

I would expect that my U.S. numbers could be converted into U.K. approximations by adjusting my numbers by the relative difference in national populations.

Table 29: Estimated Number of U.S. Software Engineers, Specialists, and Managers Circa 2008

Data from 13,000 projects considered of which 1500 were fully measured. Ongoing US projects = 1.2 million; Legacy Apps = 230,000; Total = 1.4 Million applications; 5% analysis for accuracy would = 70,000; results therefore of low accuracy. Data provided for calibration and correction purposes.

More than 90 kinds of specialists are employed in the overall U.S. software industry.

			Domestic	Systems &		Civilian		
	MIS	Web	Outsource	Embedded	Commercial	Government	Military	
Size in Function Points	**Projects**	**Projects**	**Projects**	**Projects**	**Projects**	**Projects**	**Projects**	***Total***
1	10,000	20,000	7,000	7,500	6,000	5,500	7,000	*63,000*
10	18,750	25,000	10,000	6,250	6,250	5,000	8,750	*80,000*
100	33,333	92,308	16,667	14,286	14,085	12,500	11,404	*194,581*
1,000	58,824	201,149	42,424	30,488	31,646	25,806	31,690	*422,027*
10,000	123,457	446,429	106,707	187,500	160,256	129,032	200,000	*1,353,381*
100,000	6,329	3,125	3,086	16,026	3,145	38,961	50,676	*121,348*
1,000,000	0	0	0	12,903	19,608	32,895	135,135	*200,541*
Total Staff involved	***250,693***	***788,011***	***185,885***	***274,952***	***240,989***	***249,694***	***444,654***	***2,434,878***
Estimate End-Users who program	**550,000**	**3,500,000**	**10,000**	**3,000**	**200,000**	**100,000**	**10,000**	**4,373,000**
Ratio of end users	**2.19**	**4.44**	**0.05**	**0.01**	**0.83**	**0.40**	**0.02**	**1.80**
***22 Million who use/rely on IT in UK**						**UK: IT Workforce**		***1,200,000**
						UK: Estimate of End Users who program		**2,160,000**

**(UK) Office for National Statistics: Labour Force Survey 2008*

I don't have any clients in the games or entertainment industries. I suspect they have a lot of end users who program but I don't have any good data anything in those segments. There are probably more than 300,000 individuals in the U.S. who are *quasi end users writing apps for i-Phones, Droids, and other smart phones*. Here too I don't have any clients in the area so I don't have any solid data. But this field is probably growing in excess of 15% per year.

From same data analysis - following are the top U.S. software cost elements for various situations:

End-User programming	Agile project level:	Waterfall project level:
1) The cost of programming or coding	1) The cost of meetings and communications	1) The cost of cancelled projects
2) The cost of finding and fixing bugs	2) The cost of finding and fixing bugs	2) The cost of finding and fixing bugs
3) The cost of teaching any other users	3) The cost of programming or coding	3) The cost of producing English words
	4) The cost of requirements changes	4) The cost of requirements changes
	5) The cost of producing English words	5) The cost of programming or coding
	6) The cost of project management	6) The cost of meetings and communications
	7) The cost of avoiding security flaws	7) The cost of project management

Function Point Summary / Explanation

Application	Function Points	Note
Star Wars missile defense	352,330	Applications **larger than 100,000 function points** include major defense systems, large ERP applications, and large operating systems. Such applications are important, expensive, and hazardous to construct. Once constructed, they have very long life expectancies because replacement is too costly and time consuming.
US Air Traffic Control	306,324	
Microsoft XP	126,788	
FBI fingerprint analysis	25,075	Applications **between 10,000 and 100,000 function points** comprise the main applications that drive business and government operations. Such applications are important, expensive, and difficult to construct. Also in this size range are systems and embedded software for complex equipment and weapons systems.
NASA space shuttle	23,153	
Skype	21,202	
Google search engine	18,640	
Oracle CRM Features	6,386	Applications **between 1,000 and 10,000 function points** comprise the majority of stand-alone programs, components of larger systems, and scores of embedded and systems software applications for complex physical devices. Many common applications such as Microsoft Word and Excel are in this size range.
Microsoft Excel 2007	3,969	
Apple i-Pod	1,408	
Instant messaging	687	Applications **between 100 and 1,000 function points** are primarily small embedded applications, plus features and updates to larger systems. A number of single-purpose applications are in this range.
Denial of service virus	138	
ILOVEYOU computer worm	22	
Keystroke logger virus	15	
MYDOOM computer virus	8	There are few **applications between 10 and 100 function points** other than viruses and spyware. However this size range is the most common for enhancements and new features for larger applications
APAR bug report	4	
Screen format change	0.87	Applications **between 1 and 10 function** are usually bug repairs and small updates to larger applications, Applications of this small size cannot be measured using standard IFPUG function points, but require “micro-function points” for sizing.

Activities involved in Software			
01 Requirements	09 Reuse acquisition	17 Function testing	25 Project management
02 Prototyping	10 Package purchase	18 Integration testing	
03 Architecture	11 Code inspections	19 System testing	
04 Project Plans	12 Ind. Verif. & Valid.	20 Field (Beta) testing	
05 Initial Design	13 Configuration mgt.	21 Acceptance testing	
06 Detail Design	14 Integration	22 Independent testing	
07 Design Reviews	15 User documentation	23 Quality assurance	
08 Coding	16 Unit testing	24 Installation/training	

Example of Benchmark from Large Corporation

Portfolio Benchmark Example for a Large Manufacturing Corporation
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PORTFOLIO APPLICATION TYPES	**Counts**
Information systems	1,280
Systems software	800
Embedded applications	480
Tools and support software	320
Manufacturing applications	320
End-user applications	**200**
Total	**3,400**

PORTFOLIO LANGUAGES	
Information systems	COBOL, PL/I, SQL, QBE, ASP, Visual Basic, Mumps
Systems software	Chill, ESPL/1, Coral, Bliss, C, Objective C, Assembly, Ada, Jovial
Embedded applications	Forth, Embedded Java, Assembly, Objective C, Java, J2ME
Tools and support software	Objective C, C, C++, C#, Visual Basic. PERL, Ruby
Manufacturing applications	Assembly, Objective C, C, C++, C#, Visual Basic
COTS packages	Multiple
Open source packages	Java, C, C++
End-user applications	**Visual Basic, Java, Ruby, Perl**

APPLICATION USAGE	
Total corporate employment	250,000
Number of application users	75,000
Annual usage growth %	10.00%
Users per application	23
Applications per user	15
Usage per work day (hours)	2.5
Total hours per work day	187,500
Total hours per year	41,250,000
Annual software usage $	$3,867,187,500
Annual usage cost per user	$51,563

APPLICATIONS (not all detailed)	**End User**	**Open Source**	**COTS**
Count of Applications	200	75	1,120
Average size in Function Point	70	4,500	2,000
Average size in Lines Of Code	2,800	240,000	213,000
End-user support staff	0	17	149
Latent bugs in end-user applications	8,400	11,813	78,400
High-severity bugs in end-user apps	1,848	2,363	18,032
Changes to end-user apps	Unknown	2,250	26,880

(End-user apps are not under formal change control or corporate governance)