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Getting (and Sharing!) the FACTS:
Factors, Analogies, CER's & Tools/Studies

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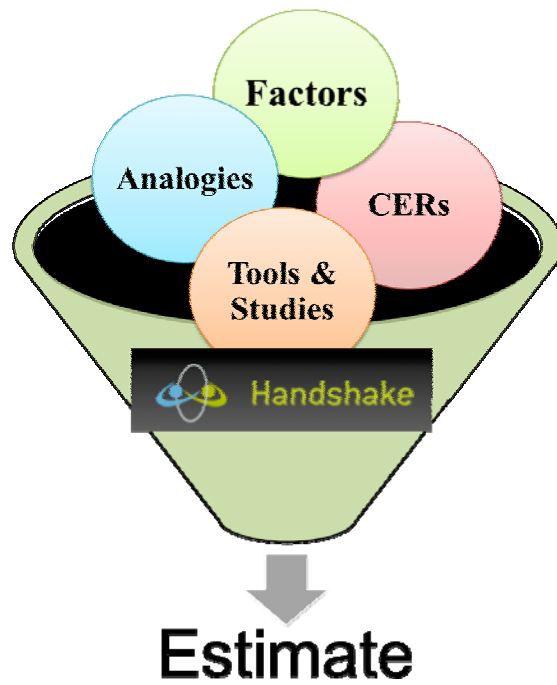
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McLean, VA

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Introduction/Prologue

In the cost community, it is often a huge challenge when it comes to sharing or finding useful cost data within one's own organization, much less outside of one's own company.

FACTS is an internal research project designed to overcome this challenge and facilitate the sharing of Factors, Analogies, CER's & Techniques/Studies (FACTS) throughout the cost community.

A Picture is Worth a Thousand FACTS



The picture to the left provides a graphical representation of the Factors, Analogies, CER's & Techniques/Studies (FACTS) being "funneled" through the Handshake platform. Handshake is a prototype built by the MITRE Corporation based on *Elgg*, an open source social networking platform.

FACTS- Factors & CERs

Estimating *Factors* & *CERs*, the "F" and "C" in FACTS (I know, clever right?), usually lend themselves well to a spreadsheet or database such as the one below:

Title of input, variable, or parameter	Most Likely	Unit	Year of Data	Source
Operations and support				
PC Refresh	3.0	years	2009	October 2009 Policy Bulletin 18:"OSD Lifecycle Standards for OSD IT Equipment"
Laptops Refresh	3.0	years	2009	October 2009 Policy Bulletin 18:"OSD Lifecycle Standards for OSD IT Equipment"
Monitors Refresh	6.0	years	2009	October 2009 Policy Bulletin 18:"OSD Lifecycle Standards for OSD IT Equipment"
Printers Refresh	4.0	years	2009	October 2009 Policy Bulletin 18:"OSD Lifecycle Standards for OSD IT Equipment"
Software				
SLOC per Function point "back-firing" ratio	80.0	SLOC/FP		David Consulting Group (http://www.davidconsultinggroup.com/indata.htm)
SW growth per month	1%-3%	%/Month		Capers Jones

Figure 1 Factors and CERs can be captured in a Database

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FACTS- Analogies

Analogies require more context than factors, but can also be expressed in a spreadsheet or database, but a little bit more context is required. Analogies can refer to entire systems/programs or just some sub-elements. For example, an analyst charged with estimating the cost of implementing an IT system to do Identity Credential and Access Management might find an *analogous* program for cost comparison.

A “sub-element” analogy might be the cost of Testing, e.g., for a particular DHS program an Operational Testing Agent was required. The analyst discovered a GAO report on a similar program for the same agency which reported \$1.8M to do OTA testing. Note that according to the GAO Cost Estimating and Assessment Guide, “an analogy requires little data and can be used as a good cross-check to validate an estimate.”¹

System or Element	Agency	Value	Year of		Definition & Comments	Source	Sensitivity
			Unit	Data			
Operational Testing Agent	DHS	\$1.8 M	TYSM	FY12	This includes test consulting services provided by the U.S. Navy Space and Naval Warfare Systems Command (SPAWAR) in support of testing. The OTA provides a number of personnel to monitor and observe testing activities and contribute suggestions drawing from the SPAWAR knowledge data base.	According to the GAO Nov 2011 Report on the DHS Transformation program, “Cost of an operational testing agent, who would be responsible for planning, conducting and reporting independent OT&E for Release A, was not included in the acquisition planning process. USCIS officials from TPO and OIT agreed that an OTA appeared to be a duplicative effort because TPO had already planned to conduct independent testing. However, DHS denied TPO’s request for a waiver of the OTA. As a result, USCIS contracted with an independent OTA by Oct 2010, and as of June 2011, TPO has awarded approximately \$1.8M towards this contract.”	Public

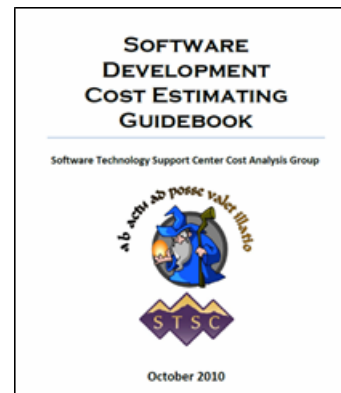
FACTS- Tools and Studies

Tools and *Studies* include artifacts that are not easily codified into a spreadsheet. For example, the *Software Development Cost Estimating Guidebook*, at 200+ pages, is not easily expressed in a couple of formulas for inclusion in a database. Much more context and background is required. This is where enterprise social networking comes in; more specifically Handshake. But first, “The Case for Change,” a short play presented in three acts.



The Case for Change, Act 1: The Wisdom of Crowds

Metcalf's law states that the value of a network is proportional to the square of the number of connected users of the system: formulaically, that's N^2 .



¹ GAO Cost Estimating and Assessment Guide, Ch. 11, p. 108

Crowdsourcing²

Much could be said about *crowdsourcing*, but a few salient points from *Rules of Crowdsourcing: Models, Issues, and Systems of Control* sum it up well:

- “In a profound move from the “pre-Web 2.0³” platform, Web 2.0 does not “impose on users any preconceived notions about how work should proceed or how output should be categorized or structured” (McAfee, 2006, p. 25).”
- “The crowdsourcing model [taps] the collective knowledge of the community to harness the crowd to directly produce goods and services. [...] the crowdsourcing model actively *involves the community in the process of online production activity.*” [emp. mine]



In other words, the traditional top-down approach to knowledge management is antithetical to tapping into the wisdom of crowds. It's reminiscent of the story of the newly built University where students ignored many of the sidewalks designed by the architect. In his next project, the architect waited to see what pathways emerged organically from students walking across the quad to and from dorms and classes before deciding where to pave. The lesson is that the architect, or in this case a designer of a virtual cost community, may have in mind something *entirely different from what the community itself will build.*

The Case for Change, Act 2: Open Government and Open Source

In 2009 President Obama's signed the Memorandum on Transparency and Open Government (http://www.whitehouse.gov/the_press_office/TransparencyandOpenGovernment/) and declared:



- Government should be transparent
- Government should be participatory
- Government should be collaborative

Cost FACTS enables this initiative and embodies the philosophy of open source. “Open source refers to a program in which the source code is available to the general public for use and/or modification from its original design. Open source code is typically created as a collaborative effort in which programmers improve upon the code and share the changes within the community⁴.”



² Rules of Crowdsourcing: Models, Issues, and Systems of Control,“ Author: Gregory D. Saxton, Onook Oh, Rajiv Kishore, Source: Information Systems Management, 2011

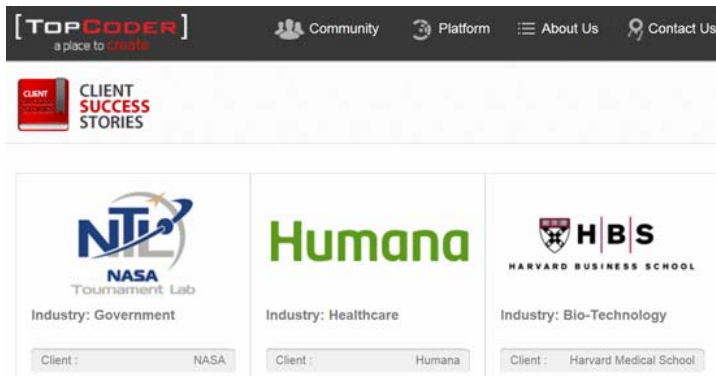
³ Note the term "web 2.0" is often used to mean the social networking aspects of the Internet

⁴ http://en.wikipedia.org/wiki/Open_source

Wikipedia and Mechanical Turk



Perhaps the most famous example of using *open source* and *crowdsourcing* is Wikipedia, the on-line, free encyclopedia that anyone can edit. Another less well-known example, Amazon's Mechanical Turk (see http://www.youtube.com/watch?v=2Uj_YwBbzVI), is a crowdsourcing Internet marketplace that enables computer programmers (known as Requesters) to co-ordinate the use of human intelligence to perform tasks that computers are currently unable to do. The Requesters are able to post tasks, such as choosing the best among several photographs of a store-front, writing product descriptions, or identifying performers on music CDs. Workers can then browse among existing tasks and complete them for a monetary payment set by the Requester.⁵



Note that *open source* does not necessarily mean *free*. Red Hat and TopCoder are private companies that have leveraged the open-source model to create products and services for private industry as well as government entities such as NASA and the Center for Medicaid Services.



The Case for Change, Act 3: Social Networking vs. Traditional Knowledge Management

E-mail lists and traditional knowledge management sharing tools are to social networking what 1995 technologies are to 2013's...i.e., what a Michael Bolton CD is to today's MP3 cloud services such as Spotify. In other words, why are we using such outdated technology to share

knowledge when there are so many advantages to the bottoms-up social networking approach taking hold across industries?



⁵ Wikipedia http://en.wikipedia.org/wiki/Amazon_Mechanical_Turk

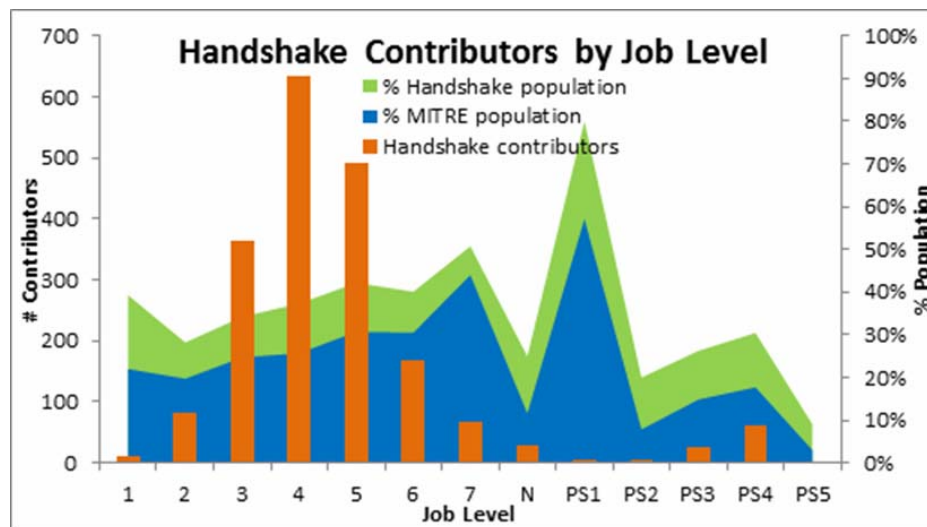
Enterprise Social Networking vs. Traditional KM

There are many advantages to using an enterprise social networking tool such as Handshake. Handshake is a business networking system hosted by the MITRE Corporation. It allows the creation of groups, which are defined as “spaces” created for collaborating and communicating around a project, a community of practice, an event, an organization, a social group, and more.



YouTube One major advantage of Handshake over traditional knowledge management tools is it is much simpler, providing much of the functionality of SharePoint, but with minimal training. Quite frankly, if you can upload or find a video on YouTube, you can use Handshake. These tools employ the bottoms-up, wisdom-of-crowds methodology...as opposed to the top-down, SharePoint approach. Handshake functions as a sort of a “SharePoint lite,” allowing for collaboration and file sharing (including metadata tagging) without the need for a SharePoint administrator. For that matter, no license at all is required-just a web browser.

And you can throw away those “Generation Y/slacker” stereotypes going through your mind (don't feel bad, they were in my mind too!). Social networking is not only for the “under 40” set-



at least at MITRE, most Handshake contributors (approximately 70%) are more senior (mid-level manager to principal). Even on Facebook, nearly half of the user population is over 45.⁶


⁶All Facebook: The Unofficial Facebook Blog http://allfacebook.com/facebook-demographics-pingdom_b97982

Typically, when something is posted to SharePoint, other users have no idea how useful the item is or what other users think of the artifact. However, Handshake or other enterprise social




networking tools allows members to provide feedback on artifacts via comments...or they can simply “Like” it. This ability to dialogue greatly enhances the usefulness of a posted study or cost factor. Members can provide their feedback, caveats, or lessons learned in their use of the artifact. A good example of this value-adding discussion is provided below, where a member provided his opinion of a shared study about software cost estimating:

Software Cost Estimating Relationships Download this file

 **Software Cost Estimating Relationships**
By Daniel Harper Oct 12, 2012 Comments (2)
932 KB
Software Cost Estimating, CERs, SLOC

Software cost overruns are a common problem for the majority of software development projects. With the ever increasing amount of software present in current Department of Defense (DOD) programs, it is extremely important to generate an accurate software cost estimates. There are many complex models that estimate software development productivity and costs. This paper builds upon the principles of these models to look for a simple regression model that can be used to generate accurate and defensible cost estimates for software development programs.

Comments

 Gareth Embrey Oct 12, 2012

Unfortunately, this paper does little to alleviate any challenges inherent in the development of software cost estimates. Even the CERs that show potential utility are discounted by additional analysis. The paper does state that the use of any CERs developed in this model (and as a rule, all other non-parametric models) should be limited to the development of ROM estimates. A good software cost estimate that is not built upon a direct analogy (which is always preferable, if available!) is heavily reliant upon a good size estimate, the use of a justified and applicable factor to estimate code growth, and a reasonably good understanding of the most impactful environmental/complexity factors that will determine the productivity of the development team.

It seems like most of the current research being done is on more effective ways to estimate size using better sizing measures rather than how better to churn out estimates using a given software size. This paper focuses exclusively on ESLOC, which is not always (and some would argue rarely) the best metric to use in measuring size given the current state of software development techniques. Today's parametric models allow for the input of many different metrics because of this, even though SLOC (or ESLOC) is still the predominant choice because of its ease of understanding.

Gareth Embrey, CCE/A

In Handshake, users can even see how many members viewed a given document or discussion. For example, a general Excel-based tool for calculating travel costs as much broader appeal than a DISA pricing catalog for telecommunication services:

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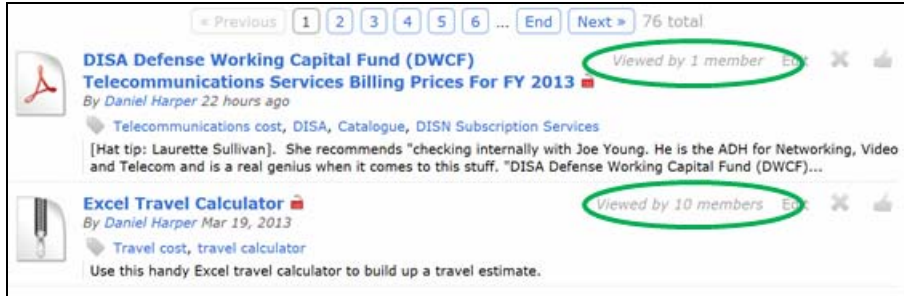


Figure 2: Handshake users can see how many members viewed a given document or discussion

Finally, Handshake integrates well with Outlook e-mail for those w/firewall issues. In other words, a PC or Mac with a browser is not required to participate in the discussion. Users can participate strictly via e-mail on their mobile device if they prefer, and the dialogue will be synchronously posted to the group site for others to view. This is preferable to traditional e-mail dialogue as it is also preserved for future members (versus sitting in individual e-mail inboxes, inaccessible to new employees).

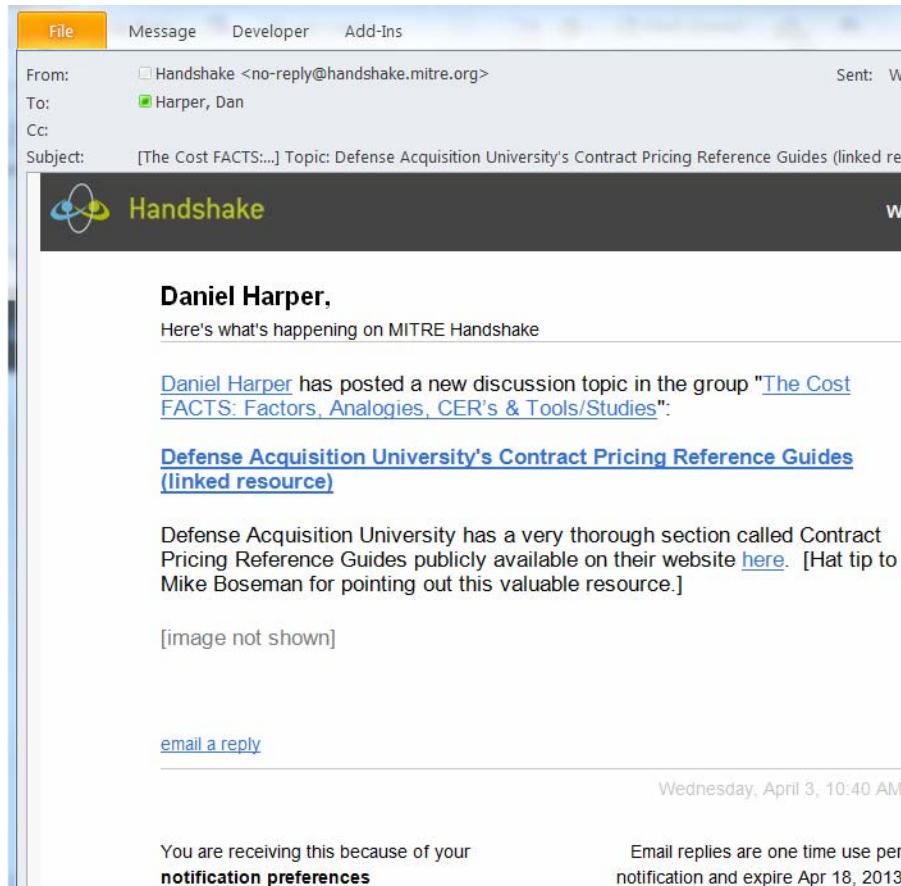


Figure 3 E-Mail Dialogue Synchronously Posted to Group Site

One unforeseen benefit of the site is the "snowball effect." I posted some information on cloud cost estimating, which prompted another colleague to share some information he had in regards to a cloud cost estimating tool:

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Sent: Wednesday, March 13, 2013 11:19 AM
To: Harper, Dan
Subject: Commercial cloud vs internal VA hosting

Dan,
I noticed you posted some cloud cost estimating info (IBM in particular) on Handshake. I am wondering if you have come across any formalized criteria for sponsors deciding whether to host an application within their infrastructure versus with a commercial cloud service provider.

VA sponsored an operations cost estimating tool, and it includes an internal cloud hosting cost estimate of sorts. The tool is publically available at <https://t4.systemsmadesimple.com/preAswEstimate.do#>

Visualization Tools-Explore Group Membership

Handshake has some insightful visualization tools for exploring to what *other* groups your group members is connected. This allows you to find “nodes” or “hubs”, e.g., well-connected individuals. In the example below, you can see Tyndall Traversa is connected to multiple groups of interest such as Big Data Analytics.

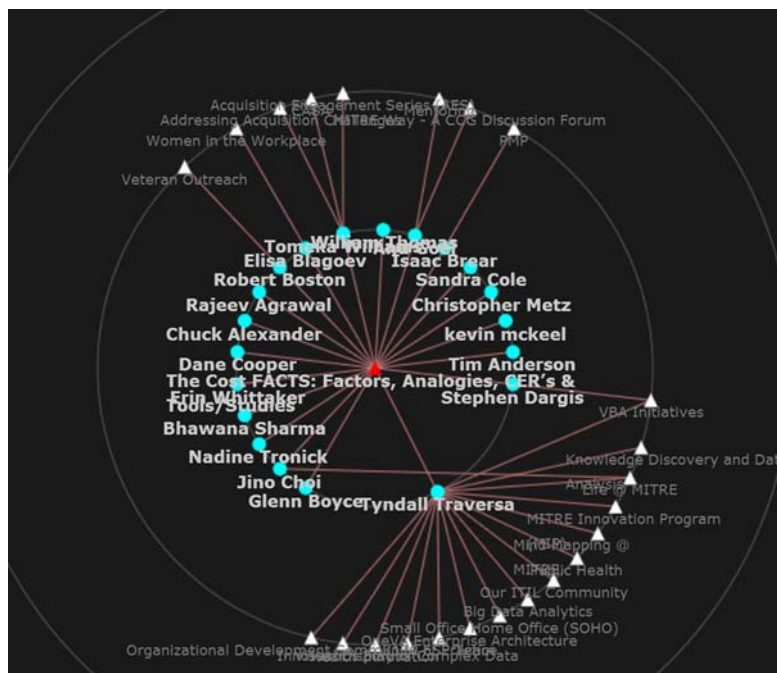


Figure 4 Handshake Allows Users to Explore Member Net Connections to Other Handshake Groups

You can also explore individual networks of other members. The example below shows that Jack Gerdeman is connected to several individuals I do not have relationships with. Jack could be the connection point between me and an individual with a particular expertise.

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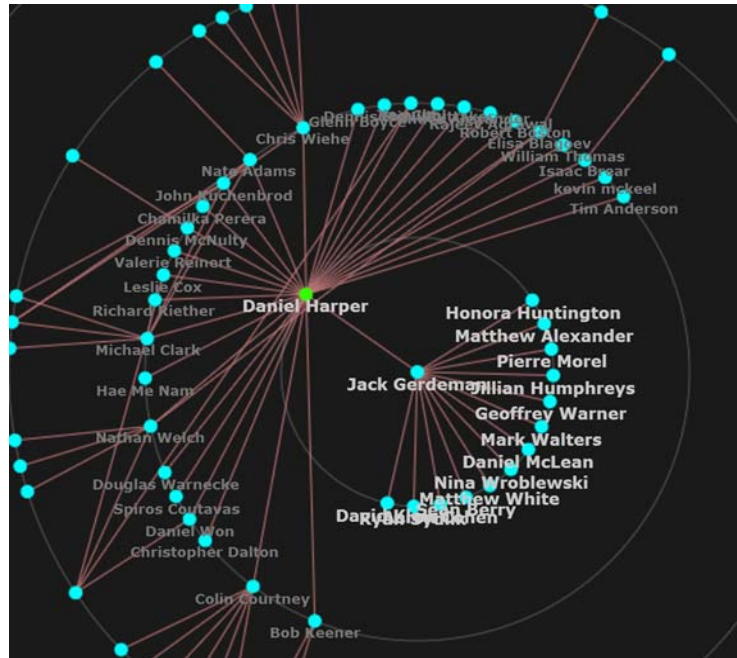
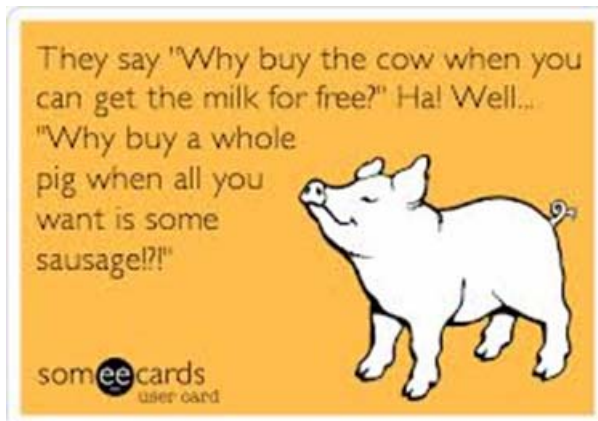


Figure 5 Handshake Allows Users to Explore Member's Connections to Other Members

What's In It for Me?



Why should companies and organizations give away hard-earned intellectual capital?

Throughout history new technologies have challenged business models across industries. In the mobile apps world, software developers give away apps and charge for additional features. In the music industry, MP3s have certainly changed the way artists make a living. Some bands give away the album or stream their music for free online, but charge for concerts or

make money selling merchandise such as T-shirts. Others employ a charge-per-song model vice the traditional single consumer option of purchasing an entire 10 song album having only heard one single.

A cheeky upstart known as “someecards” creates the ubiquitous cards like the one shown above which consumers can post to their Facebook profiles for free, while the website charges advertisers.

Admittedly, providing cost support to the federal government is different from starting up an Internet company in the garage: the point is, social networking and other technologies have affected businesses of all types throughout history. The best companies and organizations figure out the smartest way to adopt new technology for their industry, and ours is no exception.

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For the individual employee, the incentive is even clearer. The adage "scratch my back and I will scratch yours" comes to mind. If you are seen as helpful and contribute when a colleague or partner needs help, others will reach out return when you have a question or are looking for a cost factor to figure out systems engineering costs. If that doesn't convince you, then how about The Golden Rule (do unto others as you would have them do unto you). It's simply the right thing to do!

Of course, there is always the appeal to our more base instincts: customer and management recognition. When you take the time to post a study or answer someone's question *gratis*, you demonstrate that you have intellectual capital to contribute to the company and/or customer. More importantly, you demonstrate that you care about them and their problem. Managers tend to remember these things during annual review time, and customers may also factor in this somewhat intangible quality of "helpfulness" when awarding a new contract or task order. Not to mention, the colleague you help out today just might be your manager or employer tomorrow!

Fear Factor

Another benefit to Handshake groups is that they can easily be opened up to partners or customers. Some organizations are hesitant to embrace technology such as this for fear they will be letting the customer "see how the sausage is made." Or they may be afraid of how someone outside of the company/organization may perceive some potentially frank discussion. This is a legitimate concern. However, organizations cannot simply bury their head in the sand and avoid using social networking tools out of fear. Employees need to be empowered as professionals and trusted to conduct themselves accordingly in their correspondence, just as they would be expected to in a face-to-face meeting with the customer.

However, it is naïve to think there is no risk to using this technology. Inevitably, mistakes will be made, people will be embarrassed, and perhaps a customer will even be off-put by a comment. However, the potential benefits far outweigh the perceived risks. Finally, for discussions that may need to be kept in-house, an employee-only subgroup has been set up (though as of yet there has not been a use for it).

This open approach allows for interaction with a wider variety of experts in the traditional e-mail discussion lists. Generally, only cost analysis "wonks" sign up for e-mail discussion lists. However, someone without a lot of cost experience who perhaps has relevant IT experience-for example, managing a help desk, could answer a Handshake-posted question about cost of implementing help desk management software. Using the e-mail model, he would never even have a chance to see the question!

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Handshake makes site metrics visible for all participants. For example, the Group Metrics widget depicted below reveals that the Cost FACTS site has a total of 81 files as well as 21 posted discussions and six “WIKI” style Pages that have generated over 400 total comments! In addition, total membership is visible to all: the site currently includes 79 members across MITRE as well as five non-MITRE partners. With SharePoint, none of these metrics are visible to the average user.



Group metrics			
	TOTAL	PAST 7 DAYS	TREND
Discussions	21 112	2 35	↑
Files	81 280	4 28	↑
Pages	6 18	- 3	↑
Blog posts	-	-	—
Albums	1	-	—

Contributing members: 60%

Figure 6 Group Metrics widget

User Guide and Best Practices

Users should be wary of simply thinking of the group as a marketing channel to *exclusively* post information about webinars hosted by your company, or nothing but marketing materials (the kind of thing you see sometimes on LinkedIn.com). Don't become the guy in the Oxi-Clean commercials!



Also do not post anything marked FOUO (For Official Use Only), Proprietary or Sensitive. For example, do not post Forrester or Gartner Studies without permission (they frown on posting those to SharePoint OR Handshake) without prior permission. Typically these companies allow for "fair use" i.e., using information from their studies in an estimate. Also many allow for the forwarding a copy of the study to an immediate project team for review, but not for mass distribution or posting to a group SharePoint site. Bottom line, it is up to the user to use discretion and know what is allowable and appropriate. If unsure contact the original provider, or simply post a public-facing hyperlink to the original source.

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If you make a mistake, it's okay, it can be fixed. Artifacts and posts can be deleted. For more information, there is a Handshake User Guide available to members at http://info.mitre.org/communications_services/fastforward/handshake.shtml.

Handshake 101

An excellent four-minute Handshake primer can be accessed by going to http://www.mitre.org/work/info_tech/software_collaboration/ and is publicly accessible.

If you would like to know even more about Handshake you can learn by watching a 45 min. webinar at http://info.mitre.org/communications_services/fastforward/Handshake.shtml (accessible to non-MITRE Partners, but you must be a Handshake member).

If you're a super-Handshake geek (like I am) you can join the Handshake user support group. No, it is not a 12 step support group-it's a user support group!

The screenshot shows the 'Handshake User Support' group page. It includes a group description, a list of discussion topics, a group metrics table, and a tag cloud. Several callout boxes provide additional information:

- Group Home Page:** A green button at the top right.
- Handshake User Support:** The group title and logo.
- Has non-MITRE members:** A red banner indicating the group is open to all Handshake members.
- Activity:** A section showing recent discussions and replies.
- Discussion forum:** A callout box listing tools available in groups: Discussion forum, Files, Blogs, Pages (group-editable), and Albums.
- The Activity River displays the most recent group activity:** A callout pointing to the 'Activity' section.
- How healthy is your group? Is everyone contributing?:** A callout pointing to the 'Group metrics' table.
- The tag cloud provides an overview of tagged content and is a quick way to find content - just click on the tag:** A callout pointing to the 'Tag cloud' section.
- All group members:** A callout pointing to the 'Group members' section.

	TOTAL		PAST 7 DAYS	TREND
Discussions	101	257	2	5
Files	113	6	1	
Pages	47	593	-	2
Blog posts	31	57	-	
Albums	-	-	-	

Figure 7 Screenshot of the Handshake User Support Group

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The Cost FACTS: Factors, Analogies, CER's & Tools/Studies Edit group

This group is to serve as a supplemental forum to using e-mail (think SharePoint light) for MITRE and partners across the cost community (both Gov't and industry).

Handshake is useful for posting files, briefs, studies, etc. and hosting discussions related to IT cost.

microsoft excel, k461, cost estimate, cost estimating, igce, lcce, FACTS, Factors, CERs

<http://communityshare.mitre.org/sites/V400/V460/V461/Workspace/Ice%20Chest.aspx>

Group type: Community of Practice - created Dec 20, 2010

Discussion add a topic | view all

Activity view all

CHAOS Manifesto 2013: Think Big, Act Small, published by the Standish Group
By Daniel Harper Feb 26, 2013
Standish, CHAOS Manifesto
The Standish Group has just published their annual CHAOS Report, CHAOS Manifesto 2013: Think Big, Act Small. This year, the focus of the 48-page report is on: • Comparing small project...

Branding: Changing ICE CHEST Handshake Group to FACTS:
By Daniel Harper Feb 12, 2013
I've re-branded the ICE CHEST handshake group as the "Sharing Cost FACTS: Factors, Analogies, CER's & Tools/Studies" handshake group to 1) distinguish it from the ICE CHEST SharePoint site and 2) reflect a

Daniel Harper uploaded the file **IEEE Buy vs Lease for Government Contracts 1995**
IEEE Buy vs Lease for Government Contracts 1995
yesterday
add a comment

Daniel Harper added a new discussion topic **CHAOS Manifesto 2013: Think Big, Act Small, published by the Standish Group**
The Standish Group has just published their annual CHAOS Report, CHAOS... more
Feb 26, 2013
add a comment

Figure 8 screenshot of the Cost FACTS Handshake Group

Recruitment Strategies: Getting Others Engaged

This is still a work in process, and as community leaders we've learned a lot about getting others engaged with the site. These techniques have included:

- "Shameless" promotion: In Top 100 of over 800 groups on Handshake
- Publicly unveiled to MITRE cost community via June Cost newsletter, "brownbag" brief
- Pointing others to the site (vs. e-mailing files to them) and soliciting comments
- Created Fast Jump (MITRE Internet keyword search term)-"FACTS"
- Created personal intro e-mail, short orientation brief sent to new members; calling new employees to encourage them to join

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- Promoting the idea that “benefits members receive outweigh the ‘costs’”⁷
- Increasing awareness via Association for the Advancement of Cost Engineering International, ICEAA conferences
- Recruiting champions: The message below is from the league for our internal Cost Analysis Tech Team.

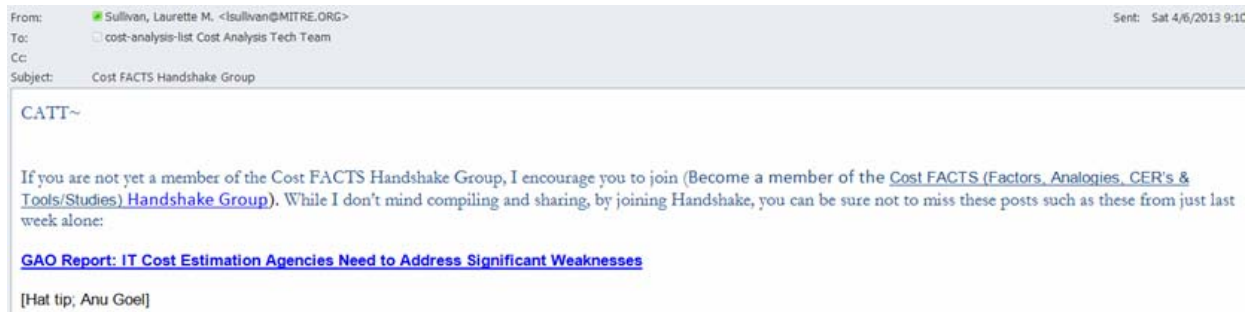


Figure 9: Recruit a Champion!

Finally, we aren't trying to create a new community out of whole cloth: *it exists informally already*. There was a great example provided in the Higgins and Clark article referenced below:

“Failure to consider the needs of network members is the principal reason why so many online social implementations have failed so spectacularly in recent years. One humorous example, relayed to us by a marketing professional for an organization that shall remain nameless, involved a consumer packaged goods (CPG) company that attempted to create an online community for fans of its brand of toilet paper ... and was shocked when the community never got any traction.”



“If network members think that the cost of a relationship with an enterprise is too high relative to the benefits they receive, they will be disinclined to participate.” -*Leveraging Social Science to Boost Adoption of SMAC Technologies* by Dave Higgins and Sam Clark, *The Journal of Information Technology Management*, February 2013, page 10

The cost estimating community already exists: You call up a former colleague to ask for help, or e-mail somebody you had a beer with last year at the International Cost Estimating and Analysis Association conference. Enterprise social media simply makes it more efficient and available.

For additional info contact Daniel Harper (djharper@mitre.org) or Ruth Dorr (rdorr@mitre.org)

⁷ a best practice according to *Leveraging Social Science to Boost Adoption of SMAC Technologies* - Higgins and Clark, *The Journal of Information Technology Management*, Feb 2013

Appendices

Tagging 101



A “tag” is user-defined metadata; that is, it is a term you can add to any object you create within Handshake. Use the Tags field when you create blog posts, discussion topics, pages (and subpages), files, bookmarks, albums, and pictures. This use of user-defined tags is common in social media. It has the advantage that people can use terms that are familiar to them.

It also means the tags that individual users assign to objects might not always match up. For example, one user might tag topics related to Enterprise 2.0 as “E20” and another might use the tag “E2.0.”

A search on one of these strings will not find content that is tagged with the other. Therefore a good rule of thumb in tagging is to tag anything that you want to be able to find again quickly and that you want other people to discover.

Tags are a great way to build a collective knowledge base and share an ongoing conversation about a topic that is interesting to you and others.

Tags ensure that when a person in Handshake is looking for material in a particular area, they will be able to find materials which have already been created or shared on the topic.

When tagging one should use both acronyms and the actual word, e.g., “IGCE” and “Independent Government Cost Estimate” (note searchers are not case sensitive)

Note that a search for anything tagged “cost estimate” would also return results for anything tagged “Independent Government Cost Estimate”

Users should apply between four and ten tags. However, there is no limit-the more the merrier.

Good tagging likely means that more site visitors will see your content, and the contributor herself will find the content more readily in the future.

FACTS in Action: Users can provide value-adding "color commentary"

Using traditional KM platforms, users post artifacts for others to download. With a tool such as Handshake, users can also provide valuable feedback on the artifact as in the example below:

The screenshot shows a document titled "Software Cost Estimating Relationships" with a "Download this file" button. The document is by Daniel Harper, dated Oct 12, 2012, with 2 comments and a size of 932 KB. The document content discusses software cost overruns and regression models. A comment by Gareth Embrey, dated Oct 12, 2012, critiques the paper's approach to CERs and size estimation metrics like ESLOC and SLOC.

Software Cost Estimating Relationships Download this file

Software Cost Estimating Relationships Edit X 👍

By Daniel Harper Oct 12, 2012 Comments (2)
932 KB
Software Cost Estimating, CERs, SLOC

Software Cost Estimating Relationships
By: Jennifer Leotta, Navy Engineering Logistics Office (NELO)

Software cost overruns are a common problem for the majority of software development projects. With the ever increasing amount of software present in current Department of Defense (DOD) programs, it is extremely important to generate an accurate software cost estimates. There are many complex models that estimate software development productivity and costs. This paper builds upon the principles of these models to look for a simple regression model that can be used to generate accurate and defensible cost estimates for software development programs.

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M Gareth Embrey Oct 12, 2012 X

Unfortunately, this paper does little to alleviate any challenges inherent in the development of software cost estimates. Even the CERs that show potential utility are discounted by additional analysis. The paper does state that the use of any CERs developed in this model (and as a rule, all other non-parametric models) should be limited to the development of ROM estimates. A good software cost estimate that is not built upon a direct analogy (which is always preferable, if available!) is heavily reliant upon a good size estimate, the use of a justified and applicable factor to estimate code growth, and a reasonably good understanding of the most impactful environmental/complexity factors that will determine the productivity of the development team.

It seems like most of the current research being done is on more effective ways to estimate size using better sizing measures rather than how better to churn out estimates using a given software size. This paper focuses exclusively on ESLOC, which is not always (and some would argue rarely) the best metric to use in measuring size given the current state of software development techniques. Today's parametric models allow for the input of many different metrics because of this, even though SLOC (or ESLOC) is still the predominant choice because of its ease of understanding.

Gareth Embrey, CCE/A

Figure 10 Users Can Add Color Commentary

FACTS in Action: Obsolescence/DMSMS example

In another instance a user posted an e-mail about estimating the cost of obsolescent equipment/software. Because we did not have any data points on the site at the time, we created a WIKI page to capture the knowledge originally shared via e-mail. We also *tagged* it using a similar DoD term "Diminishing Manufacturing Sources and Material Shortages" as well as the acronym for the term "DMSMS."

ROM estimate for cloud computing services

The request below when out on another listserv:

We have been tasked to write a SOW for global commercial-based, non-classified cloud computing services (i.e., PaaS, IaaS, SaaS). There is a quick turnaround time on this task. Does anyone know of an existing SOW, requesting similar services, that I can tailor?

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An open-source analogy appropriate for a ROM was shared and preserved on the Cost FACTS site:

System or Element	Agency	Value (TY\$K)	Unit	Year of Data	Definition & Comments	Reference	Sensitivity
Email as a Service (EaaS)-planning and implementation of a cloud email services	Labor	\$ 4,350,000	TY\$M	FY12	The planning and implementation of a cloud email services throughout DOL. Effort lasted 16 months from 5/1/2011 to 9/30/2012	Please say that again Dashboard: DOL - IT Infrastructure Modernization (DITIM)	Public

Figure 11 Cloud Computing ROM Analogy

Supply Chain Risk Management Cost

Capture of Supply Chain Risk Management Cost discussion conducted via e-Mail list serve converted to a “page” artifact with searchable “tags” as well as important POC/SME info for SCRM questions:

Supply Chain Risk Management Cost Create a sub-page

Supply Chain Risk Management Cost History Edit X Like
Last updated yesterday by Daniel Harner

Supply chain risk management, SCRM Cost ← **searchable “tags” & POC**

I thought it worth capturing this recent dialogue re: Supply Chain Risk Management Cost:

From: owner-e520-risk-management-list@lists.mitre.org [mailto:owner-e520-risk-management-list@lists.mitre.org] **On Behalf Of** Granata, Steve ← **searchable “tags” & POC**

Sent: Thursday, November 08, 2012 12:04 PM

To: Rosa, Linda M.; acquisition-cell-list Acquisition Cell; e520-risk-management-list Risk Management & Analysis Tech Team L; supply-chain-risk-management-list Multi-Disciplinary Forum for S

Subject: RE: FYI - a New DoD Instruction on the street: Protection of Mission Critical Functions to Achieve Trusted Systems and Networks (TSN)

Linda:

You articulated the common refrain of most DoD PMs and PEOs when they become aware of SCRM policies and procedures. Understandably cost is a major concern and in the final analysis a PM or PEO must trade-off cost against mitigating cyber threats posed by the global supply chain vector.

Regarding cost itself, I have a rough approximation of SCRM costs from my engagement in a Navy ACAT II program implementing SCRM in a tactical messaging system. I worked on-and-off for several months with a

Figure 12 Supply Chain Risk Management Cost Discussion

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