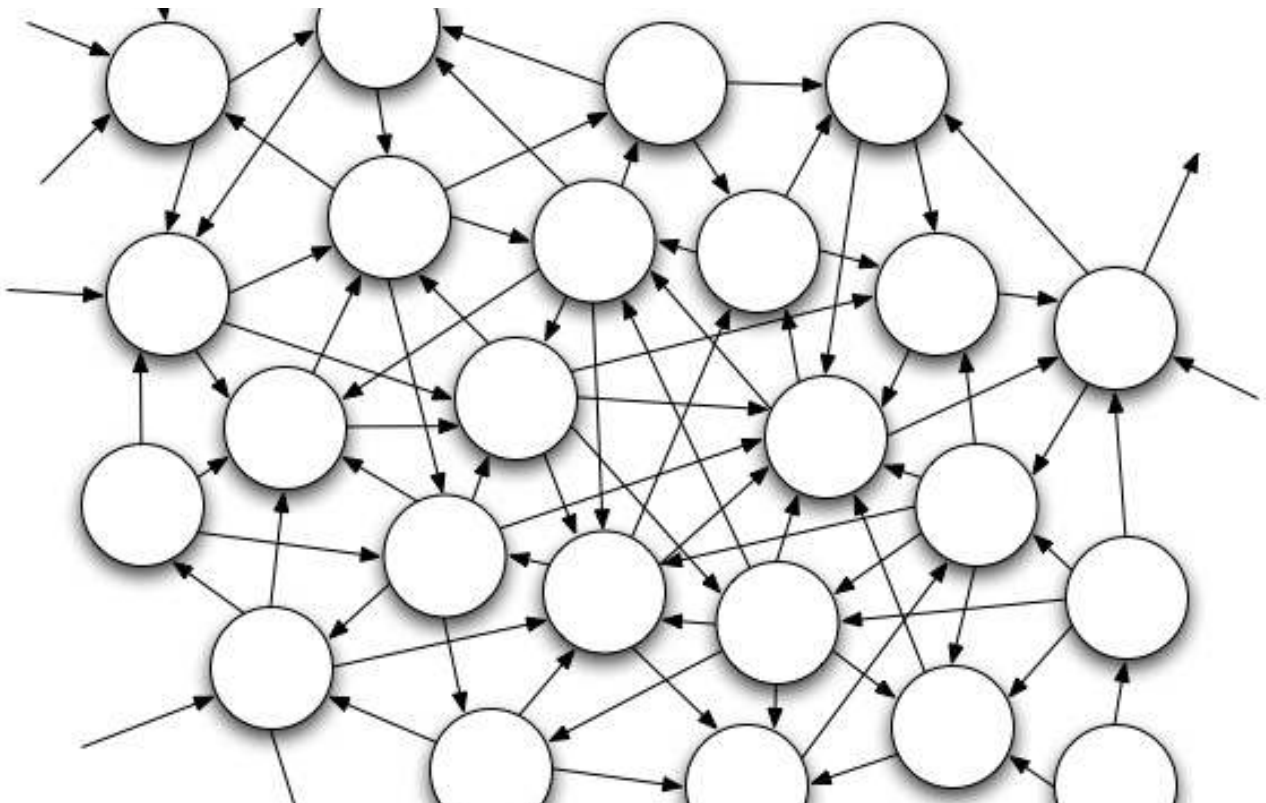


# βeta

— news from computer science and engineering —



**“intuitive” protocols** and why they suck

*page 3–4*

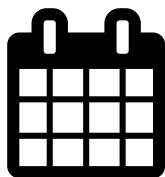
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and...



**from the  
trenches**

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**catch up on  
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# Beta

## About CSESoc beta

CSESoc beta is published fortnightly  
by UNSW CSESoc, Beta team.

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[www.csesoc.unsw.edu.au](http://www.csesoc.unsw.edu.au)

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### 2015 issue 105

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## Editorial

Hello, hello, and welcome back from mid-semester break; to get you back into the swing of it, here's what's left of CSESoc beta for this week.

I should also apologise for last week's glitch in the printed version. I now know a disturbing amount more than I used to about the way CUPS works, the way that our printers work, and have an immense amount of gratitude to the team in SS for helping me fight the printer.

Printing on Linux now is akin to what audio was like there, ten years ago. A solved problem everywhere else, to boot.

As ever, if you've stumbled on anything interesting, or you're keen to get involved, join the team via the CSESoc website, or send in an article—[beta@cse.unsw.edu.au](mailto:beta@cse.unsw.edu.au). We'd love to hear from you!

Enjoy this (disturbingly sparse) issue.

■ Jashank Jeremy

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(I did mean it when I said sparse.)

# “Intuitive” Protocols

*In which Emily announces that her name is Emily, and considers the nature of the Internet.*

Upon dwelling upon the core of the Internet, and the fact that its nothing more than a very large, very distributed system, I always begin to feel a gentle, yet unshakable, sense of sadness creep over me; kind of like when you first realise that the world is not a fair place and that kitten on the box may never reach its treat, or that Keanu Reeves will almost certainly make more money than you over arbitrary time scales.



*Facial expressions are for the weak.*

The Internet is such a core utility in our lives, but an eternally confusing one. Whenever people try to “explain” the core protocols and connections that make up distributed, weblike, systems, they always lean towards “intuitive”, “approachable” arguments. Interestingly, no matter how they spin it, these kinds of intuitive arguments are not intuitive. A successful intuitive explanation must invoke experiences that someone would have in real life, and I have never had a real-life experience that has resembled any form of common distributed or Internet protocol.

For example, let’s suppose that I am having a nice conversation with a friend. If that conversation was similar to HTTP, it would go something like:

**Emily.** Alex, I would like today’s xkcd.

**Alex.** OK, here it is.

**Emily.** Alex, I would like last week’s comic.

**Alex.** Yeah, it’s here.

**Emily.** Alex, I want the comic with Knuth being a ninja.

**Alex.** ... Give me a moment to find it.

**Emily.** Let me tell you again that I want the xkcd comic with Knuth being a ninja.

**Alex.** ... Here.

*[Hours pass.]*

**Emily.** Alex, do you have the xkcd comic with the ghost and the eternal passage of time?

**Alex.** 404 FILE NOT FOUND. GO AWAY.

And that, children, is how you lose friends forever.

## What’s the Gossip?

But maybe something less concrete, more conceptual, is necessary for the real intuitive explanation experience. Gossip protocols are ostensibly modeled off, you guessed it, gossip, so sound as if they can be easily explained. So let’s pretend that I’m at a party and am meeting someone for the first time:

**Emily.** I announce that my name is Emily.

**Oz. (to Beth)** I verify that she announced that her name is Emily.

**Andy. (to Beth)** I verify that she announced that her name is Emil.

**Beth. (to Oz)** I verify that she announced that her name is Emil.

**Oz. (to Beth)** I verify that she announced that her name is Emily!

**Beth.** I VERIFY THAT SHE ANNOUNCES THAT HER NAME IS EMIL!

**Andy.** I VERIFY THAT SHE ANNOUNCES THAT HER NAME IS EMIL!

**Oz.** I ANNOUNCE THAT YOUR NAME IS EMIL.

**Emily.** I announce that my name is Emily!

**Oz. (to Andy)** She announces that her name is Emily.

**Andy. (to Beth)** She announces that her name is Emily.

**Beth. (to Oz)** She announces that her name is Emily.

**Emily.** Who are you?

**Oz, Beth, Andy.** ... YOU ANNOUNCE THAT YOUR NAME IS EMILY.

**Emily.** I ANNOUNCE THAT YOU ARE BORING.

**Oz.** I ANNOUNCE THAT YOU ARE BORING.

**Emily.** I announce that I am leaving.

Have I mentioned that I don’t like gossip parties?

## An Ottoman And A Hard Place

Last but not least, we have the old “favourite”, known as Byzantine Fault Tolerance. The name itself should give it away as being an unintuitive idea, as neither you, nor I, nor the NSA, are Byzantine Generals, and the attack at dawn is a ruse anyway, so we can get a few hours peace before lunch. So, lets all suppose I am in the basement, and want to go to lunch with a few friends. This is what the experience would look like if it resembled a BFT protocol:

**Emily.** I announce my desire to go to lunch.

**Beth.** I verify that I heard that you want to go to lunch.

**Andy.** I also verify that I heard that you want to go to lunch.

**Chris.** YOU DO NOT WANT TO GO TO LUNCH.

**Emily.** OH NO. LET ME TELL YOU AGAIN THAT I WANT TO GO TO LUNCH.

**Chris.** YOU DO NOT WANT TO GO TO LUNCH.

**Beth.** CHRIS IS FAULTY.

**Chris.** CHRIS IS NOT FAULTY.

**Andy.** I VERIFY THAT BETH SAYS THAT CHRIS IS FAULTY.

**Beth.** I VERIFY MY VERIFICATION OF MY CLAIM THAT ANDY CLAIMS THAT I KNOW CHRIS.

**Emily.** I AM SO HUNGRY.

**Chris.** YOU ARE NOT HUNGRY.

**Andy.** I DECLARE CHRIS TO BE FAULTY.

**Chris.** I DECLARE ANDY TO BE FAULTY.

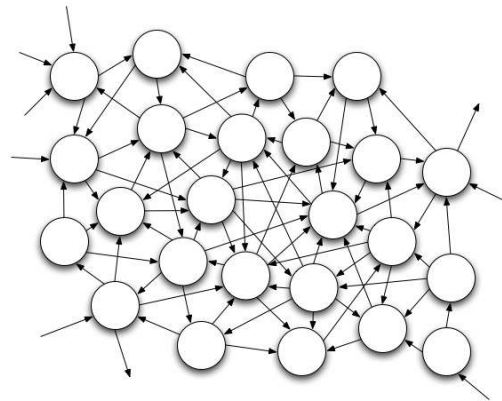
**Emily.** I DECLARE EMILY TO BE SLIPPING INTO A DIABETIC COMA.

**Andy.** I have already left for lunch.

## On Coherence

Ultimately, we need to stop obsessing over distributed systems and how they do or don't talk to each other. I don't

blame people for being interested in this hideously complex, excruciatingly irrational field, in the same limited sense that I do not blame drug addicts for wanting to acquire and then consume cocaine. The desire to make computers communicate, and then make that communication fast and reliable is a powerful one, growing with the Internet in size and scale. However, unfortunately, this addiction, if left unchecked, will inescapably lead to madness and/or reports containing no less than 453 pages of diagrams (with appendices, containing the proofs), and these reports will *still* be incoherent to the educated expert.



*As you can see, we removed the labels for simplicity.*

Even if we break the will of the machines with formal proofs, and restrictive protocols, and cryptography, we will never be able to put ourselves inside the computer. And as such, we will be left helpless and crying as the Internet explodes and the computers decide that gossip was overrated after all.

■ *Emily Saunders Walmsley*

## From The Trenches

*or, The Adventures of Edward Gough Webapp, in which Jashank grumbles about his job*

First, a précis: I got made an offer to take a year off uni and write code. I compromised, and I'm taking a year doing full-time work and part-time uni, which means I still get to bring you Beta each week. But I also have some fun stories to share, so each issue, I hope to bring you a few of them.

I suppose I should begin by saying that the company I work for is essentially a start-up in terms of the number of employees we have. On a good day, we have twelve people in a large open-plan office, and while we don't have Google-grade employee perks, it's a pretty great atmosphere, and I can really understand why the start-up culture is so attractive.

We also seem to have a huge number of students of, and graduates from, UNSW Engineering—I suppose that's a quality thing—and some who have even, over the course of their degrees, done first-year computing courses.

But for the most part, my job had, up to now, been spent mas-saging a PHP monolith. It has severe performance issues; we clocked it firing off nearly 20,000 unique database queries over three or four seconds, and decided that Something Really Must Be Done.

To attempt to improve matters, \$boss suggested we go and, uh, "buy more processor". I suggested, of course, that we go into the butt—er, cloud—and seek what performance benefits we could get from there.

So there I was, whacking bugs on the AWS instance, holding my laptop in one hand, typing with the other, and walking along a major road to work. Truly, a great sight.

Also, SSL certificates are hard to do. I'd write a good guide, but it'd disappear into the thronging mass of bad ones.

■ *Jashank Jeremy*

# we are discontent

CSESoc beta can only happen  
if you help us!

Submit content.

Make your magazine great.

*the rest of this page left blank, and not by choice*

# Upcoming Events

**every Monday** CSESoc's Weekly Barbecue

social

1–2p, Physics Lawn

Come on down to the Physics Lawn for your weekly dose of free barbecue! Don't forget to pick up your copy of CSESoc **beta**, and make some new friends!

**13 April** Vim Workshop

tech

5p, K17 Seminar Room

Vim is a text editor. It can run in a terminal, over ssh or as its own app. But what's the big deal? Well, Vim is quite powerful, and mastering it will allow you to program much faster.

However to unlock Vim's power requires quite a learning curve, and that's where this workshop comes in! Join Callum Howard and learn how you can edit text at the speed of thought.

For more details, head to  
[csesoc.unsw.edu.au/blog/vim-workshop](http://csesoc.unsw.edu.au/blog/vim-workshop)

**18–19 April** Facebook University Hackathon

tech

registrations close 9 April

Join Facebook for our very first hack in Sydney! Join us as we stay up all night hacking, learning and having a some fun! Start brainstorming ideas & forming teams (of up to 4 people). We'll supply the food, fun diversions, prizes, and some expert guidance in the form of our engineers. We'll also provide reimbursement for public transportation. You bring your laptop, appetite, skills and ideas.

For more details, head to  
[csesoc.unsw.edu.au/blog/facebook-university-hackathon-comes-to-syd](http://csesoc.unsw.edu.au/blog/facebook-university-hackathon-comes-to-syd)

**20 April** Laser Tag, Bowling, Karaoke

social

5.30p, Strike @ Entertainment Quarter

Got some beef with a mate in CSESoc? Maybe you've got something against a Social Head? Come settle the scores by shooting (lasers) at each other, and get even!

We're going to keep your hyperactive minds busy on the 20th day of April (yew) with some Laser Tag, some Bowling and some Karaoke! (Did you know that Karaoke means "empty orchestra"? That's hauntingly beautiful.)

\$15 for all you can shoot, all you can bowl, all you can sing.

For more details, head to  
[csesoc.unsw.edu.au/blog/strike-laser-tag-bowling-karaoke](http://csesoc.unsw.edu.au/blog/strike-laser-tag-bowling-karaoke)

**27 April** Flask Workshop

tech

2p, K17 Seminar Room

Flask is a Python web framework, allowing you to create your own web apps in minutes (or even seconds).

Nicholas Whyte, the developer of *Flask Boilerplate*, will be walking through how to get started using Flask, as well as some tips and tricks along the way.

For more details, head to  
[csesoc.unsw.edu.au/blog/flask-workshop](http://csesoc.unsw.edu.au/blog/flask-workshop)

**15 May** Applications Close:

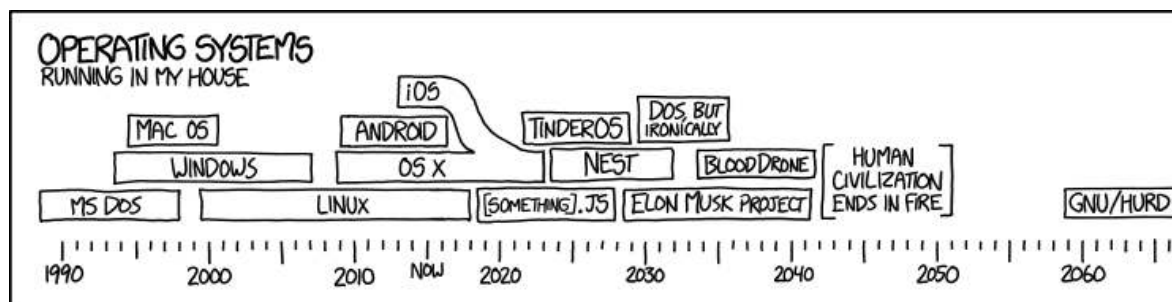
news

Google Anita Borg Memorial Scholarship 2015

Dr. Anita Borg (1949–2003) devoted her life to revolutionizing the way we think about technology and dismantling the barriers that keep minorities and women from entering the computing and technology fields.

As part of Google's ongoing commitment to furthering Anita's vision, the Google Anita Borg Memorial Scholarship 2015: Asia-Pacific (APAC) has been announced; its aim is to encourage women to excel in computing and technology, and become active role models and leaders.

For more details, head to  
[csesoc.unsw.edu.au/blog/google-anita-borg-scholarship](http://csesoc.unsw.edu.au/blog/google-anita-borg-scholarship)



One of the survivors, poking around in the ruins with the point of a spear, uncovers a singed photo of Richard Stallman. They stare in silence. "This," one of them finally says, "This is a man who BELIEVED in something."

# Puzzles

## Regular Expression Crossword

[illegible]

## Brain Teasers

- A. What is the least number of changes required to turn the word “work” into “play”, where the only operations allowed are to add, remove or change a letter, and each intermediate word must also be in English?
- B. There’s a king in the land of Binaria who’s planning on throwing an enormous party, and has amassed 1000 bottles of wine for the occasion. A would-be assassin breaks into the cellar where he’s storing this wine, and proceeds to poison one of the 1000 bottles, but gets away too quickly for the king’s guard to see which one he poisoned or to catch him.

The king needs the remaining 999 safe bottles for his party in 4 weeks. Thankfully, the king has 10 servants who he considers disposable. The poison takes about 3 weeks to take effect, and any amount of it will kill whoever drinks it. How can he figure out which bottle was poisoned in time for the party?

**Hint.** The king will have to mix wine for this to work.

**Hint.** It's easier to think of this in binary numbers.

## Issue 104 Solutions

## Brain Teasers

- A.** You need to get the same probability for both of you; cannot be done in one flip, but can with two flips. H, T and T, H have the same probability. If the two throws are H H or T T, throw again. **B.** Binary trees.

## Takuzu

0	1	1	0	0	1	0	0	1	1
1	0	0	1	1	0	1	1	0	0
0	1	0	1	0	1	0	1	1	0
1	0	1	0	1	0	1	0	0	1
0	1	1	0	1	1	0	1	0	0
1	0	0	1	0	1	1	0	1	0
0	1	1	0	1	0	1	0	0	
1	0	0	1	1	0	0	1	1	0
0	1	1	0	0	1	0	1	0	1
1	0	0	1	0	0	1	0	1	1

## Crossword

Takuzu

[illegible]

				D					E						
				Y		C	O	M	P	L	E	X	I	T	Y
				N		O					P				
				A		R		B		O					
	S			M		R		F	I	B	O	N	A	C	C
O	P	T	I	M	I	S	E	D		G		E			
	A			C		C		O				N		P	
	R			P		T						T		S	
	S		T	U	R	I	N	G	M	A	C	H	I	N	E
	E			O		E						A		U	
				G		S						L		D	
				R		S								O	
				T	H	E	T	A						C	
				M						H	A	M	I	L	T
				M										O	N
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			K	O	N	I	G	S	B	E	R	G		E	
					N										
S	T	R	I	N	G		M	A	T	C	H	I	N	G	

■ *Emily Saunders Walmsley*



# The News

**iiNet forced to identify seeders.** The Federal Court has decided in favour of copyright trolls Dallas Buyers Club LLC in their case against iiNet, an Australian ISP. The verdict allows DBC to distribute legal threats to iiNet customers observed seeding their awful film. Threats will likely demand cash in order to avoid a month in court. Expect more torrent shake-downs from aggrieved multimedia millionaires in your near future.

**Netflix chokes urban internet.** The Australian launch of film and TV streaming service Netflix has been fairly successful, insofar as many people seem to have subscribed and they are all trying to use it at the same time. Since the launch, domestic internet traffic has doubled, and netizens have reported unusually high packet loss during the evening peak.

**Just keep buying new games, OK?** A DMCA exemption request from the Electronic Frontier Foundation to permit the modification of older games in order to resurrect abandoned multiplayer servers has not gone down well with gaming industry trade groups. The Entertainment Software Association argued that any technique enabling such behaviour would be equivalent to piracy, and they would prefer you just pump more cash into ESA member organisations.

**CSIRO logo survives Cisco attack.** The CSIRO's logo has been successfully registered as a trademark. This would not be news if not for Cisco's unsuccessful attempt to block it, arguing it was too similar to their own. The CSIRO logo is a series of vertical bars shaping out Australia, while Cisco's vertical bars draw the Golden Gate Bridge, a landmark often confused for an entire island continent.

**Apple product launches.** Apple's Watch and new 12" MacBook have launched, and both are fairly confusing products. The MacBook's keyboard has hit a new low, and in my testing,

the system struggled while scrolling a PDF. Though the screen is pretty, the maximum effective resolution is 1440x900. The Watch suffers from the same existential angst as the cheaper smartwatches, with a bonus dose of conspicuous wealth display.

**Mac OS X privilege escalation.** The latest update to Mac OS X closes a local privilege escalation bug that has been present since 2011. An unprivileged user could gain root by sending a `nil` value to an authentication function that expected identifying information. Objective-C treats a method call on a `nil` object as a no-op, so permissions checks could be bypassed.

**.sucks TLD racket.** ICANN are concerned by the high prices domain registrars are charging for the new .sucks TLD. Given companies are duty-bound to purchase these domain names, lest they fall into the hands of angry Yelp reviewers, registration at US\$2,499 starts to look a little bit like a shakedown. ICANN will assess the legality of registrar Vox Populi's operation before acting.

**Swarm fascism.** As a reminder that cheap and ubiquitous drones have horrifying implications for warfare and policing, Indian police have begun equipping them with pepper spray for crowd control. Suddenly the dream of an automatically-delivered burrito or Amazon package seems a little petty.

**Russian meme crackdown.** The Russian media overseer Roskomnadzor has clarified its position on defamation law, and in the process seem to have outlawed most memes, foreign and domestic. Depicting public figures in a manner they might not like is now fully in breach. Image macros mocking celebrities and politicians supposedly harm their "honor, dignity and business."

■ Timothy Humphries

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