‘4차 산업혁명 시대의 오픈소스 소프트웨어 인력 문제

고건

이화여자대학교 석좌교수

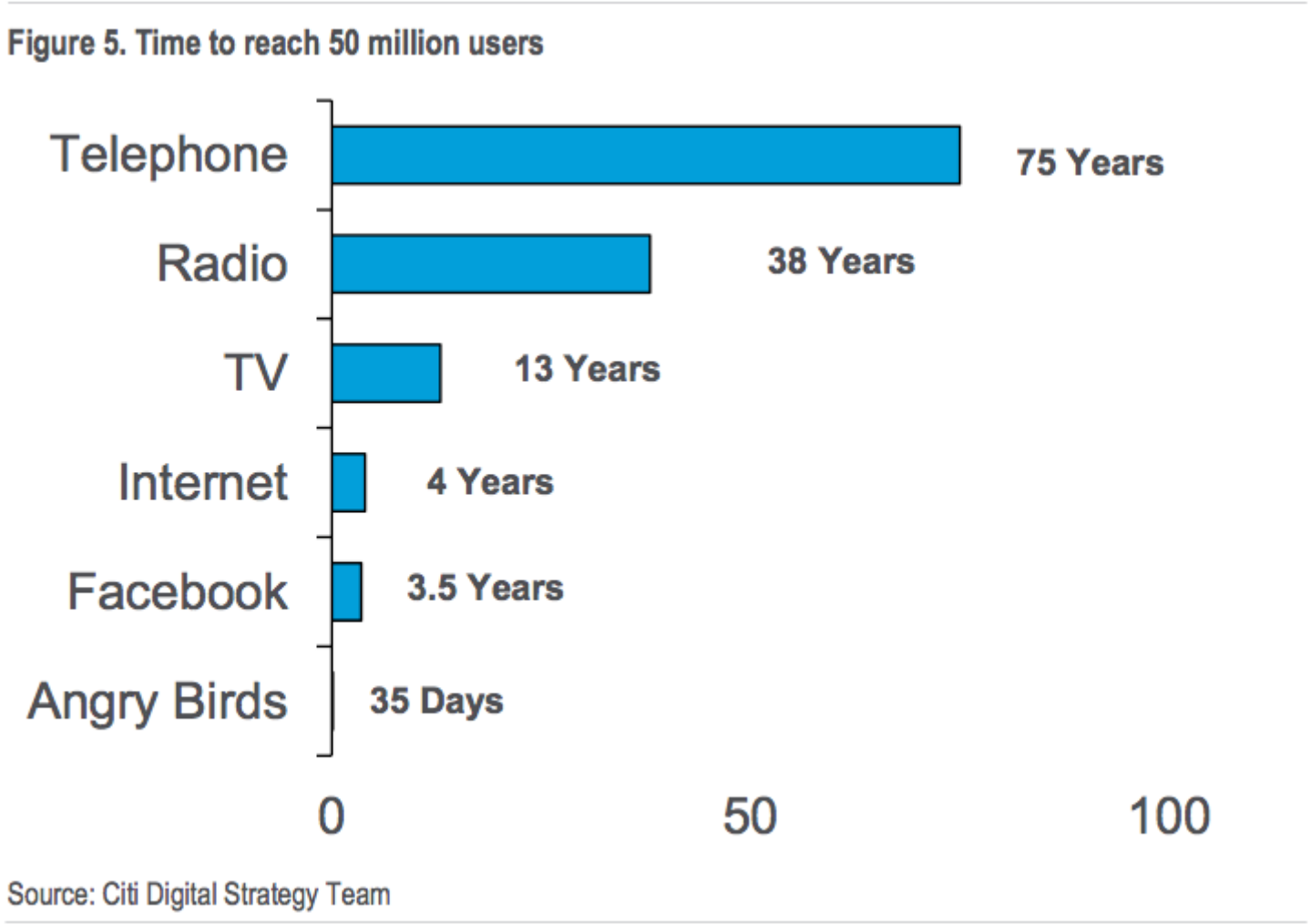
차례

4차 산업혁명의 특징

4차 산업혁명의 특징

- 변화 속도

https://www.techworm.net/2015/03/to-reach-50-million-users-telephone-took-75-years-internet-took-4-years-angry-birds-took-only-35-days.html



4차 산업혁명의 특징

- 변화 속도
- **후발주자에 기회?**

200년 늦게 출발해도

인건비

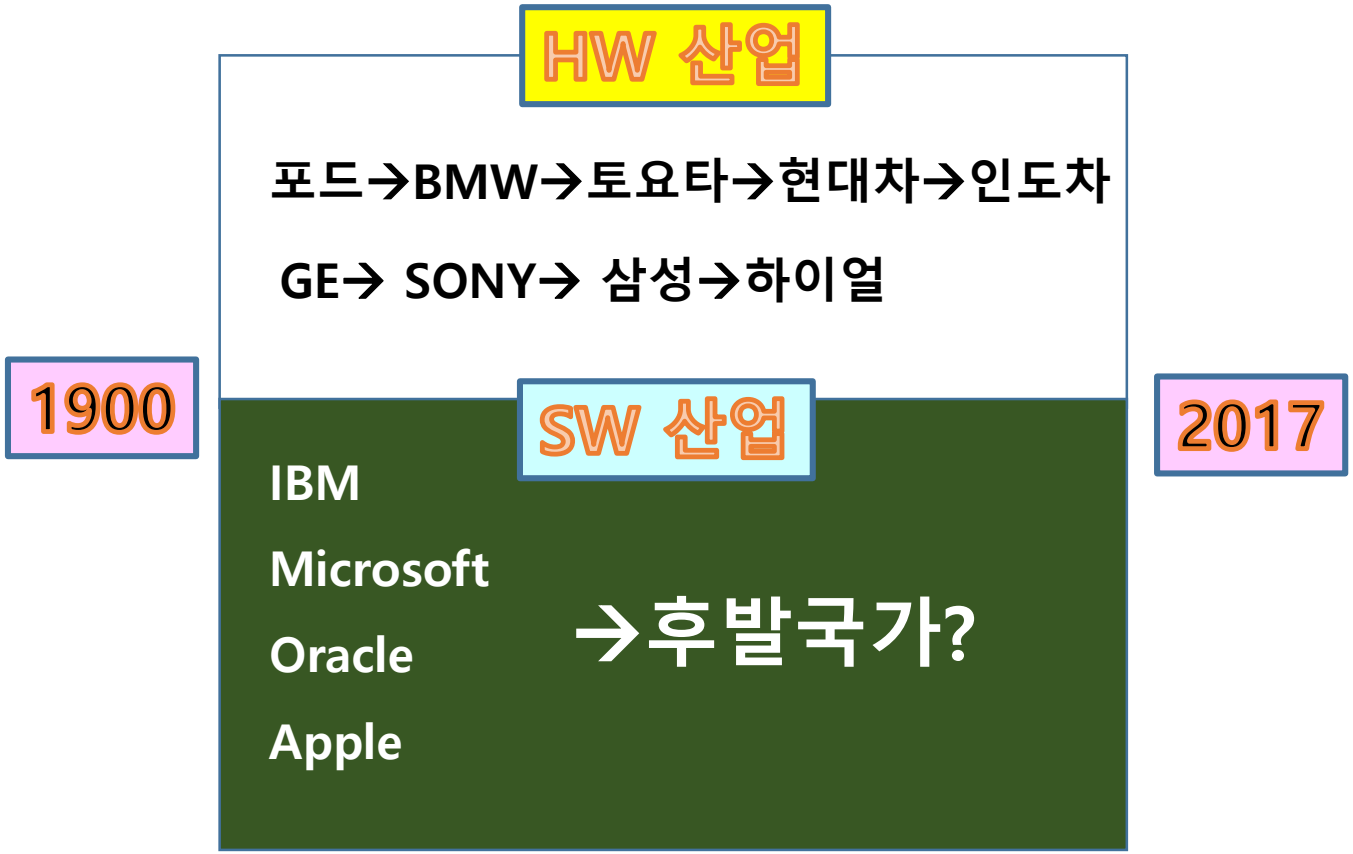
전기값

땅값

환경

4차 산업혁명의 특징

- 변화 속도
- **후발주자에 기회?**



4차 산업혁명의 특징

- 변화 속도
- 후발주자에 기회?
- **모든 분야에 영향**

산업혁명(제조업) ➔ 정보혁명(모든 분야)

- Computational Biology
- Computational Chemistry
- Computational Physics
- Computational Mathematics
- Computational Geometry
- Computational Logic
- Computational Statistics
- Computational Engineering
- Computational Electronics
- Computational Mechanics
- Computational NeuroScience
- Computational Material Science
- Computational Toxicology
- Computational Cosmology
- Computational Sociology
- Computational Linguistics
- Computational Economics
- Computational Medicine
- Computational Journalism
- Computational Culture
- Computational Sustainability
- Computational Legal Studies
- Computational Intractability
- Computational Learning Systems
- Computational Metaphysics
- Computational Crystallography
- Computational Creativity
- Computational Photography

OSS is Key

4차 산업혁명의 특징

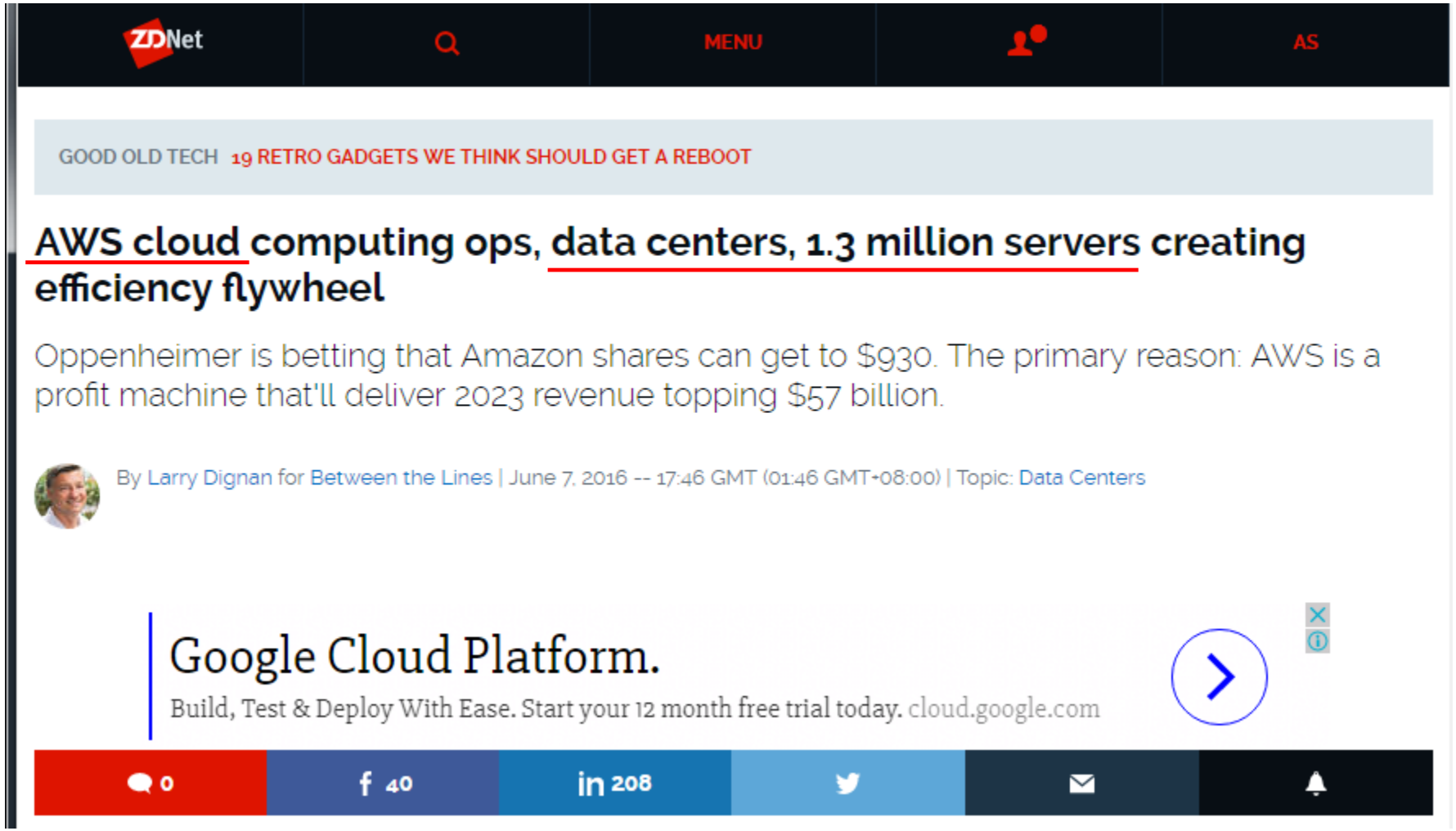
OSS is KEY

- 최첨단 ICBM에 필수 불가결한 기술
- 시대의 변화: 고립된 Silo 사회 ➔ 초연결 사회
  - 글로벌 디지털 인프라(교통 소통 보건 등) 구축 시대 – 호환(open API)
  - 자연과학 발전과 Open
- OSS는 인력양성에 중요 – 이유: 소스코드, 라이선스, 무료

Amazon

130만개의 서버

(2016 6월)



Google

250만개의 서버

(2016 6월)

http://www.datacenterknowledge.com/archives/2017/03/16/google-data-center-faq/

DATA CENTER FAQS, GOOGLE

Google Data Center FAQ

BY DATA CENTER KNOWLEDGE ON MARCH 16, 2017

1 COMMENT

Google is the largest, most-used search engine in the world, with a global market share that has held steady at about 90 percent since Google Search launched in 1997 as Backrub. In 2017, Google became the most valuable brand in the world, topping Apple, according to the Brand Finance Global 500 report. Google's position is due mainly to its core business as a search engine and its ability to transform users into payers via advertising.

IBM

AI, 빅데이터

Linux 서버

DATA CENTERS

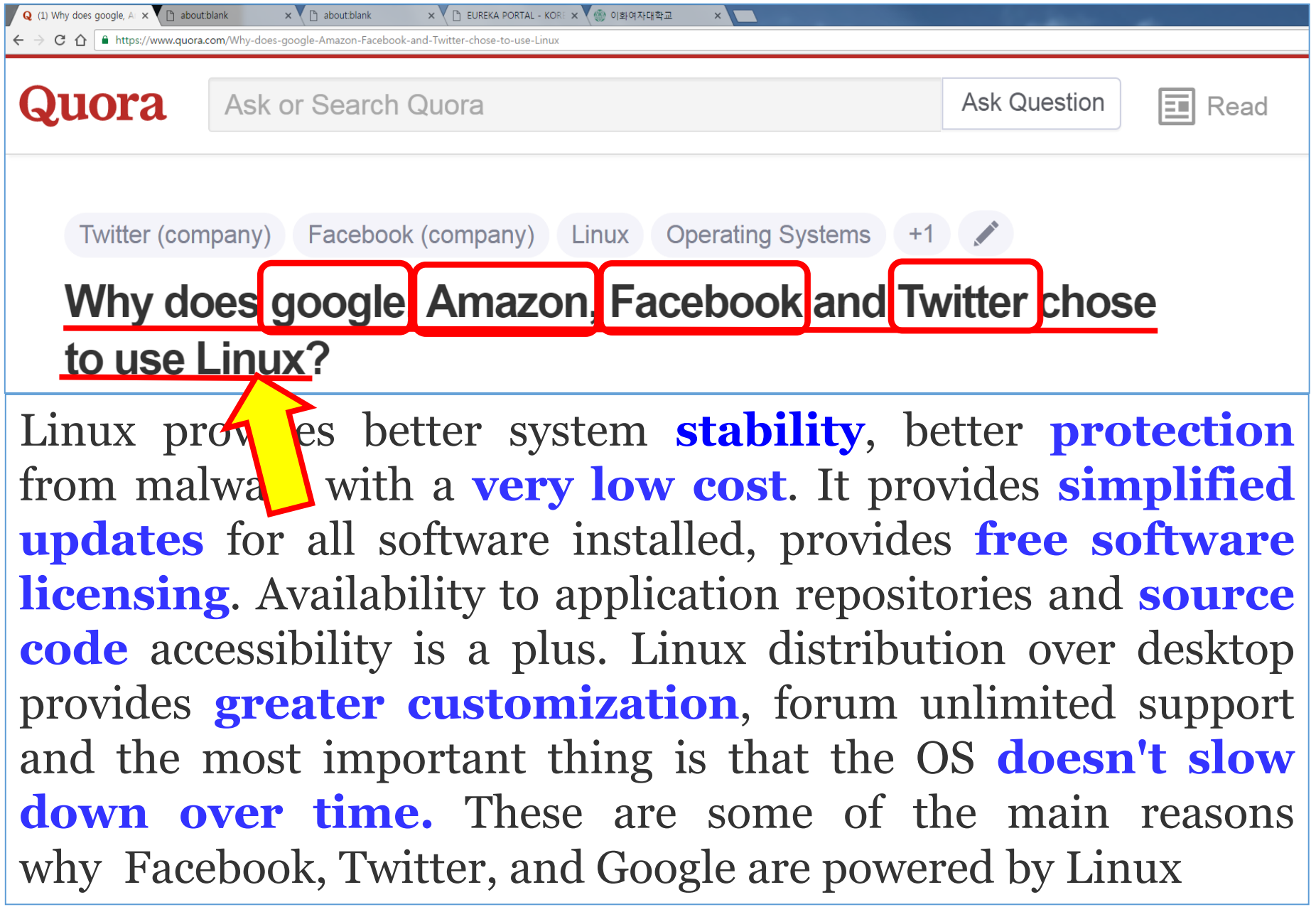
New IBM Linux servers could boost AI and big data efforts

A new line of servers from IBM could help make the enterprise data center more efficient, while providing additional computer power for deep learning and high performance data analytics.

By Conner Forrest | September 8, 2016, 6:55 AM PST

Image: IBM

IBM is releasing a new line of Linux-based servers that are designed to handle


(1) Why does google, A
about:blank
about:blank
EUREKA PORTAL - KOR
이화여자대학교
https://www.quora.com/Why-does-google-Amazon-Facebook-and-Twitter-chose-to-use-Linux
Quora
Ask or Search Quora
Ask Question
Read
Twitter (company)
Facebook (company)
Linux
Operating Systems
+1
Why does google Amazon, Facebook and Twitter chose to use Linux?
Linux provides better system stability, better protection from malware with a very low cost. It provides simplified updates for all software installed, provides free software licensing. Availability to application repositories and source code accessibility is a plus. Linux distribution over desktop provides greater customization, forum unlimited support and the most important thing is that the OS doesn't slow down over time. These are some of the main reasons why Facebook, Twitter, and Google are powered by Linux

Cloud couldn't exist without OSS

https://blogs.dxc.technology/2017/05/24/how-many-servers-do-you-need-for-your-cloud/

DXC.technology

APPLICATIONS ANALYTICS BUSINESS CLOUD SECURITY MOBILITY W

How many servers do you need for your cloud?

May 24, 2017 by **Cloudy Weather** **Leave a Comment**

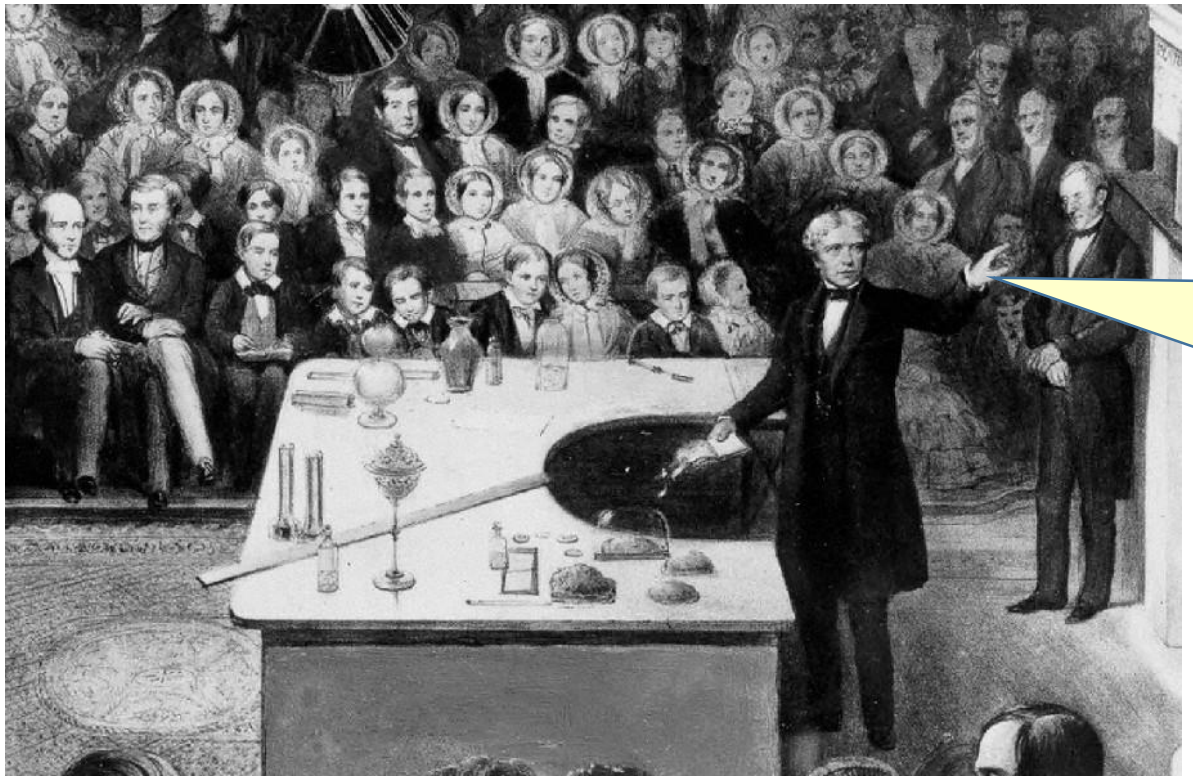
One of the neat things about cloud, as a user, is that you don't have to worry about how many servers you need. Need some more? Just spin them up. No fuss, no muss.

But what about when you're the cloud architect? You know — the guy or gal who must buy the servers that make up the cloud? Well, in the case of **Amazon Web Services (AWS)**, they turn to artificial intelligence (AI).

“자연과학 발전에 Open이 매우 중요했다”

Science as an open enterprise
The Royal Society Science Policy Centre report 02/12

“Remarkable growth of science is due to open practices”



“Knowledge concerning God’s creation

is for all people to enjoy

not just a professional elite“

Michael Faraday

일부러 공공장소에서 Demo

OSS 교육의 문제점

OSS 실습교육의 특징

SW 실습교육은 매우 어렵다

실습교육

- 교과서 PPT - 모두 손수 만들어야
- 실습환경도 갖취야
- 조교 부담 (실습환경, 상담, 채점, 프로젝트)
- 짧은 수명
- 논문 수 불리 -5:1 – 10:1
- 계속 새 과목 – 그러나 영세한 학과

이론교육

- 출판사가 모두 제공
- 교과서로 충분
- 시험채점
- 반영구적
- 논문 수 유리
- 새 이론은 많이 안나온다

- **타분야 실습과 차별화된 지원이 필요하다(예: 물리 화학 전기 등)**
- **교수에 대한 인센티브가 전혀 없다 – 평가/보상 – 신분/경제적**

Yale News

IsaacJulien

Wednesday
Sept 28
5pm Lecture
Yale Center for British Art Auditorium
1080 Chapel St, New Haven, CT

CS50: Yale's most popular course

ANDI WANG | SEP 22,
STAFF REPORTER

수강생 330명

TA 40명

With 510 students of all Yale undergraduates, C mputing and Programming, ost popular course in Y

The companion cla the structure and material of its Boston counterpart while supplementing Crimson lectures with a Yale teaching assistant team of nearly 40 students. This is the first time that a computer science class has been the most popular course at Yale since 2011, when course demand

SW 실험분야와 논문수

"Evaluating Computer Scientists and Engineers for Promotion and Tenure"

http://www.cra.org/reports/tenure_review.html

David Patterson, Jeff Ullman, Larry Snyder

" .... CSE **Experiment 분야** 에서는
Conference papers
System **Artifacts**
Patent 가
Journal paper 보다 더 중요합니다"

SW 실험분야와 논문수

"Academic Careers for Experimental Computer Scientists and Engineers"
http://books.nap.edu/html/acesc/

More generally, universities should recognize that
an **experimentalist** being considered for **tenure or promotion**
may have

논문수
Conf.
논문보다
지도 학생

fewer publications
and predominately **conference** **publications**,
nonstandard forms of dissemination
(e.g., distribution of **software artifacts**),
and **few graduate students** completed

and yet still be a spectacular researcher.

교과목 수 증가

보안, 무선통신, HCI, Web, Cloud, Virtualization, Object Oriented,

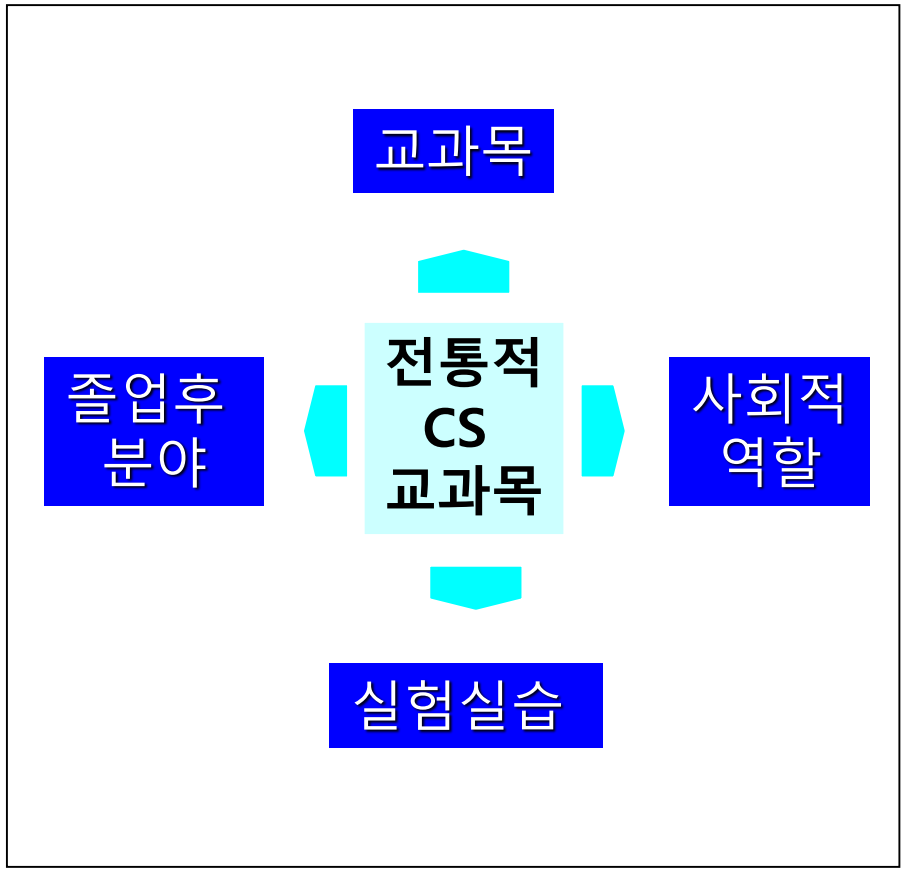
MIS

이동 통신

임베디드 시스템

엔터프라이즈

Big Data



교수

연구소

기업 개발

벤처

CIO

변호사

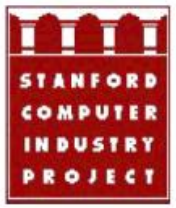
Python, Linux, Android, javascript, Hadoop, Ruby, CSS,
HTML, Arduino, Cloud, Scratch, Github, Eclipse IDE, …

A similar move has been proposed in Korea as part of the Brain Korea 21 initiative. This change is motivated in part by the quota allocation of students to departments, and the increased demand by students who want to study software in Computer Science. Note, however, as shown in Figure 6, that there are 71 CS faculty in the EECS department at Berkeley, and only 51 EE faculty. In Korea, where the CS faculty is very small compared to the EE faculty, and software faculty is only a fraction of the total CS faculty, combining departments may be very problematic for software education. In fact, unless something is done, the quality of software education is likely to deteriorate as the number of students who want to learn programming goes up.

School	Dept.	Emeriti	Full	Assoc.	Asst.	Lecturer	Other	Total
Stanford	CS	6	18	11	10	6	34	86
Berkeley	EE+CS	2 + 21	32 + 37	6 + 9	9 + 2	2 + 0	0 + 2	51 + 71
San Jose State	CIS		5	4	4		37	50
	Math & CS		43	5	2	24	1	75
Santa Clara	CE		2	5	2		48	57
	Math & CS	2	3	7	3	7		22
KAIST	CS		17	5	7			29
SNU	CE	1	6	5	3	1		16
Postech	CSE		6	7	3		1	17
Yonsei	CS		5	5				10

Figure 6. Faculty in software-related departments.

Another fact apparent from Figure 6, is that Silicon Valley universities have a large number of 'other' faculty, compared to their Korean counterparts. This title includes consulting and courtesy professors and other adjunct or part-time faculty, many of whom are from industry. The use of adjunct, visiting and consulting faculty not only increases the



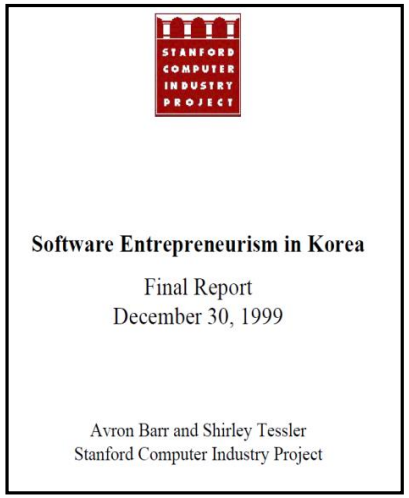
Software Entrepreneurism in Korea

Final Report
December 30, 1999

Avron Barr and Shirley Tessler
Stanford Computer Industry Project

교수 수

- In Korea, CS faculty is very small compared to the EE
- software faculty is only a small fraction of CS faculty
- this may be very problematic for the SW education
- unless something is done, the quality of software education is likely to deteriorate



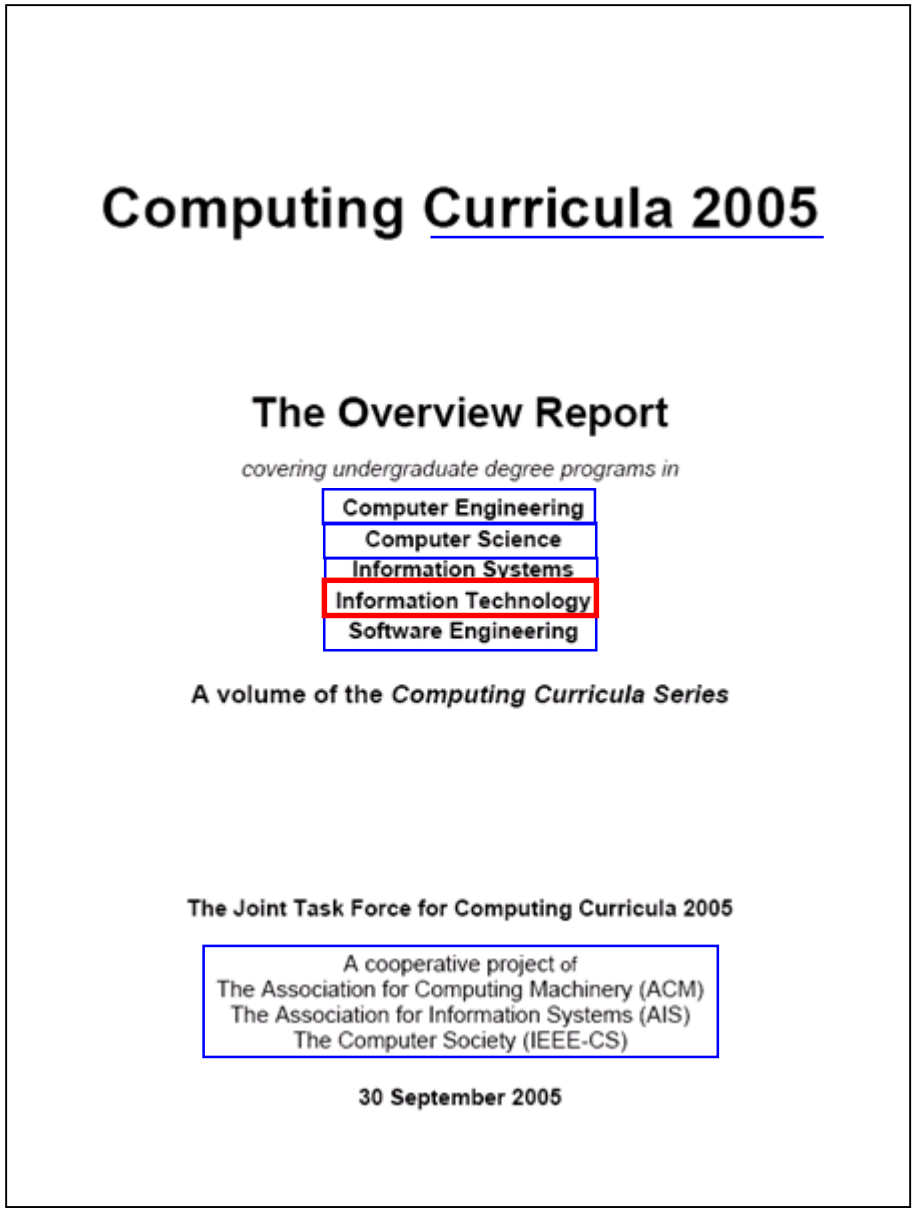
OSS 교육의 해결방안

OSS 실습교육 해결방안

MOOCs 적극 고려해야

- 교수에 대한 보상체계 - OSS 업적을 반영해줘야(신분, 경제적)
- 산업체 경력자 교수 채용 - 대우 신분 보장
- 새로운 학과 신설 – CS CE SE --> IT
- MOOCs도 적극 고려해야
- 외국 MOOCs 컨텐트 – 언어/비용 문제
- 좋은 과목이 있어도 수강신청 안한다
  - 사례: SNU 폐강, 이대 수강생, S 전자 사장, E 연구소 연구원
  - 공부는 어려운데 보상체계?

CS CE IS SE → IT



Computing Curricula 2005

The Overview Report

covering undergraduate degree programs in

Computer Engineering
Computer Science
Information Systems
Information Technology
Software Engineering

A volume of the *Computing Curricula Series*

The Joint Task Force for Computing Curricula 2005

A cooperative project of
The Association for Computing Machinery (ACM)
The Association for Information Systems (AIS)
The Computer Society (IEEE-CS)

30 September 2005

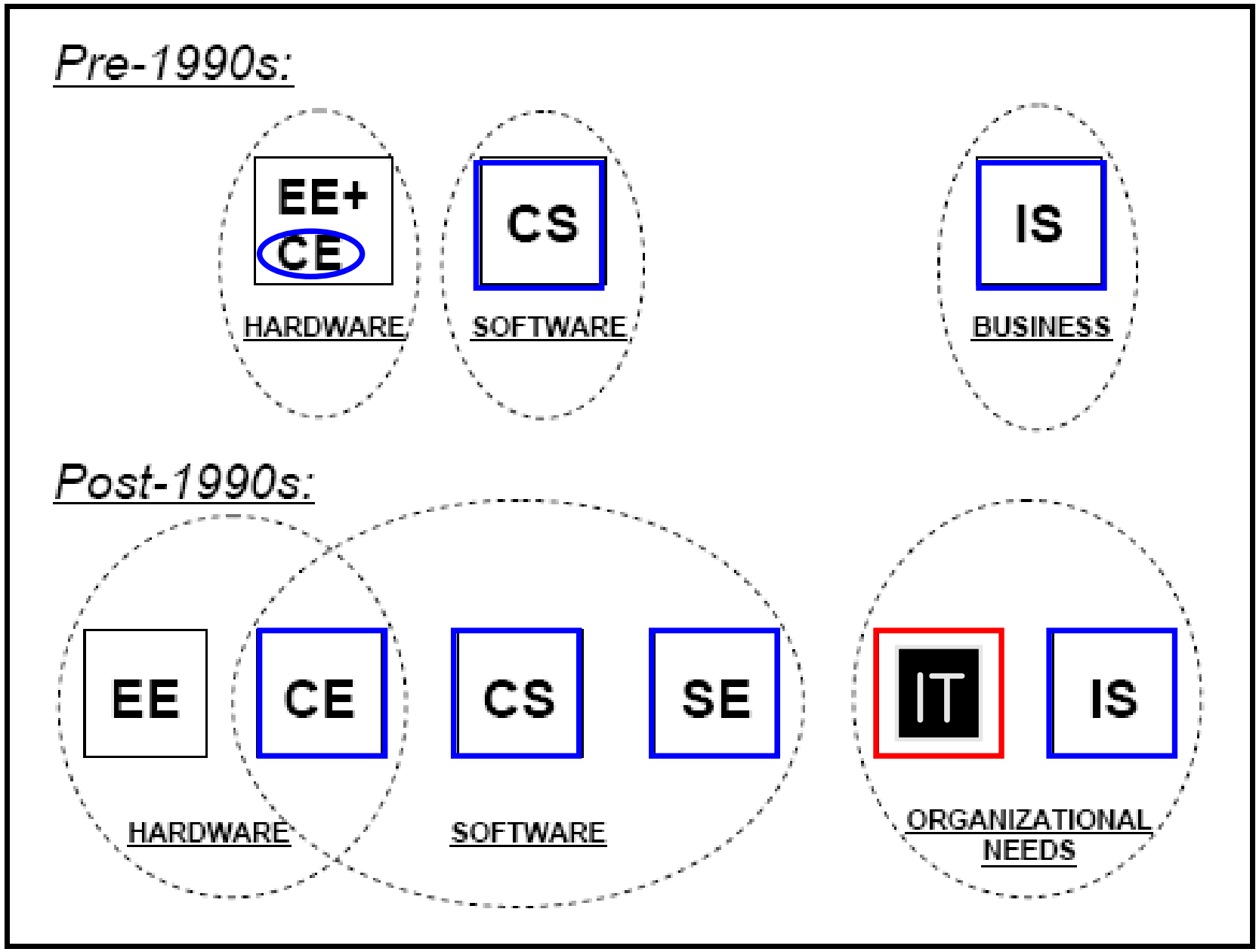


Figure 2.1. Harder Choices: How the Disciplines Might Appear to Prospective Students

Information Technology

- By the end of the 1990's, it became clear that **academic degree programs were not producing graduates** who had the **right mix of knowledge and skills** to meet these essential needs of society.

- Only a few years ago,
- educators in the U.S. were not familiar with IT degree programs
- IT curriculum **began to emerge in the late 1990's**

Computer Science Curriculum 2008:

An Interim Revision of CS 2001

Report from the Interim Review Task Force

includes update of the CS2001 body of knowledge plus commentary

December 2008

Association for Computing Machinery

IEEE Computer Society

Information Technology 2008

Curriculum Guidelines for Undergraduate Degree Programs in Information Technology

Association for Computing Machinery (ACM)
IEEE Computer Society

Barry M. Lunt (Chair)
Joseph J. Ekstrom
Sandra Gorka
Gregory Hislop
Reza Kamali
Eydie Lawson
Richard LeBlanc
Jacob Miller
Han Reichgelt

Information Technology
2008

Curriculum Guidelines for Undergraduate Degree Programs in Information Technology

Association for Computing Machinery (ACM)
IEEE Computer Society

Barry M. Lunt (Chair)
Joseph J. Ekstrom
Sandra Gorka
Gregory Hislop
Reza Kamali
Eydie Lawson
Richard LeBlanc
Jacob Miller
Han Reichgelt

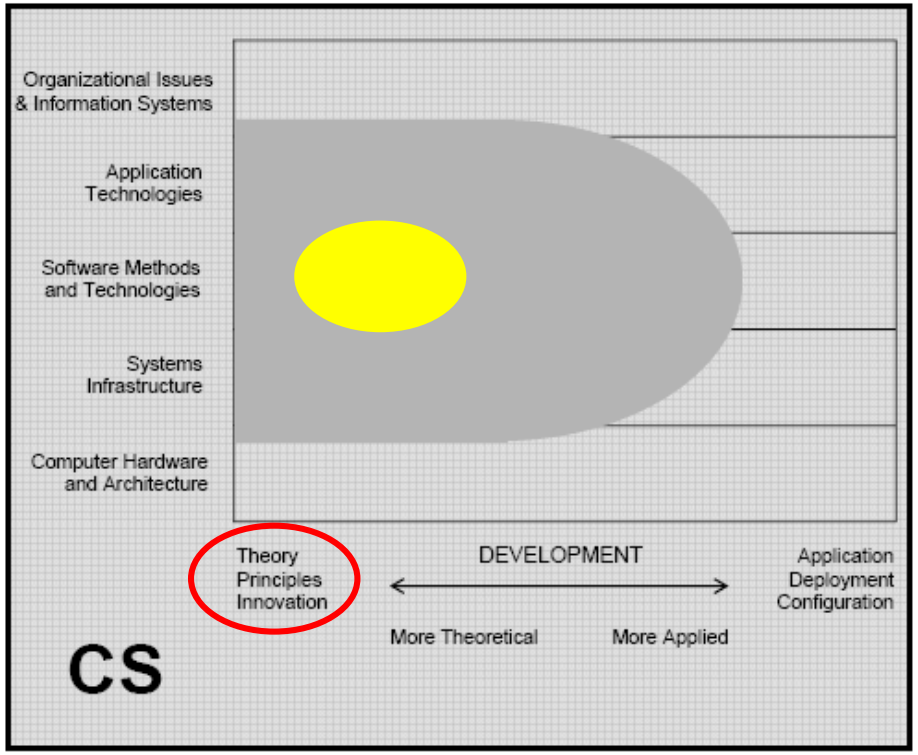


Figure 2.4. Computer Science

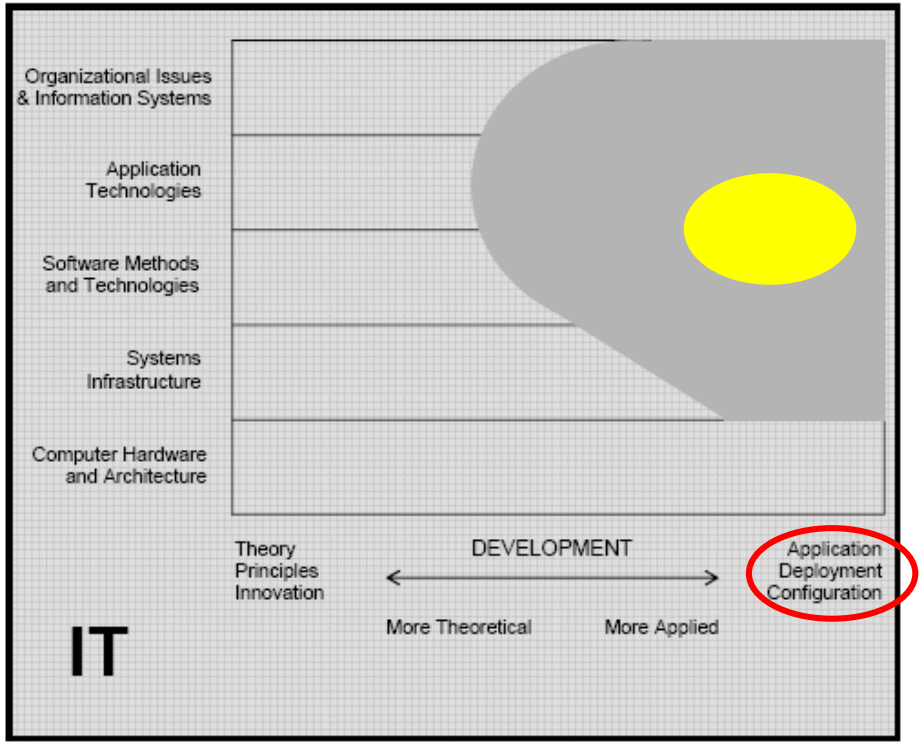
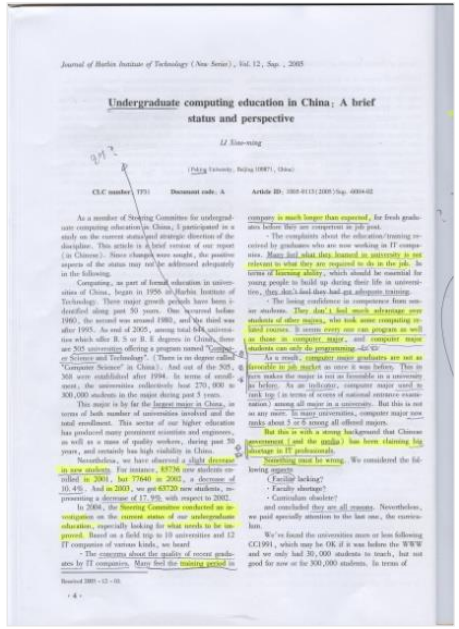


Figure 2.6. Information Technology

중국의 동향



Undergraduate computing education in China: A brief status and perspective

- 중국 대학 CSE 지망자
  - 2001 85736
  - 2002 77640
  - 2003 63720
- 2004 Committee Investigation
  - **"그들이 대학에서 배워온건 현업 일과 상관이 없다"**
  - **"CS 학생들은 (C, java) 프로그래밍밖에 할줄 모른다"**
  - **"그들이 하는 정도 프로그래밍은 얼마든지 다른 비전공도 할 수 있다"**
  - **"CS 졸업생은 job market에서 환영 안한다"**
- 정부 제정 표준 교과과정 – CS CE SE **IT**
- 70개 대학 설문
  - **CS** (13%) < **CE** (27%) < **IT** (70%)

Information Technology

2008

Curriculum Guidelines for Undergraduate Degree Programs in Information Technology

Association for Computing Machinery (ACM)
IEEE Computer Society

Barry M. Lunt (Chair)
Joseph J. Ekstrom
Sandra Gorka
Gregory Hislop
Reza Kamali
Eydie Lawson
Richard LeBlanc
Jacob Miller
Han Reichgelt

IT Curriculum 2008 Guideline
ACM, IEEE

3.4 Research in IT

Information Technology is the newest computing discipline covered by the Computing Curricula volumes. And, like all the computing disciplines, it is still evolving rapidly. Given this state of affairs, this section presents comments on both the current picture of research in IT and on likely developments in the future.

In addition to the simple newness of the discipline, making definitive statements about research in IT is difficult for several reasons, including:

Focus on practice – IT emphasizes knowledge combined with practical, hands-on expertise. This emphasis is well matched to the challenge of successfully applying information technology in organizational and societal contexts. Most of the IT programs are undergraduate programs. In addition, many of the programs are located at teaching-oriented institutions, perhaps reflecting a greater incentive among these institutions to respond flexibly to career opportunities for graduates.

This history contrasts with disciplinary areas that emerge as research topics first, and then coalesce into disciplines. Development of a research agenda in the IT community is being informed by practice and educational programs. At this early stage in development of the discipline, this may be misinterpreted to conclude that IT lacks sufficient research potential. More accurately, the research agenda simply needs to be viewed as emerging from the practice, and so, by definition, it will develop at a somewhat slower pace.

nputer Interaction (20 core hours)

tors (6)
s of Application Domains (3)
tered Evaluation (3)
Effective Interfaces (3)
y (2)
echnologies (2)
tered Computing (1)

Assurance and Security (23 core hours)

l Aspects (3)
chanisms (Countermeasures) (5)
Issues (3)

mains (2)
)
States (1)
vices (1)
ysis Model (1)
ies (1)

Management (34 core hours)

and Fundamentals (8)
ery Languages (9)
tation Architecture (7)
ng (6)
e Database Environment (3)
ose Databases (1)

Programming & Technologies (23 core hrs)

Communications (5)
ng and Exchange (4)
Coding (4)
chniques (4)
curity Practices (4)
us Issues (1)
f Programming Languages (1)

PF. Event-Driven Programming (3)

PT. Platform Technologies (14 core hours)

PT. Operating Systems (10)
PT. Architecture and Organization (3)
PT. Computing Infrastructures (1)
PT. Enterprise Deployment Software
PT. Firmware
PT. Hardware

SA. System Administration and Maintenance (11 core hours)

SA. Operating Systems (4)
SA. Applications (3)
SA. Administrative Activities (2)
SA. Administrative Domains (2)

SIA. System Integration and Architecture (21 core hours)

SIA. Requirements (6)
SIA. Acquisition and Sourcing (4)
SIA. Integration and Deployment (3)
SIA. Project Management (3)
SIA. Testing and Quality Assurance (3)
SIA. Organizational Context (1)
SIA. Architecture (1)

SP. Social and Professional Issues (23 core hours)

SP. Professional Communications (5)
SP. Teamwork Concepts and Issues (5)
SP. Social Context of Computing (3)
SP. Intellectual Property (2)
SP. Legal Issues in Computing (2)
SP. Organizational Context (2)
SP. Professional and Ethical Issues and Responsibilities (2)
SP. History of Computing (1)
SP. Privacy and Civil Liberties (1)

HCI. HCI Aspects of Application Domains (3)
HCI. Human-Centered Evaluation (3)
HCI. Developing Effective Interfaces (3)
HCI. Accessibility (2)
HCI. Emerging Technologies (2)
HCI. Human-Centered Computing (1)

IAS. Information Assurance and Security (23 core hours)
- IAS. Fundamental Aspects (3)
- IAS. Security Mechanisms (Countermeasures) (5)
- IAS. Operational Issues (3)
- IAS. Policy (3)
- IAS. Attacks (2)
- IAS. Security Domains (2)
- IAS. Forensics (1)
- IAS. Information States (1)
- IAS. Security Services (1)
- IAS. Threat Analysis Model (1)
- IAS. Vulnerabilities (1)

IM. Information Management (34 core hours)
- IM. IM Concepts and Fundamentals (8)
- IM. Database Query Languages (9)
- IM. Data Organization Architecture (7)
- IM. Data Modeling (6)
- IM. Managing the Database Environment (3)
- IM. Special-Purpose Databases (1)

IPT. Integrative Programming & Technologies (23 core hrs)
- IPT. Intersystems Communications (5)
- IPT. Data Mapping and Exchange (4)
- IPT. Integrative Coding (4)
- IPT. Scripting Techniques (4)
- IPT. Software Security Practices (4)
- IPT. Miscellaneous Issues (1)
- IPT. Overview of Programming Languages (1)

MS. Math and Statistics for IT (38 core hours)
- MS. Basic Logic (10)

PT. Platform Technologies (14 core hours)
- PT. Operating Systems (10)
- PT. Architecture and Organization (3)
- PT. Computing Infrastructures (1)
- PT. Enterprise Deployment Software
- PT. Firmware
- PT. Hardware

SA. System Administration and Maintenance (11 core hours)
- SA. Operating Systems (4)
- SA. Applications (3)
- SA. Administrative Activities (2)
- SA. Administrative Domains (2)

SIA. System Integration and Architecture (21 core hours)
- SIA. Requirements (6)
- SIA. Acquisition and Sourcing (4)
- SIA. Integration and Deployment (3)
- SIA. Project Management (3)
- SIA. Testing and Quality Assurance (3)
- SIA. Organizational Context (1)
- SIA. Architecture (1)

SP. Social and Professional Issues (23 core hours)
- SP. Professional Communications (5)
- SP. Teamwork Concepts and Issues (5)
- SP. Social Context of Computing (3)
- SP. Intellectual Property (2)
- SP. Legal Issues in Computing (2)
- SP. Organizational Context (2)
- SP. Professional and Ethical Issues and Responsibilities (2)
- SP. History of Computing (1)
- SP. Privacy and Civil Liberties (1)

WS. Web Systems and Technologies (22 core hours)
- WS. Web Technologies (10)
- WS. Information Architecture (4)

OSS 실습교육 해결방안

MOOCs 적극 고려해야

- 교수수 영세 – 전국 공유체제 필요
- 교육 대상 --> 학생 + 졸업생(평생/계속 교육)
- 전국이 best practice 공유해야
- 교수 인센티브 – 정확한 평가, 보상(규모의 경제로)
- 외국 MOOCs – 언어/비용 문제

https://www.bostonglobe.com/metro/2015/11/17/yale-most-popular-course-harvard-class/OsJs36GYID8tViXKDUEaqM/story.html

Yale's most popular course is a Harvard class

KEN YANAGISAWA

Harvard University professor David Malan revealed a Yale sweatshirt (right) that he was wearing under a Harvard sweatshirt during the first CS50 class at Yale University this fall.

By Steve Annear | GLOBE STAFF NOVEMBER 17, 2015

리눅스 재단

팔로우

리눅스 재단은 리눅스의 발전을 제고하기 위해 설립된 비영리 연합체이다. 2007년에 OSDL과 FSG의 병합으로 설립된 리눅스 재단은 리눅스 제작자 리누스 투르발스의 일을 지원하고 있으며, 전 세계의 선도하는 리눅스 및 오픈 소스 기업과 개발자로부터 지원을 받고 있다. 위키백과

관련 사이트: linuxfoundation.org

설립: 2007년

최근 소식

GlobalLogic CTO Alex Agizim discussed building OSS-based IVI systems with the Xen Project Hypervisor in his Collab Summit talk last week. Here's his recap: 1시간 전

Enterprise IT & Linux System Administration Training

Course ID	Title	Duration
LFS540	**Linux KVM Virtualization** Gain the background needed to understand how KVM and related open source components can be assembled to create an entire virtual IT infrastructure, acquire practical KVM deployment skills and understand how to built virtualization solutions from scratch by coupling KVM with tools such as oVirt, libvirt and OpenStack	4 days
LFS520	**OpenStack Cloud Architecture and Deployment** Understand and learn how to deploy a private cloud using the OpenStack project, implement a state-of-the-art private cloud design, learn about cloud computing benefits and challenges seen in today's enterprise environments.	4 Days
LFS430	**Linux Enterprise Automation** Acquire the knowledge and skills needed to automate provisioning, configuration, software packaging, patching and OS release management in heterogeneous Linux environments.	4 Days
LFS426	**Linux Performance Tuning** This advanced Linux training teaches you to optimize your application's performance by acquiring useful performance metrics from the hardware, tracing applications and the Linux kernel, and tuning various aspects of the system, from the hardware to kernel settings and application optimizations.	4 Days
LFS422	**High Availability Linux Architecture** Learn to successfully design, implement, provision, maintain, and administer Linux high-availability clusters to support mission-critical workloads.	4 Days
LFS416	**Linux Security** Learn to assess security risks in your enterprise Linux environment, apply techniques and use tools to increase security, deploy monitoring and attack detection tools, gain visibility into possible vulnerabilities and develop your Linux security policy and response strategy.	4 Days
LFS230	**Linux Network Management** This Linux course will teach you how to design, deploy and maintain a network running under Linux and to administer the network services most commonly found in enterprise environments.	4 Days
LFS220	**Linux System Administration** This Linux system administration course helps you discover the tools used by system administrators in enterprise Linux environments, install new systems with a variety of Linux distributions and configure systems with new hardware and software combinations.	4 Days
LFS101	**Introduction to Linux** Acquire a practical understanding of how Linux works, quickly get up to speed using the Linux graphical interface and leverage efficiencies by using the command line tools. **FREE VERSION: Please** click here **to pre-register for the free version of this course that is coming in summer 2014**	4 Days
LFS541	**Introduction to Linux KVM Virtualization Crash Course** Gain the background needed to understand how KVM and related open source components can be assembled to create an entire virtual IT infrastructure, acquire practical KVM deployment skills and understand how to built virtualization solutions from scratch by coupling KVM with tools such as oVirt, libvirt and OpenStack	1 day
LFS425	**Linux Performance Tuning Crash Course** Gain a high level understanding of the standard tuning and monitoring interfaces available in the majority of current Linux distributions. Identify the factors that can lead to performance degradations in your Linux environment. Apply changes to the kernel tuning interface and maximize the hardware utilization and performance of your applications.	1 Day

Open Source Compliance Courses

Course ID	Title	Duration
LFC288	**Implementation and Management of Open Source Compliance** Adapt compliance activities to your organization's needs with this comprehensive open source compliance course that provides in-depth guidance on implementing an open source compliance program. Course topics include: disclosure obligations, source code distribution mechanisms, corporate code contributions, adaptation of existing processes, open source compliance tools and automation and much more.	2 Days
LFC284	**Overview of Open Source Compliance End-to-End Process** This open source compliance course will help your organization implement an open source compliance program by teaching you the fundamentals of open source development, licensing principles, compliance obligations, and the contributions needed from various functional groups, such as Executive Management, the Law Department, Supply Chain, Technical Documentation and Configuration Management.	1 Day
LFC281	**Executive Review of Open Source Compliance** Learn about the framework for an open source compliance program, including: open source licensing basics, compliance requirements, and the consequences of non-compliance. In addition, organizing, managing and staffing for the compliance effort will also be discussed.	
LFC272	**Open Source Compliance Programs - What You Must Know** Gain insight into industry best practices in organizing and managing the compliance function in this condensed open source compliance course delivered live via the internet. Pitfalls and common process challenges in establishing open source compliance programs will also be discussed.	
LFC271	**Practical Guide to the Open Source Development Model** The goal of this course is to help organizations maximize their internal efficiency once they have decided to contribute to or create an open source project.	1

Tizen Project Training

Course ID	Title	Duration
LFT220	**Portable Application Development for Tizen Devices** This Tizen development training provides the fundamentals to develop HTML5 applications for Tizen.	1 Day
LFT210	**Tizen Training For Non-Developers** Lessen the learning curve with a Tizen Project course that provides an introduction to the fundamentals of Tizen, including the hardware enablement process, governance structure, compliance program and roadmap and release management. This Tizen Project course will dive into the innovative operating system, applications, and user experience provided by Tizen.	1 Day
LF273	**Tizen Training For Non-Developers** Lessen the learning curve with a Tizen Project course that provides an introduction to the fundamentals of Tizen, including the hardware enablement process, governance structure, compliance program and roadmap and release management. This Tizen Project course will dive into the innovative operating system, applications, and user experience provided by Tizen.	1 Day

Developing Linux Device Drivers (LFD331)

The Linux device drivers course will help you become familiar with the different kinds of Linux device drivers used under Linux and the appropriate API's through which devices interface with the kernel.

ENROLL NOW IN AN UPCOMING COURSE

Virtual

Apr 21 - Apr 25

5 Days - $2750

ENROLL NOW

Jun 2 - Jun 6

5 Days - $2750

ENROLL NOW

Jul 14 - Jul 18

5 Days - $2750

ENROLL NOW

Aug 25 - Aug 29

COURSE DESCRIPTION

Linux Foundation Training Program Director Jerry Cooperstein talks about our Developing Linux Device Drivers course.

Developing Linux Device Drivers is designed to show experienced programmers how to develop device drivers for Linux systems, and give them a basic understanding and

OSS 실습교육 해결방안

좋은 강의 있어도 안듣는다

대학에서 OSS 기피해서 제가 피해(?)를 보고 있습니다.

정부의 시스템과제를 하면서 신규로 뽑을 사람도 없고,

내부에 공고해도 오는 사람이 없습니다.

온 사람도 - 어렵다고 곧 응용SW쪽으로 가버립니다

그래서 최근 해외 연구원들을 면접하고 있습니다.

한국 연구비로 외국인 인력을 육성하다니 …

그러나 과제 수행을 위해서는 어쩔 수 없는 선택입니다

국내
SW 연구소

OSS 이수자에 대한 보상체제

나가며 ---

(1) OSS는 4차 산업혁명에 매우 중요하다

(2) 학생들은 OSS를 기피한다

(3) 공부는 어려운데 – 보상은 없기 때문

(4) OSS 전공자 - 대우를 높여야

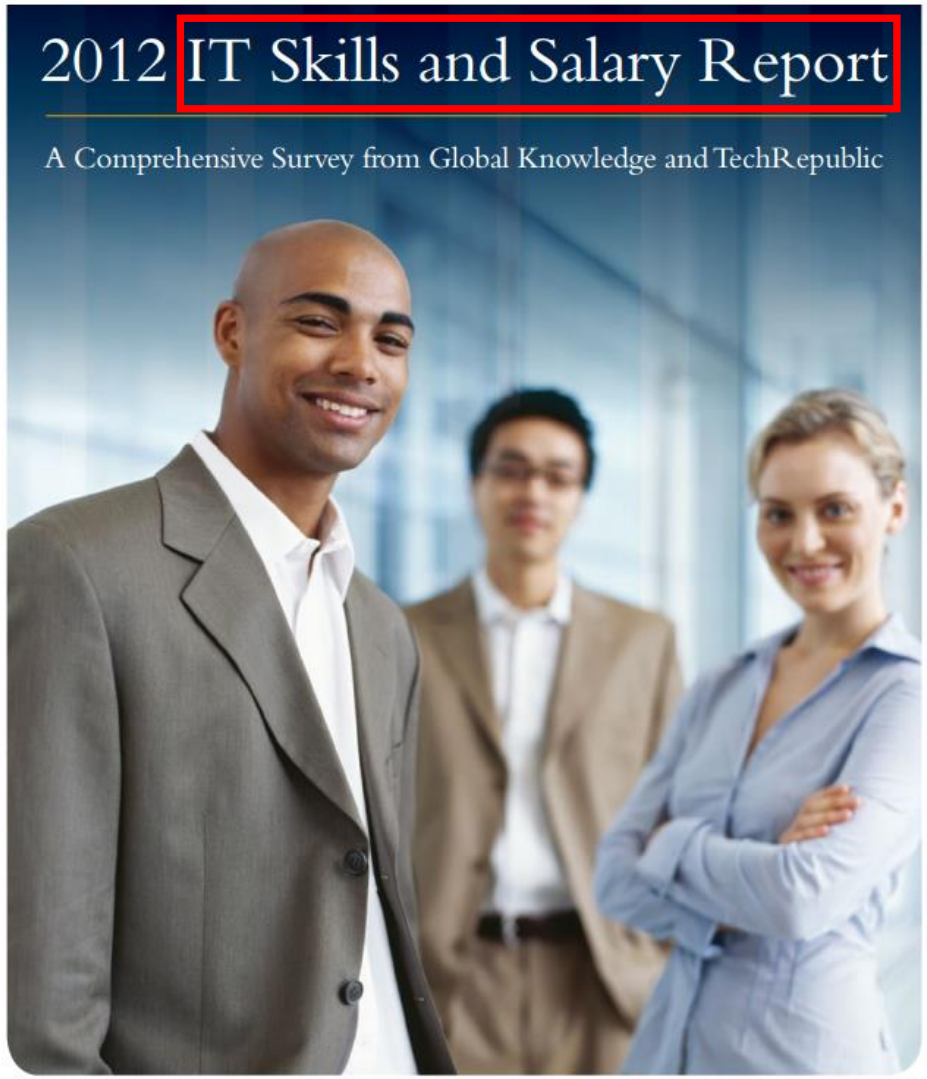
OSS 이수자 보상

- 대학
  - OSS를 논문처럼 인정할것 (스탠포드 대학 등)
- 교육부
  - MOOCs 인증, 타대학 강의 – 학점 인정
- 기업
  - OSS 전공자 연봉을 공개하라

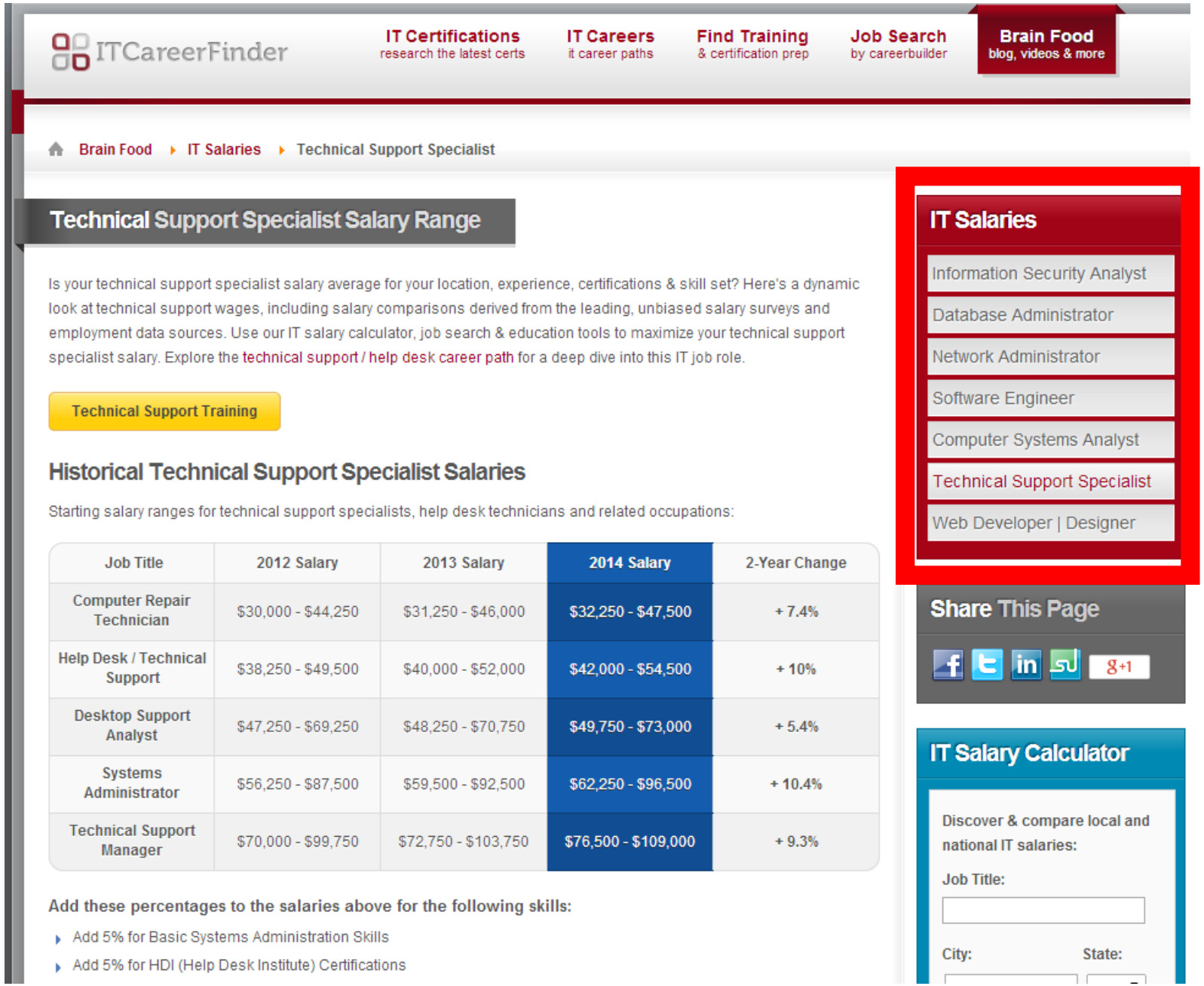
http://images.globalknowledge.com/wwwimages/pdfs/2012_Salary_Report.pdf

Global Knowledge

TechRepublic



http://www.itcareerfinder.com/brain-food/it-salaries/technical-support-specialist-salary-range.ht



ITCareerFinder

IT Certifications
research the latest certs

IT Careers
it career paths

Find Training
& certification prep

Job Search
by careerbuilder

Brain Food
blog, videos & more

Brain Food ▸ IT Salaries ▸ Technical Support Specialist

Technical Support Specialist Salary Range

Is your technical support specialist salary average for your location, experience, certifications & skill set? Here's a dynamic look at technical support wages, including salary comparisons derived from the leading, unbiased salary surveys and employment data sources. Use our IT salary calculator, job search & education tools to maximize your technical support specialist salary. Explore the technical support / help desk career path for a deep dive into this IT job role.

Technical Support Training

Historical Technical Support Specialist Salaries

Starting salary ranges for technical support specialists, help desk technicians and related occupations:

Job Title	2012 Salary	2013 Salary	2014 Salary	2-Year Change
Computer Repair Technician	$30,000 - $44,250	$31,250 - $46,000	$32,250 - $47,500	+ 7.4%
Help Desk / Technical Support	$38,250 - $49,500	$40,000 - $52,000	$42,000 - $54,500	+ 10%
Desktop Support Analyst	$47,250 - $69,250	$48,250 - $70,750	$49,750 - $73,000	+ 5.4%
Systems Administrator	$56,250 - $87,500	$59,500 - $92,500	$62,250 - $96,500	+ 10.4%
Technical Support Manager	$70,000 - $99,750	$72,750 - $103,750	$76,500 - $109,000	+ 9.3%

Add these percentages to the salaries above for the following skills:

- Add 5% for Basic Systems Administration Skills
- Add 5% for HDI (Help Desk Institute) Certifications

IT Salaries

- Information Security Analyst
- Database Administrator
- Network Administrator
- Software Engineer
- Computer Systems Analyst
- Technical Support Specialist
- Web Developer | Designer

Share This Page

g+1

IT Salary Calculator

Discover & compare local and national IT salaries:

Job Title:

City: State:

http://www.itcareerfinder.com/brain-food/it-salaries/computer-software-engineer-salary-range.html

Software Engineer Salaries by Specialty & Experience

- Software QA Engineer: $77,000
- C++ Software Engineer: $83,000
- Software Engineer: $90,000
- Applications Software Engineer: $91,000
- Systems Software Engineer: $91,000
- PHP Software Engineer: $91,000
- Firmware Engineer: $92,000
- Perl Software Engineer: $93,000
- Mobile Application Developer: $94,000
- Python Software Engineer: $94,000
- Ruby on Rails Software Engineer: $94,000
- Java Software Engineer: $95,000
- Objective-C Software Engineer: $96,000
- Senior Software Engineer: $96,000
- Android Software Engineer: $96,000
- Lead Software Engineer: $98,000
- iOS Software Engineer: $102,000
- Web UI Software Engineer: 104,000
- Principal Software Engineer: $104,000
- Senior Java Software Engineer: $109,000

Source: Indeed.com

Software Engineer Wages vs. Other IT Job Functions

- Networking (LAN, WAN, Wireless, etc.): $75,666
- Operations and Facilities: $76,512
- Communications & Telecommunications: $80,326

http://www1.salary.com/Linux-Administrator-Salary.html

Linux Administrator Salaries

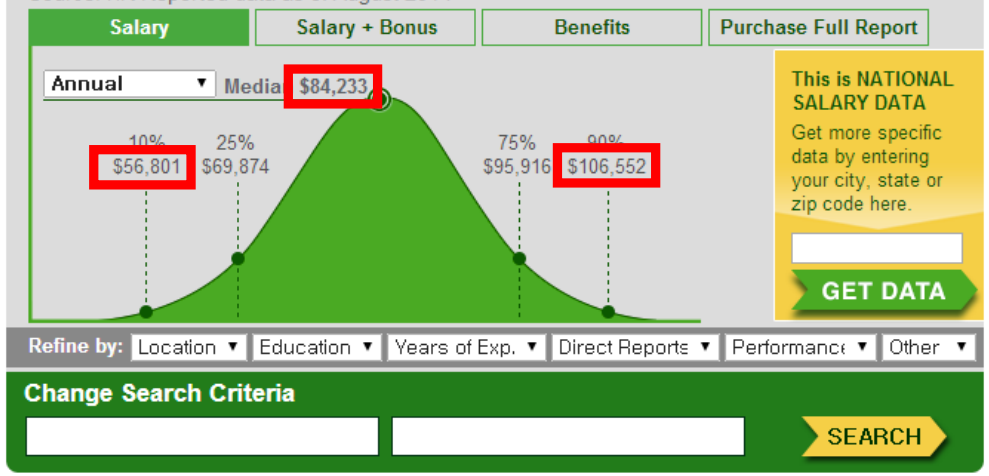
View Linux Administrator Hourly Wages

Alternate Job Titles: Linux Administrator

What is the average annual salary for Linux Administrator?
The annual salary for someone with the job title Linux Administrator may vary depending on a number of factors including industry, company size, location, years of experience and level of education. Our team of Certified Compensation Professionals has analyzed survey data collected from thousands of HR departments at companies of all sizes and industries to present this range of annual salaries for people with the job title Linux Administrator in the United States.

This chart describes the expected percentage of people who perform the job of Linux Administrator in the United States that make less than that annual salary. For example the median expected annual pay for a typical Linux Administrator in the United States is $84,233 so 50% of the people who perform the job of Linux Administrator in the United Sates are expected to make less than $84,233.

Source: HR Reported data as of August 2014



If you would like more details about compensation for this position including benefits and how other factors may influence your pay try our Salary Wizard. If you are planning to negotiate a salary you may want to purchase a Personal Salary Report. If you are an employer looking to price this position you may want to purchase a Job Valuation Report or Salary Wizard Professional Edition.

Job Description for Linux Administrator

Installs, configures, and maintains Linux operating systems. Analyzes and resolves problems associated with the operating system's servers, hardware, applications, and software. Monitors systems performance and ensures compliance with security standards. May require a bachelor's degree in a related area and 3-5 years of experience in the field or in a related area. May also require a Linux certification such as Red Hat. Familiar with standard concepts, practices, and procedures within a particular field. Relies on limited experience and judgment to plan and accomplish goals. Performs a variety of tasks. Works under general supervision. A certain degree of creativity and latitude is required. Typically reports to a project leader or manager. View Linux Administrator job description

View IT -- All Jobs by Salary Range: <$30K, $30K–$50K, $50K–$80K, $80K–$100K, >$100K

http://www.linuxfoundation.org/sites/main/files/dice_lf_linux_jobs_report_2012.pdf

감사합니다