forming a structured development process that proceeds from concept to production to operation. Systems Engineering considers both the business and the technical needs of all customers with the goal of providing a quality product that meets the user needs.

3. Systems engineering deals with work-processes, optimization methods, and risk management tools in such projects. It overlaps technical and human-centered disciplines such as industrial engineering, mechanical engineering, manufacturing engineering, control engineering, software engineering, electrical engineering, cybernetics, organizational studies, engineering management and project management. Systems engineering ensures that all likely aspects of a project or system are considered and integrated into a whole. The systems engineering process is a discovery process that is quite unlike a manufacturing process. A manufacturing process is focused on repetitive activities that achieve high quality outputs with minimum cost and time. The systems engineering process must begin by discovering the real problems that need to be resolved and

identify the most probable or highest impact failures that can occur – systems engineering involves finding elegant solutions to these problems.

4. "The systems engineering method recognizes each system is an integrated whole even though composed of diverse, specialized structures and sub-functions. It further recognizes that any system has several objectives and that the balance between them may differ widely from system to system. The methods seek to optimize the overall system functions according to the weighted objectives and to achieve maximum compatibility of its parts."[11] — Systems Engineering Tools by Harold Chestnut, 1965.

2.0 What is a System?

1. A system is a construct or collection of different elements that together produce results not obtainable by the elements alone. The elements, or parts, can include people, hardware, software, facilities, policies, and documents; that is, all things required to produce systems-level results. The results include system level qualities, properties, characteristics, functions, behavior and performance. The value added by the system, beyond that contributed independently value added by the system as a whole, beyond that contributed independently by the parts, is primarily created by the relationship among the parts; that is, how they are interconnected.

3.0 System Engineering Methods

1. System engineering while used in the management of technological systems is not limited to or dependent on technology alone. Systems engineering principals also have a long history of being applied to social systems.

2. Competent System Engineers take a very structured and methodical approach to discovery and problem solving:

    - Understand the whole problem before you try to solve it -- What are we trying to accomplish?

    - Translate the problem into measurable requirements -- Break the problem down into distinct parts that can be solved independently and systematically.
      This problem solving contributes to solving the whole problem.

    - Examine all feasible alternatives before selecting a solution -- Are there other way to accomplish the goal? Cost, quality, and Time are factors.

    - Make sure you consider the total system life cycle. The birth to death concept extends to maintenance, replacement and decommission. If these are not considered in the other tasks, major life cycle costs can be ignored.

- Make sure to test the total system before delivering it. -- Does it work?

- Document everything. -- What did we do? (System of record.) (Change Management).

4.0 Understanding the difference between Technicians and Engineers

1. In the marketplace there exists a distortion. The hallmark of this distortion is the blurring of the lines between technicians and Engineers. The foundation of this distortion comes from those not trained in system engineering. There is a false and incorrect technical work makes one a system engineer. Without a foundation in the method of engineering on the service you get something that looks the same but is not the same in terms of value creation. To put it simply Engineers can to technical work but people who do technical work are not automatically engineers.

2. The difference between a technician and engineer can be made clear through understanding the difference between an Emergency Medical Technician (EMT) and a Doctor. To the laymen they are both medical professional but, to trained observer they have different mandates. Therefore, the scope of responsibility, knowledge and training are different.

3. The absence of the engineering method is the clearest determinant that one is dealing with technicians rather than engineers.

5.0 Observations and References

1. For a more comprehensive review of System Engineering see the International Council on System Engineering- What is Systems Engineering.[1]

2. I published a position paper that more fully explores the market distortion between engineering and narrowly technical focused practices. [2]
3. There have been several authors who have explored the market distortion of Engineering vs technicians.[3] And the differences between them.[4]

[1] http://www.incose.org/AboutSE/WhatIsSE

[2] Reflections On The IT Landscape - Understanding the Color Blue Problem - IT Consultant vs IT Technician

[3] http://www.varjan.com/articles/0912-dec-09-it-consultant-or-computer-technician.shtml

[4] https://www.nde-ed.org/Careers/TechvsEng/techvseng.htm

6.0 Career Path

1. I studied Management Information Systems (MIS) in high school. I started my career as a software developer. I developed a line of software applications which I sold through the mail and eventually sold my entire portfolio to an early Internet e-commerce site in exchange for royalty payments.

2. I moved into Technical consulting doing systems engineering, teaching a course in introduction to Microcomputers and Operating Systems. And working with small businesses. I joined a technical consulting company to work on high-profile corporate migrations.

3. I eventually signed on to a project with an ambitious company that was looking to build a service organization for the security industry. I spent 4,960 days helping this company achieve its business goals. Over the course of my career I have worked as systems engineer for many private sector enterprises.

7.0 Select Experience

IT EXECUTIVE Enterprise IT, Infrastructure, Operations, Leadership, Security, Applications

Strategic business leader with extensive diverse IT experience building state-of-the-art technology operations for start ups, turnaround and high-growth operations. Talented team builder and mentor who delivers user-friendly technology solutions that achieve/surpass user experience, business and financial goals. Business savvy professional who has saved hundreds of thousands of dollars in technology costs through strategic partnerships, collaboration and technical innovation. Systems thinker and trusted advisor to senior executives. 15 years in a leadership capacity. Exceptional skills in IT strategy, network and data infrastructure services, ISPs and telecommunications, operations management, enterprise architecture, vendor management, organizational development, project management, change management, 24x7x365 continuous operations, tier-4 data center infrastructure management, security, customer service, and organization transformation.

Specialties: Exceptional skills in IT strategy, infrastructure services, telecommunications, operations management, enterprise architecture, vendor management, project management, change management, security and organization transformation.

CORE COMPETENCIES

- Leadership & Talent
- Management Systems-Thinker
- Strategic IT Planning
- Methodical Problem Solver
- Diagnostic Reasoning
- Critical Thinker (INTJ)
- Vendor Management
- Emerging Technologies Budgeting & Cost Containment
- Security and Disaster Planning
- IT and Business Operations
- Professional Service Consulting

PROFESSIONAL EXPERIENCE

LeeWare Development Consulting, SP
1988 - Present, Greater Chicagoland, Privately held, Technical Management and Services

Consultancy

Principal IT Consultant - Subject Matter Expert

I offer a Virtual Chief Information Officer (vCIO) service to a portfolio of anchor clients[5] which are referred to me through my professional network. My clients are MSP-type consulting firms and VC backed technology organizations. I provide a diverse array of professional services ranging from infrastructure engineering consulting (40%). IT Project management (40%). Advisory consulting (10%). Tactical support (10%). I work as a subject matter expert to provide direction and coaching by managing activities to achieve results through others. I provide hands-on support for infrastructure engineering projects.

EMERgency 24 Inc.
Nationwide multi-state, multi-site, ISP and security firm. 100-200 employees.

Reports to Vice President of Technical Operations and SVP of business Operations

1999-2013 Senior Systems Engineer (Enterprise Architecture)
1997-1999 Enterprise Infrastructure Manager (Systems Engineering)
1996-1997 Network Manager / PBX Tech (Systems Integration)

Hands on systems manager for a 24x7x365 tier 4, real-time computing environment that processes property and life-safety data for a 911 Service. Monitoring over 15,000+ panels nation-wide. 99.999% reliability. Central Technical manager for multiple branch offices located around the country.

- Established the strategic direction for the application of new technologies designed to keep the business technically competitive in an ever changing technological and business climate. Worked with senior level executives, department heads and branch managers on developing and managing projects to improve service delivery and efficiency.

- Managed multiple multi-million-dollar, multi-year IT projects, initiatives and life-cycle-evolution to ensure business IT alignment. Managed the day-to-day operations of the IT organization. Planned and executed Corporate HQ relocation, new data center build out and several new call centers and disaster recovery sites. Aligned IT operations for regulatory compliance: UL 1981, 827, FM 3011 and PCI-DSS. IT Project manager completed 4000+ IT projects during my tenure.

- Transformed data center and IT operations, developed and implemented an enterprise-level plan to replace and enhance IT systems. Implemented monitoring systems to ensure compliance of service level agreements to customers and developed security protocols and technologies to

[5] Ongoing relationship with client for which there is a steady flow of projects and income.

guarantee data and system integrity of services across the enterprise to address internet security threats. Managed the activities and served as mentor to a small team (15) of highly competent multi-disciplined systems engineers and software developers charged with developing Enterprise software for business use.

Founder LeeWare Development UVM - Commodity Hosting
2003 - 2007, Registered Remote Computing Facility Operator and Telecommunications provider.

Funded, engineered and operated QEMU/XEN based Virtual Machine Hosting service.
Provided self-managed VMs to a variety of internet users, entrepreneurs and companies. Pivot up the value chain.

Founder LeeWare Development IaaS - Commodity Hosting
2005 - 2012, Registered Remote Computing Facility Operator and Telecommunications provider.

Funded, engineered and operated Linux Dedicated Hosting Service. Provided self-managed Linux based dedicated servers to a variety of internet users, entrepreneurs and companies. Closed business in response to the increased adoption and competitiveness of cloud computing.

MicroAge Inc.
~ 1995, The IT Solution Experts, Chicago Area.

Network & Systems Engineer / Chicago Project Team

- Worked with an impressive group of engineers on high-profile projects in the Chicagoland area. Corporate HQ relocation, network and systems upgrades. Chicago project team member for the relocation of True Value company HQ relocation and IT Systems overhaul. Novell 3.x to Novell 4.x, Token Ring, FDDI, Ethernet, Windows For Workgroups 3.11, IBM 3270 terminals, printers and the deployment of 500 new PCs and telecommunication services.

PROFESSIONAL CREDENTIALS

Management:

- Managing Employees Performance, MW Associates (People Management) - 1994
- Quality Work Group, Proudfoot, Crosby PLC (Management Consulting) 1993

Professional:

- Illinois Permanent Employee Registration Card # 129191364
- Passed State and Federal Background Checks
- Professional Errors & Omissions Policy Coverage
- ITIL v3 Foundation # 229637738
- CompTIA Project+ (PMBOK) # COMP001020888431

Information Technology:

- VMware Certified Associate - Data Center Virtualization # 00365956
- VMware Certified Professional 5 - Data Center Virtualization # 00365956
- VMware Certified Professional 6 – Data Center Virtualization # 00365956
- Cisco ARC, Network and Internet Engineering, GK, 1999
- Microsoft Certified Systems Engineer + Internet (MCSE+I) # 1253449, 1999
- Microsoft Azure Fundamentals # H256-9599

EDUCATION

Masters level in field competence. I started my career out of high-school and I have 28 years of practical industry experience in MIS. I have held a variety of positions in engineering and technical management and have won awards for outstanding achievement. All these accomplishments are directly attributed to my industry knowledge and professional development. In addition, I have owned and operated several technology related businesses over the course of my career. Therefore, I have proven real world experience supplemented by professional development.

- AS Computer Information Systems/Microcomputer, IU, 1991
- BS Information Systems Engineering, IU, 1993
- MS Management Information Systems, IU, 1995
- Honorary Doctorate in Philosophy, IU, 2019

PRACTICAL KNOWLEDGE

- **Networking:** LAN/WAN Design, Ethernet GigE, FE, Cisco T3/E3, T-1, Opt-E-MAN
- **Routers:** Cisco 3745, 3660, 3620, 1841, 2500
- **Network Switches:** Cisco 3750, 2980G, HP 4000M, 2708, 2610 Dell PowerConnect 5448, 6448, 8024k, Force 10, Netgear GSM, and FST Series ●
  VPN Devices: Adtran, Netvanta 2100, SonicWall TZ Series
- **Firewalls:** SonicWall E5500, 4100, 3050, 2040, Fortigate 1000D, 100D
- **Load Balancers:** Coyote Point E350GX
- **CSU/DSU:** Larscom Orion 4500, Access-T45
- **Routing Protocols:** BGP4, TCP/IP
- **Traffic Filtering:** ACLs
- **Implementation of:** DHCP, DNS, WINS, FTP, MRTG
- **Networking Tools:** Observer 11x, WhatsUp Gold, Wireshark, Bandwidthd, Darkstats, OpenNMS, Request Tracker, Autotask
- **FIM Tool:** Tripwire Enterprise
- **Cabling Experience:** Punch Blocks, Patch Panels, Telco, Digital & Analog, Fiber MM/SM, Coax, Toners, Testers, and Tracers. Termination and Cross Connects. T568A/B
- **Server Hardware:** Dell M1000E, M620/520, HP DL360, DL380 Series G3-G7
- **PC Hardware:** Lenovo 8080, 8181, XW4000, 5000, Blackbox PC Assembly.
- **Network Operating Systems:** Windows 2012, 2008, 2003, 2000, and NT.
- **Client OS:** Windows 10, 8, 7, XP
- **Linux Operating Systems:** CentOS, Ubuntu, Debian, SuSe
- **Virtualization:** VMware vSphere, 6.0, 5.5, 5.1, 4.1, XenServer, Hyper-v
- **SANS:** Nimble CS 260, 460, 700 and AF 7000 + Shelves, NetApp FAS 3020, 2050, 6070 + FC shelves and SATA shelves.
- **Methodologies:** PDCA, SDLC and Waterfall, TQM, ZD.

8.0 Conclusion

1. I have done lots of great work during my career and helped many businesses reach their goals and achieve success.

2. I continue in my mission to help businesses win.

3. I am always interested in learning and working on new and interesting projects. Contact me today!

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