

Red Hat Inc.

Patent Portfolio Analysis

November 2018

Introduction

In the event of IBM's USD 34 billion offer to acquire Red Hat, we present an analysis of Red Hat's patent portfolio to provide insights into its various aspects.

For this report, we analyzed a total of 3,049 currently active published patent applications in Red Hat's portfolio. Unless otherwise stated, the report displays numbers for published patent applications. The analytics are presented in the various charts and tables that follow. These include the following,

- Portfolio Summary
- Published Applications - Growth
- Top Forward Citing (FC) Assignees
- Technology Focus of the FC Assignees
- Topic Map based on Concepts
- Patent Quality
- Key Patents in the Portfolio
- Top 20 CPC Codes
- Growth of the Top 10 CPC Codes
- Key Portfolio Acquisitions
- Portfolio Taxonomy
- Red Hat-IBM – Category-wise Comparison

Insights

- Red Hat possesses a medium-sized patent portfolio that is tightly focused on cloud infrastructure and software - its deployment and management.
- Red Hat's year-wise published patents show a sharper upward trend beginning in 2009, flattening out in 2014, with another spurt in 2017.
- The jurisdiction of Red Hat's published patent filings is almost exclusively the U.S. (over 97% of its portfolio).
- The average patent quality of the portfolio is high. The portfolio has an average Relecura Star rating of 2.9 out of 5. Typically, a patent with a Relecura Star rating of 3 or more is deemed as one of high-quality.
- IBM's patent portfolio is many orders of magnitude larger than that of Red Hat, with greater coverage in each of the technology categories addressed by Red Hat's portfolio.
- Hence, it does not seem that patents were the main driver for IBM's acquisition of Red Hat, in comparison to other strategic objectives such as making inroads into the open cloud segment by virtue of Red Hat's established position in the market, and thus competing more strongly with the leading incumbents like Amazon, Microsoft and Google.
- Nonetheless, Red Hat's high-quality patent portfolio greatly strengthens IBM's patent coverage in the cloud infrastructure related categories, especially in the U.S. market.

Published Applications - Summary

TOTAL DOCUMENTS COUNT (APPLICATIONS)
3,049

PUBLICATION TYPES



● Applications ● Grants

Peak Year of Activity
2017 (452)

Top Active Jurisdiction
US (2,974)

IP TYPES



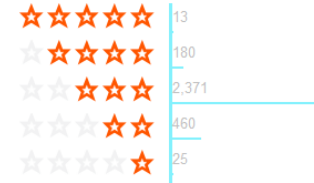
● Invention

No of technologies (49)

Top Rated
US9037692B2 (4.5)

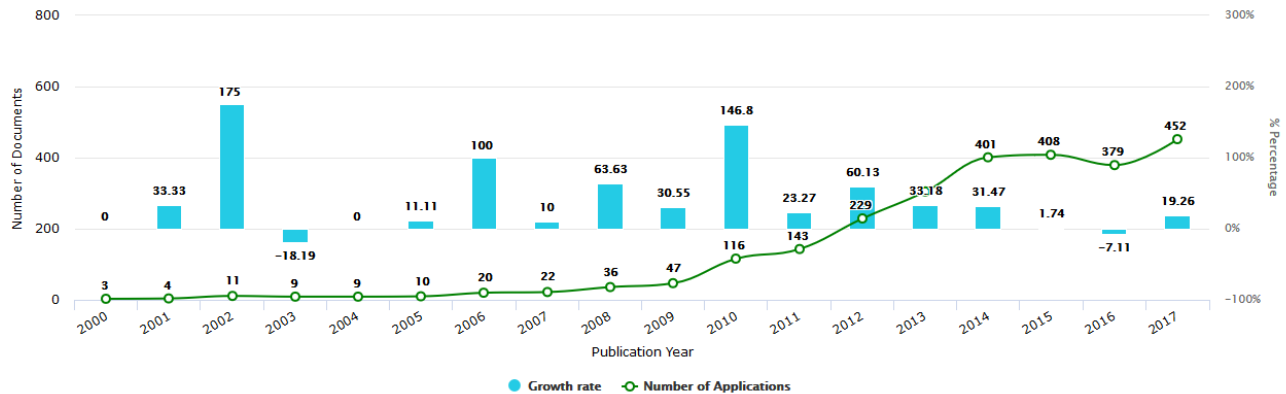
PATENT BY STAR RATING

2.90



Top Cited
US6535909B1 (1,145)

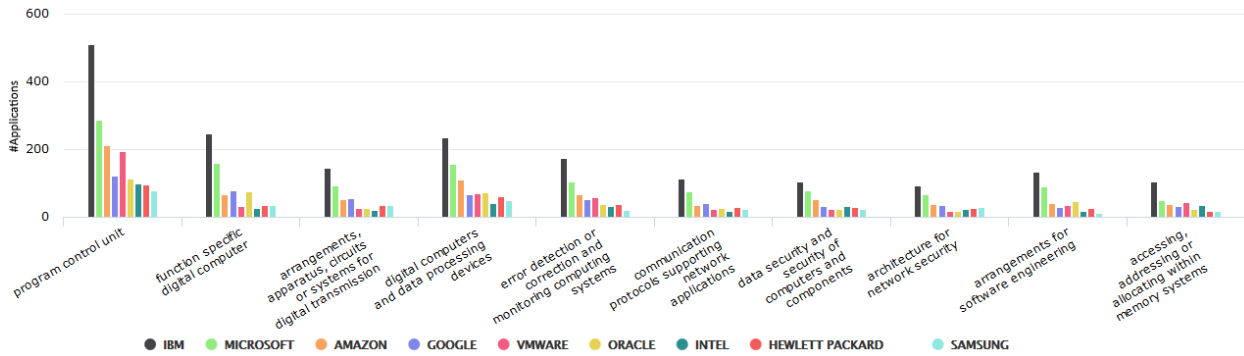
Published Applications - Growth



Top Forward Citing (FC) Assignees

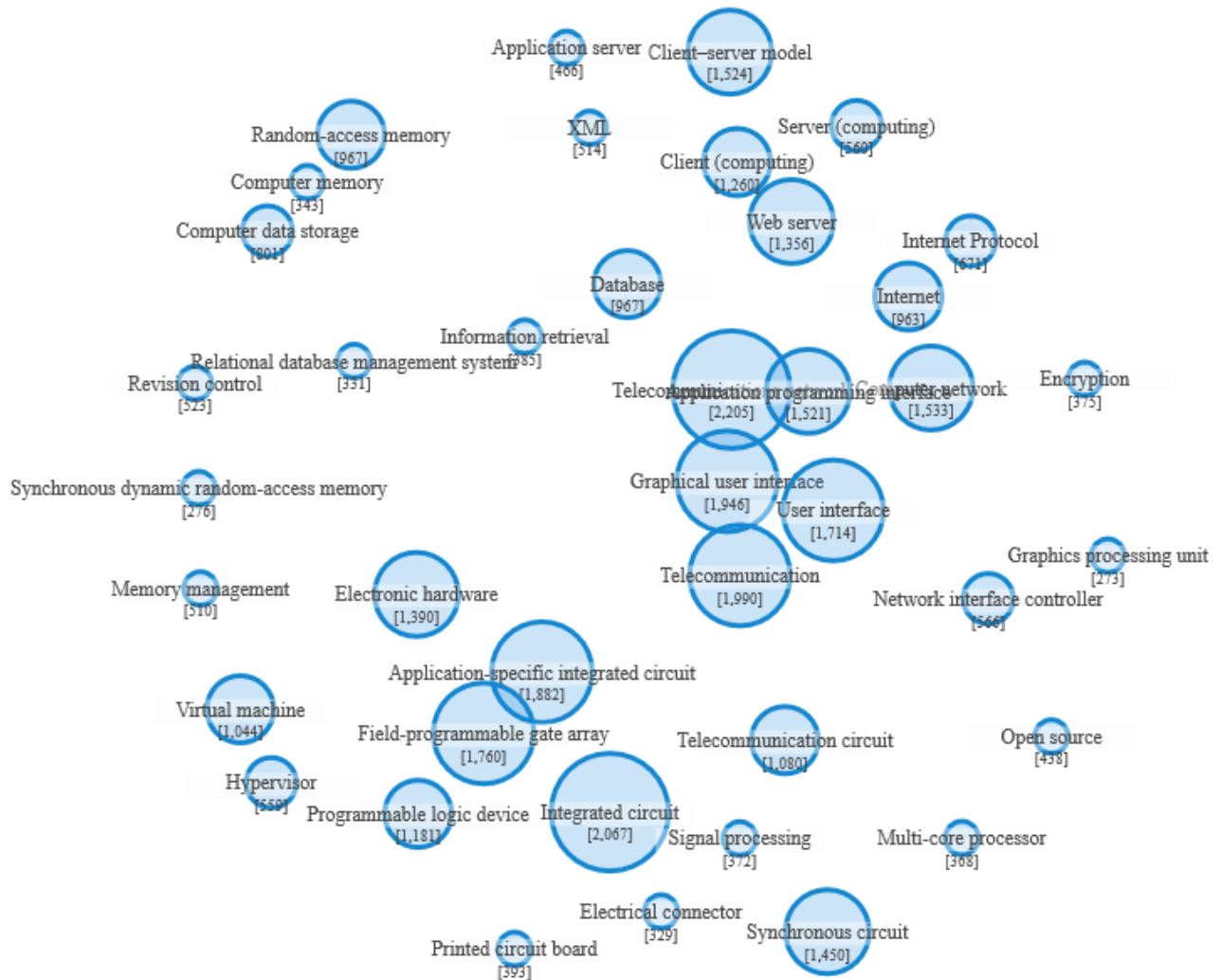
FC Assignee	# Applications cited
IBM	1005
MICROSOFT	615
AMAZON	367
GOOGLE	291
VMWARE	259
ORACLE	242
INTEL	202
HEWLETT PACKARD	199
SAMSUNG	185

Technology Focus of the Forward Citing Assignees

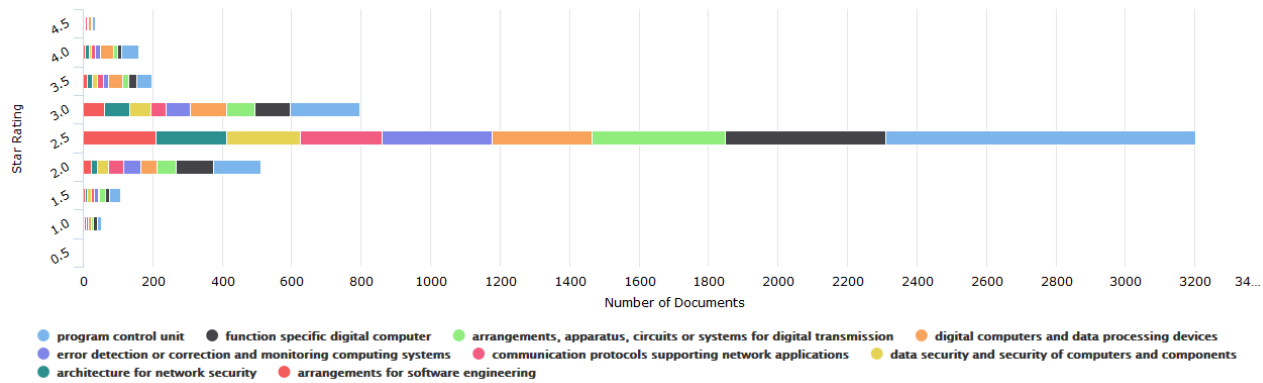


Topic Map – Concepts

- The bubble size corresponds to the total number of patent applications for each concept.
- The bubble proximity corresponds to the “relatedness” of the individual concepts.



Patent Quality by Sub-technologies *(Relecura Star Rating on a scale of 5)*



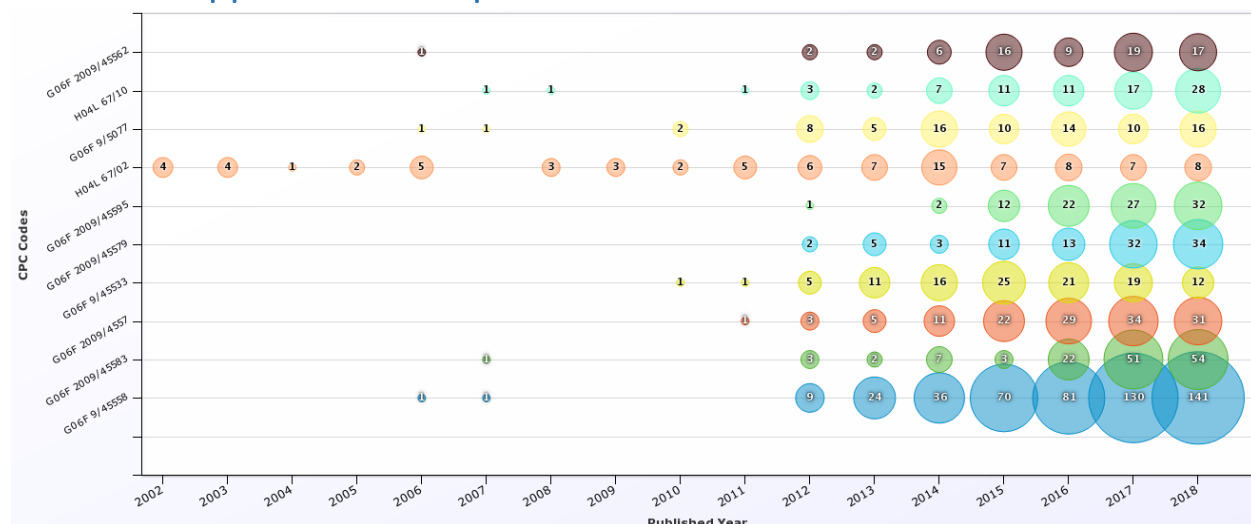
Key Patents in the Portfolio

Publication #	Title	Inventor	Filing Date	Star Rating	# Forward Citations
US8938489B2	Monitoring system performance changes based on configuration modification	John M. Suit, Mark J. Yourcheck	2010-10-15	4.5	94
US8949826B2	Control and management of virtual systems	Joseph Fitzgerald, Oleg Barenboim	2007-11-27	4.5	212
US7133896B2	Providing a presentation on a network	Robert H. Ogdon, Frank E. Johnson	2003-07-18	4.5	224
US8108912B2	Systems and methods for management of secure data in cloud-based network	James Michael Ferris	2008-05-29	4.5	188
US7103663B2	License management server, license management system and usage restriction method	Mitsuhiro Inoue, Ryuichi Okamoto	2002-06-10	4.5	218
US8271653B2	Methods and systems for cloud management using multiple cloud management schemes to allow communication between independently controlled clouds	Michael Paul DeHaan	2009-08-31	4.5	139
US8458658B2	Methods and systems for dynamically building a software appliance	Norman Lee Faus, David P. Huff, Bryan M. Kearney	2008-02-29	4.5	123
US8943497B2	Managing subscriptions for cloud-based virtual machines	James Michael Ferris, Aaron Peter Darcy	2008-05-29	4.5	160
US8458695B2	Automatic optimization for virtual systems	Joseph Fitzgerald, Oleg Barenboim	2007-11-27	4.5	133
US9703609B2	Matching resources associated with a virtual machine to offered resources	James Michael Ferris	2009-05-29	4.5	160

Published Applications - Top 20 CPC Codes

Class Code	Description	# Applications
G06F 9/45558	Program control unit >> Hypervisor-specific management and integration aspects	493
G06F 2009/45583	Program control unit >> Memory management, e.g. access, allocation	143
G06F 2009/4557	Program control unit >> Distribution of virtual machine instances; Migration and load balancing aspects	136
G06F 9/45533	Program control unit >> Hypervisors; Virtual machine monitors	111
G06F 2009/45579	Program control unit >> I/O management (device drivers, storage access)	100
G06F 2009/45595	Program control unit >> Network integration; enabling network access in virtual machine instances	96
H04L 67/02	Communication protocols supporting network applications >> involving the use of web-based technology, e.g. hyper text transfer protocol [HTTP]	87
G06F 9/5077	Program control unit >> Logical partitioning of resources; Management or configuration of virtualized resources	83
H04L 67/10	Communication protocols supporting network applications >> in which an application is distributed across nodes in the network	82
G06F 2009/45562	Program control unit >> Creating, deleting, cloning virtual machine instances	72
G06F 8/65	Arrangements for software engineering >> Updates	69
H04L 63/08	Architecture for network security >> for supporting authentication of entities communicating through a packet data network	69
G06F 8/61	Arrangements for software engineering >> Installation	68
H04L 63/0823	Architecture for network security >> using certificates	67
G06F 8/71	Arrangements for software engineering >> Version control ; Configuration management	62
G06F 9/455	Program control unit >> Emulation; Interpretation; Software simulation, e.g. virtualisation or emulation of application or operating system execution engines	62
G06F 2009/45575	Program control unit >> Starting, stopping, suspending, resuming virtual machine instances	62
G06F 9/5072	Program control unit >> Grid computing	59
G06F 9/44505	Program control unit >> Configuring for program initiating, e.g. using registry, configuration files	58
G06F 2009/45587	Program control unit >> Isolation or security of virtual machine instances	58

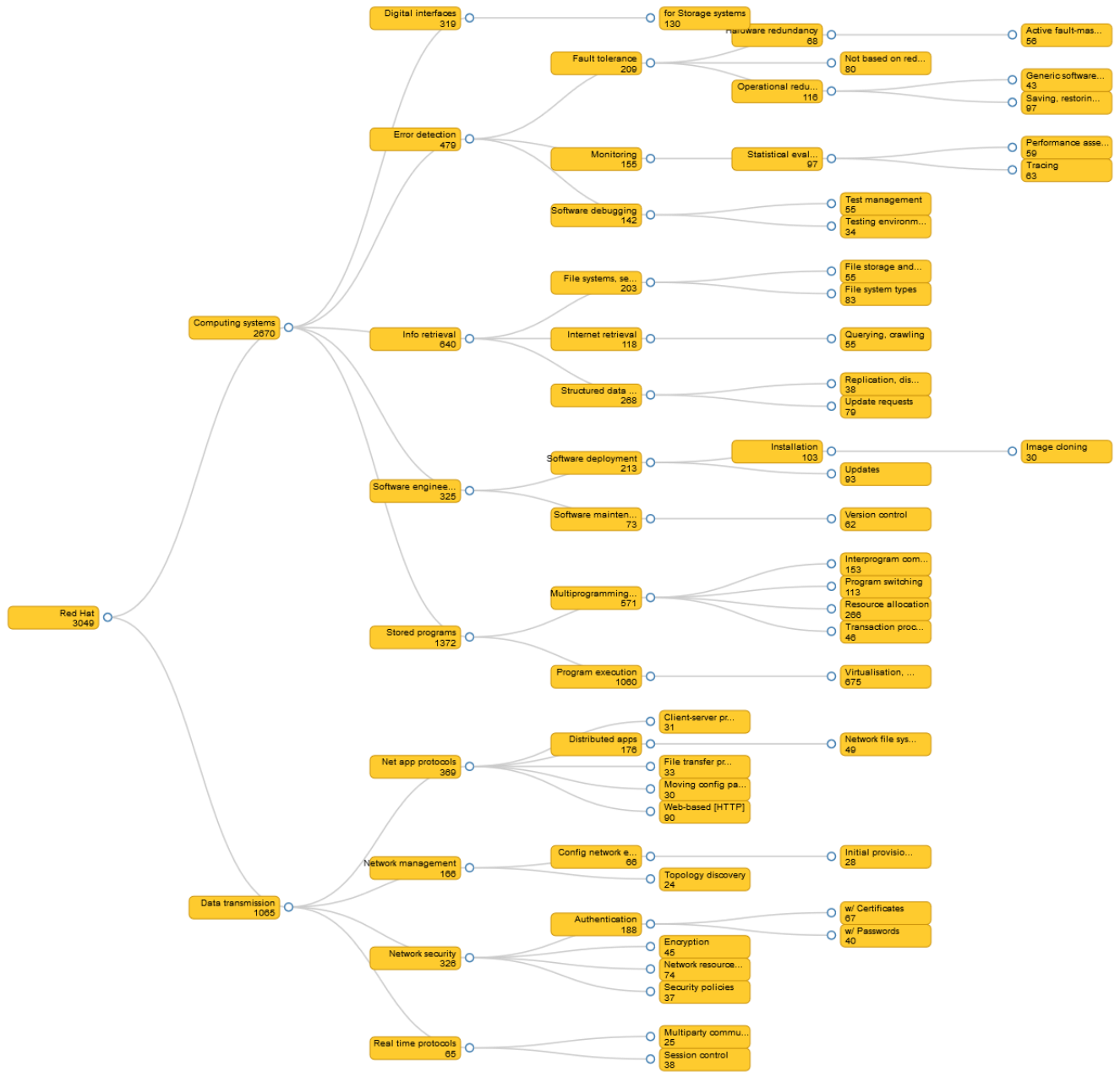
Published Applications – Top 10 CPC Codes – Growth



Key Portfolio Acquisitions

Transferred from	# Applications	Technologies
OPEN INVENTION NETWORK	46	data transmission (69), digital data processing (67), telephonic communication (42), data processing systems (32), wireless communication networks (29)
MANAGEIQ INC	26	digital data processing (26), data transmission (6), greentech - others (3)
PERMABIT TECHNOLOGY CORPORATION	26	digital data processing (42), greentech - others (32), data processing systems (14), data transmission (6), coders & decoders (1)
WEST CORPORATION	17	digital data processing (22), speech synthesis (15), data processing systems (14), telephonic communication (13), data transmission (12)
IBM	16	digital data processing (11), data processing systems (7), greentech - others (5), data transmission (4)
INTERCALL INC	13	digital data processing (23), data transmission (16), data processing systems (9), speech synthesis (6), telephonic communication (5)
OPTICAL FUSION INC	12	pictorial communication (11), telephonic communication (10), data transmission (9), digital data processing (9)
PERMABIT INC	11	digital data processing (34), greentech - others (32), data processing systems (14), data transmission (6), coders & decoders (1)
AT&T	9	data transmission (11), sports apparatus - indoor games (5), data processing systems (4), pictorial communication (4), signal transmission (3)
UBEEAIRWALK LLC	9	data transmission (20), wireless communication networks (20), telephonic communication (16), electric elements - aerials (2)

Taxonomy (Showing published applications in each category)



Red Hat – IBM Category-wise Comparison (# Applications given for color-coded categories)

		Technology Categories				Red Hat	IBM	
Red Hat - IBM	Computing systems	Digital interfaces	for Storage systems			130	5067	
		Error detection	Fault tolerance	Hardware redundancy	Active fault-masking, e.g. by switching out faulty elements or by switching in spare elements	56	1979	
				Not based on redundancy		80	1774	
				Operational redundancy	Generic software techniques for fault masking	43	251	
			Monitoring	Statistical evaluation	Saving, restoring, recovering or retrying	97	2365	
					Performance assessment	59	1021	
				Software debugging	Test management	Tracing	63	1162
						Testing environments	55	981
			Info retrieval	File systems, servers	File storage and access structures		34	496
					File system types		55	411
					Internet retrieval	Querying, crawling	83	885
		Structured data stores			Replication, distribution or synchronisation of data between distributed databases	55	2059	
		Software engineering		Software deployment	Update requests		38	847
					Installation	Image cloning	79	1593
					Updates		30	211
				Software maintenance	Version control		93	682
					Interprogram communication		62	603
					Program switching		153	1739
		Stored programs	Multiprogramming arrangements	Resource allocation		113	1894	
				Transaction processing		266	4753	
				Virtualisation, emulation		46	794	
				Client-server protocols		675	3791	
				Distributed applications	Network file systems [NFS]	31	671	
				File transfer protocol [FTP]		49	1869	
		Data transmission	Network application protocols	Moving configuration parameters		33	427	
				Web-based [HTTP]		30	463	
				Configuration network elements	Initial provisioning	90	1490	
				Topology discovery		28	206	
				Authentication	w/ Certificates	24	457	
			Network management	w/ Passwords			67	380
						40	499	
	Encryption				45	1057		
	Network resource access				74	1779		
	Network security		Security policies		37	716		
			Multiparty communications		25	380		
			Session control		38	319		

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