CPATH i18n Seminar

A Day in My Life and My Road to IT

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Overview

• A day in my life (three days, actually)
• “How I got this way”
• Globalization and IT
• How you can thrive
Day 1: January 12, 2008

- Wake up in Beaverton
- Fly from PDX to Frankfurt, Germany
- Fly from Frankfurt to Bangalore

- Purpose: business meetings in India, conference in Australia
Day 2: May 11, 2007

- Wake up at home (Beaverton)
- Drive to Corvallis, OR
- Attend Oregon State University Industrial Advisory Board
- Dinner with daughter
- Drive back home
“Day” 3: QRCU Fast Path

- 11/15/06: Jen Axboe complains SRCU too slow
  - I propose a 3x speedup
  - But Jens wants more like a 1000x speedup...
- 11/30/06: Oleg Nesterov proposes “QRCU”
  - Gets 1000x speedup by slowing other things down
  - But works just fine for Jens
- 01/28/07: Christoph Hellwig complains about a proposed addition by Peter Zijlstra and Ingo Molnar
- 01/31/07: I propose adapting Oleg's QRCU
- 02/01/07: Oleg says this is impossible
- 01/31/07: I send out a proposed change to QRCU
- 02/02/07: Oleg agrees this should work
- 02/03/07: I send out Promela validation code
  - Which runs a 20GB-RAM machine out of memory
- 02/27/07: I send patch with proof of correctness
Other Things That Might Happen

- Travel to India, China, Australia, Israel, UK, Germany, Greece, New Zealand, Canada, France, Singapore, Malaysia, Cyprus, Austria, Japan, ...
  - More about this later
- Help universities to develop coursework
- Mentoring
- Present papers, file patents, publish articles
- Legal issues
- Measure/critique/evaluate old technologies
- Invent new technologies
- Prepare business cases for new technologies
- Help work out how to adjust to competitors' moves
  - I have met with the CEO of IBM
  - More than once
Overview

- A day in my life
- “How I got this way”
  - With apologies to Patrick McManus
- Globalization and IT
- How you can thrive
How I Got This Way

• Raised in Silverton, Oregon (60s and 70s)
  – No, I had no idea that I was going to high school with an astronaut-to-be! ;-)  
• Drawn to math and science very early, but then I came across computers
  – IBM 360 with punched cards and lineprinter: FORTRAN
  – HP timesharing system with papertape and TTY: BASIC
    • First professional programming assignment: computer dating program for local National Honor Society fundraiser
    • “Grand challenge”: computing 1000! -- but only had an hour of runtime, so only made it to 659!
      – Consumes 84 milliseconds on my 1GHz laptop...
• Whether or not to go to college was difficult decision
  – Other choices: military, entry-level job
  – Encouraged to continue college by a teen-aged father
How I Got This Way

- Enrolled in Mechanical Engineering and Computer Science at Oregon State University
  - Really liked computers, but was concerned that they might be a passing fad
  - Mechanical Engineering had been around for many centuries, so was confident of its endurance
- Worked my way through as student programmer at the OSU Computer Center
- Breakdown of contribution to my education:
  - One third classwork
  - One third job (suggest internship these days)
  - One third crazy students I hung out with
- Attaining fluency requires much computer time
  - No laptops: so either get a job that allows access to computers or work on breaking-and-entering skills
- Graduated in June 1981 double-major with honors...
How I Got This Way

- But also with zero job offers...
  - Hence the earlier suggestion of internships...
  - Unless of course you like receiving letters saying things like “We can offer you no hope of employment”...
- Self-employed contract programmer in early 80s
  - After a very slow Summer...
  - Building control systems
  - Security card-access systems
  - First visit to China in 1983
  - Stock-broker customer-tracking system
  - Dining-hall systems
  - Acoustic navigation (GPS not yet operational)
  - 64K address spaces standard: 640K really did seem huge!!!
- But contract programming was often “bulk code”
  - So took post-bac courses, then started Masters
  - Got married, started full-time on Masters
  - But after not quite one term, the telephone rang...
How I Got This Way

- SRI International in late 80s
  - Systems administration
    - Pyramid 90x: UNIX timesharing machine with 8MB main memory and not quite 1GB of disk
    - Used mainly for email, netnews, and typesetting
  - Packet radio research
    - Some relation to digital cellphones
    - Learned to write from Savel
  - Internet protocol research (but before Internet was popular)
    - One of a handful of people who programmed a Cisco AGS box, but who never worked for Cisco
    - Worked with Van Jacobson, Lixia Zhang, Barry Leiner, ...
- Completed Masters in CS at Oregon State
  - Coursework at Stanford
How I Got This Way

- Sequent in 90s
  - Parallel SMP/NUMA UNIX database servers and clusters
    - Intel based, 30 CPUs in early 90s, 64 CPUs in late 90s
    - UNIX-based operating system: DYNIX/ptx
    - Early-90s refrigerator-sized disk array: 72 GB capacity!!
    - High I/O bandwidth: one EMC Symmetrix per 2 CPUs
  - Started with networking performance analysis, but the real bottlenecks were in the Base OS:
    - Parallel DMA-address management
    - Parallel TLB-shootdown management
    - Parallel memory allocation
    - Parallel timeout/callback handling
    - NUMA-aware locking primitives
    - Read-Copy Update (RCU) – shameless plug: 4PM talk!!
- First visit to India in 1997 (developer training)
- IBM purchased Sequent in 1999
How I Got This Way

- IBM (parallel and realtime Linux) in 00s
  - Continued DYNIX/ptx
  - Worked on AIX for a year (NUMA-aware locking)
  - Started on Linux:
    - Scalability work (NUMA, RCU)
    - Realtime work (mainly RCU)
  - Elected to IBM Academy of Technology in 2002
  - Work with world-wide IBM and Linux communities
    - Visited IBM development/research sites in Canada, Germany, UK, Israel, India, China, Australia – and IBM has sites in lots of other countries
    - Very aware of timezones and country codes
    - And just how did Australia get the chemical symbol for gold, anyway???

- Ph.D. in CS at OGI/OHSU
  - If you aren't going to start a Ph.D in Y2K, when are you going to start, anyway???

- More than 50 papers/articles, 25 patents granted, 40 patents pending
And Here I Am!!!
Overview

- A day in my life
- “How I got this way”
- *Globalization and IT*
- How you can thrive
Globalization and IT

- 1983 delegation to People's Republic of China
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Globalization and IT

- Computer technology is primitive
  - But the personal computer has arrived
  - And if I move from agrarian Silverton into high tech...
- And the salaries were 1% of US salaries
  - Scarcity of hardware impacted their skills, but...
  - To compete on price alone with a Chinese programmer in 1983 required being \textbf{100} times more productive!!!

- I expected to have to find another career in 5-10 years (1988-1993)

- So why am I still working in IT 25 years later???
Globalization and IT

- Language barrier: 那只狗是白色的。
- Culture and history
- Weak legal system
- Weak financial system
- Geography
- Human capital (education, training)
- Availability of technology
- Rapidly increasing standard of living
  - Factor of ten increase in China over 25 years
  - How much does 2-bedroom flat cost in Bangalore?
    2000 sq ft house on ½ acre?
- And decrease in dollar actually helps you
Overview

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• *How you can thrive*
How to Thrive

What can you do???
How to Thrive

- Understand strengths and weaknesses
  - Both yours and theirs: position your strengths against their weaknesses
  - Don't compete strictly on price!!!
- Count on continuing to learn and grow: attain fluency
- Prepare yourself to work internationally:
  - Learn a language, maybe two
  - Learn a culture, maybe ten
  - Travel, get to know the world outside of your little country
- Build your network – and your brand
  - Volunteer work can help with both of these
- Invent something new – make them catch up with you
- Make full use of automation
- Take advantage of local effects:
  - Citizenship, face-to-face contact, transport costs, culture, language
- Live well within your means
  - And why not work to increase their standard of living?

- Do not get discouraged!!!
Traveling Internationally

• Be yourself!!!
  – If you are American, you might not be popular, but you can at least be honest and sincere – which usually gains respect of techies
    • America is to much of the world as Microsoft is to the Linux community
  – If you have a thin skin, please just stay home
• Learn at least a little bit about the country you are visiting
  – Greetings and rituals (e.g., Japanese presentation of business cards)
  – Where it is and what are the neighboring countries
  – How to count to ten in the local language
  – Current political leaders and economic situation (even if you don't visit!)
  – Rough outline of history
    • Keep in mind that most Indian and Chinese citizens do not encompass their homeland's 8,000-year history, either
  – Political/social/legal constraints citizens may face
    • Americans take freedom of speech for granted, but it is not as common as you might think – severe penalties in many countries
    • Try hard not to get people into trouble – find an ex-citizen who lives in the US to gain an understanding
      – Failing that, simply refuse to discuss politics
• Americans reputed ignorant: a little knowledge goes a long way
Summary

• A day in my life
• “How I got this way”
• Globalization and IT
• How you can thrive

• Questions?