Lunch-N-Learn
1:00-1:45 PM
The future of system administration: how to stop worrying and love self-managing systems
The future of system administration: how to stop worrying and love autonomic computing

Alva L. Couch
Tufts University
couch@cs.tufts.edu
Threat or menace?

• Autonomic computing means “systems manage themselves”. So…
• No more system administrators 😞
• No more profession 😞
• “Would you like fries with that server?”
• What a crock!
Prognosis is good, but...

- Preparing for the past or present isn’t enough.
- Must prepare for the future, instead.
- This includes particular kinds of professional development.
Purpose of this talk

• Reframe the problem and threat of autonomic computing to the profession of system administration.
• Discuss some lessons from history and experience.
• Develop a strategic plan that we can use to address the threat.
• Side-effects: respect, dignity, professional stature, increased pay: everything you’ve always wanted.
Many names, same idea

- “Autonomic” systems.
- “Self-*” systems
- “User-aware” systems.
If you’re so smart,

• “why ain’t you rich?”
• Writing an autonomic system is something like predicting the stock market!
• It needs a lot of help when unexpected things arise!
Before and after

<table>
<thead>
<tr>
<th>Before autonomic</th>
<th>After autonomic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manage configuration</td>
<td>Manage architecture</td>
</tr>
<tr>
<td>Twiddle bits on disk</td>
<td>Set policies</td>
</tr>
<tr>
<td>Troubleshoot configurations</td>
<td>Analyze system dynamics</td>
</tr>
<tr>
<td>Understand file formats</td>
<td>Understand performance factors</td>
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</tbody>
</table>
Do what I think, not what I say

- Dream of autonomic: managers will input business process, all goes well.
- Reality: we’ll find out that what we say is not what we want.
- Role of new sysadmin: figure out what people really want and make it happen.
- We are the translators of the new age!
“Blue collar” or “white collar”?

- Without autonomics, we’re plumbers.
- With autonomics, we’re managers.
- Not all plumbers can become managers.
- But the ones that do get more respect!
Can you be replaced?

- Autonomic systems exhibit:
  - narrow but substantial technical expertise.
  - compulsion to protect themselves to the exclusion of other considerations.
  - limited communications skills.
  - no social skills.
Reframing the threat

• Myth: autonomic systems require no management and will eliminate the profession.
• Reality: they require a different form of management, and goodly bit of it.
• But you might have to become a different kind of system administrator in order to manage them.
• We are neither educating nor producing this new breed.
Darwin was wrong!

• It’s not “survival of the fittest.”
• It is “survival of those who fit.”
• Keys to survival
  – develop a new niche.
  – exploit its strengths.
  – avoid its weaknesses.
Not with a bang, but a whimper

- There will be no sudden house-cleaning.
- Selection process is subtle.
- “Certain people” become less crucial.
- “Certain people” become more crucial.
- **Probabilities** change, not certainties.
- Lots of “old jobs” still around.
- Just slightly fewer, each year...
Pruning failures from the gene pool

• The old niche is full: nut-turners and techno-hermits are an endangered species.
• The new niche: intermediary between humans and complex systems.
• “Managers of human-computer communities”
Survival skills

- technical and non-technical communication: vocabulary, written, spoken.
- intrapersonal: collegiality, negotiation, conflict resolution.
- time management: balancing, prioritizing.
- analysis: scientific method, statistics, predictive techniques.
Survival attitudes

- self-valuation and professionalism.
- placing management goals above self-interest.
- ability to “close a box” and leave it closed.
- ability to leave “good enough” alone.
What color is your epitaph?

- “My job was just too difficult”?
- “I didn’t get no respect”?
- “1,203,492 asses saved”? 
A hard lesson learned

- Good works aren’t enough.
- Clean sweeps can eliminate everyone who owes you anything.
- Cannot base job security upon being essential now.
- Must be perceived as essential to the future!
Lesson from a Chemistry T-shirt

• “If you’re not part of the solution, you’re part of the precipitate.”
• This isn’t a problem.
• You’re just irrelevant.
Lessons from Database Administration

- **Design**
- **Deployment**
- **Tuning**
- **Maintenance**
- **Programming**

**Fragmentation**

**Delegation**
- Outsourcing: specialists
- Autonomics: replace humans
- Reflection: define business objects
- Unchanged

**Time**

- **The Past:** do everything
- **The Present:** specialization
- **The Future:** humans define policies
Trends in DBA

- Specialists do **design**.
- Autonomics take over **grunt work**.
- Much of what autonomics do, humans were perhaps **not doing already**.
- But you can’t outsource **refining business goals**!
Right now...

- Design of databases is already an outsourced thing.
- Autonomics can tune performance at 80% of the capabilities of a human administrator.
- Reflection modeling is replacing lots of database programming.
- The former kind of DBA is slowly becoming obsolete.
- But a new kind is becoming crucial...!
The new DBA...

- Understands and supports business process.
- Designs business objects that model that process.
- Optimizes object methods.
- Updates models as business processes change.
- Serves as interface between management and infrastructure.
Lessons learned from DBA

• When automation threatens:
  • human problems remain (help desk is safe)
  • systems become more complex (and require more mediation)
  • people who remain move upwards in business hierarchy.
  • perceptions of those people improve.
Old and New

old: mediate between users and infrastructure

new: mediate between management goals and infrastructure
System administrators and post-it notes

• If you want to be essential to a business, users aren’t the primary vector.
• You have to get to management.
• Best way: make your job the easiest way to accomplish business objectives.
• Put post-it notes on desk of every Fortune-500 CEO in the country.
Analogy to system administration

• Best way to become more important: get on management’s radar:
  – support business process.
  – become crucial in their eyes.
  – connect yourself to the future, not the past.
System administrators and asbestos abatement contractors

- EPA: This stuff is dangerous.
- State government: Don’t do this yourself. Hire someone licensed by us, or you’ll make a mess!
- Result: highly trained people who form a licensed “guild”, with higher pay, better benefits, etc.
Autonomics as an abatement process

- This stuff is dangerous.
- One slip and the business loses lots of money.
- Driven by complex policies that untrained people can’t understand.
- Don’t try this at home.
Lesson learned from abatement contractors

- It all works better when:
  - the government sanctions professionalism.
  - there is licensing.
  - the culture takes a stand against doing it yourself without a license.
So, what’s the prognosis?

- You *might* lose your job.
- You might, however, become more crucial than ever before.
- Key is how you as an administrator react to this threat.
Interfacing with management

• Stop distinguishing between “us” and “them”:
• Make your goals their goals.
• Learn to speak their language.
• Learn to justify your decisions in their terms.
• Make yourself partners rather than servants.
Psst...

• I don’t want to be the one to tell you this, but, you’re managers already.
• A lot of how people view us is how we view ourselves.
• If we view ourselves as downtrodden, abused people, they will too.
• It’s time to change our perception of ourselves.
Case study: learning to speak with management

- “Broadband in dorms” stalled at an edu.
- Administration unresponsive to “what we can do” to solve the problem.
- Arguments about
  - how it’ll help students
  - how it’ll help faculty
don’t work.
The cost of not doing things

- Key issue: “what is the cost of not solving the problem?” This includes:
  - faculty and student satisfaction.
  - applicant and alumni perceptions.
Lesson learned

• No power in the universe could interest the administration in spending money to fix the problem for the benefit of faculty or existing students.
• Everyone jumped when Admissions feared an impact upon new student applications.
• Key lever: what’s important to the business?
Learning to listen

• Lots of us waste lots of time trying to explain our point of view to management.
  – This is a waste of time.
  – They aren’t trained to understand your point of view.
• Most important skill of the next generation: learning to listen to management.
  – Not to obey, but to understand.
  – Not to argue based your own goals, but instead based upon theirs.
Learning to understand autonomies

• Autonomic systems don’t function like non-autonomic ones.
• One crucial key: understand what it’s doing.
• Must engage instead in a form of science:
  – Hands off.
  – Minds on.
Service Science

- A new way of conceptualizing management.
- Based upon invariant laws of services and service composition.
- Key methodology is scientific:
  - analyze, predict, plan, act, evaluate
Summary

• Autonomic systems don’t require present-day system administrators.
• They require a new kind.
• We can either be eliminated, or we can benefit.
• The risks are great, the benefits are greater.
Conclusions

• Don’t fear the future; be part of it.
• Don’t build walls around management; become it.
• Don’t resist change; exploit it.
• And we will evolve toward a better profession.