Achilles

How to create apps for automatic design analysis ("How to find hidden gold in your logfiles")

Aaron Ng - Oct 17, 2013

Agenda

- The legend of Achilles
- The legend of Vivado
- Goals of this presentation
- Is there hidden gold in your logfiles?
- Who Achilles is for
- Demo - Proof
- How to start using Achilles for your project (in 15 minutes or less)
- Q&A / *Achilles Fast-start week (*Oct 17 – Oct 24)

The Legend of Achilles *(uh-kil-eez)*

The Legend of Achilles

The Legend of Achilles

The Legend of Vivado

- Vivado is strong
  - But there are always weaknesses
  - … and opportunities
- Achilles project
  - automated system to expose opportunities and weaknesses in Vivado
  - … that anyone can use right away (without fisusr, infra or IT support)

Goals of this presentation

- Make you powerful
  - those who missed this presentation will be like cavemen without fire
- Fast-track you to the state of the art in the software world
  - trend: desktop → cloud; monolithic → distributed
  - programs replaced by web applications
  - “cloud computing” framework (used by Gmail, YouTube, Google+, etc)
- Show you how to create your first web application
  - extract data from your existing ABE run’s logfiles
  - analyze the data to reveal **opportunities** and **weaknesses** in Vivado
  - (in under 15 minutes)

How to use modern technology to find hidden gold

- The old way of reporting data:
  - raw data → static PERL scripts → static reports

- Analogy: Mining
  - old mines are not abandoned
  - new technology lets you revisit old mines
    - resources not efficiently harvested with old tech
    - resources not reachable with old tech
  - "hidden gold" right under your nose… needs new technology to tap

- More powerful way (thanks to modern technology):
  - raw data → **Database** → **Web Application** → **Interactive Reports**
  - raw data → **SQL** → **web2py** → **Web Browser**

Model – View – Controller framework

- General pattern:
  - raw data → Model → Controller → View
- Create “controllers” to process data in DB
  - raw data → DB → Controller → View
    |→ Controller → View
    |→ Controller → View
- Examples coming up next…
  - raw data → DB → “QOR spy” → compare placer WNS by phase
    |→ “Critpath spy” → investigate worst paths
    |→ “Your App” → Meaningful report

Who Achilles is for

- Developers
  - Discover opportunities for new optimizations
  - Test your idea
    - Find best candidates for your optimization
    - compute expected gains before writing any code
  - Test your implementation
    - “Did it work?”
  - Nightly tracking of your code’s health
- Managers
  - Uncover opportunities for new projects
  - Detect degradations and triage problems across nightly builds
  - Track your group-specific metrics
    - (can go deeper than just final numbers in Excel reports)
  - Quality “dashboard” or “command center”

How to start using Achilles for your projects (in 15 minutes or less)

- Demo starting now
  - Achilles (web2py / python / PERL)

- Instructions to follow along:
  http://confluence/pages/viewpage.action?pageId=10174117

Magic show

- Demo – show you “hidden gold” in logfiles you already have
  - Gold you would miss with “old technology”

- *Example 1:* Compare RDS / SDS QOR by phase
  - “QOR Blamefinder”
- *Example 2:* Analyze placed/routed critical paths
  - Any common symptoms? Anything look fishy?
- *Example 3:* Prototyping / test your idea
  - Test opportunities / How much gain can you expect?
- *Example 4:* Compare critical paths before/after your opt
  - Expected wins? Unexpected loss? Something else became critical?
- *Example 5: Bonus*

Achilles fast-start week (Oct 17 – Oct 24)

1. "How to start using Achilles for your current project (in 15 minutes or less)": http://confluence/pages/viewpage.action?pageId=10174117

2. Email / IM me today by 5pm to schedule
   - Give me 10-15 minutes (Oct 17 – Oct 24)
   - I'll walk you through
   - You'll get your own server that does everything you saw here

Appendix

- Approx forward retime gain:
  - … → FD → LUT → …
  - … → LUT’ → FD → → …

Forward Retime