

Programming the Cloud – The Internet as a Platform



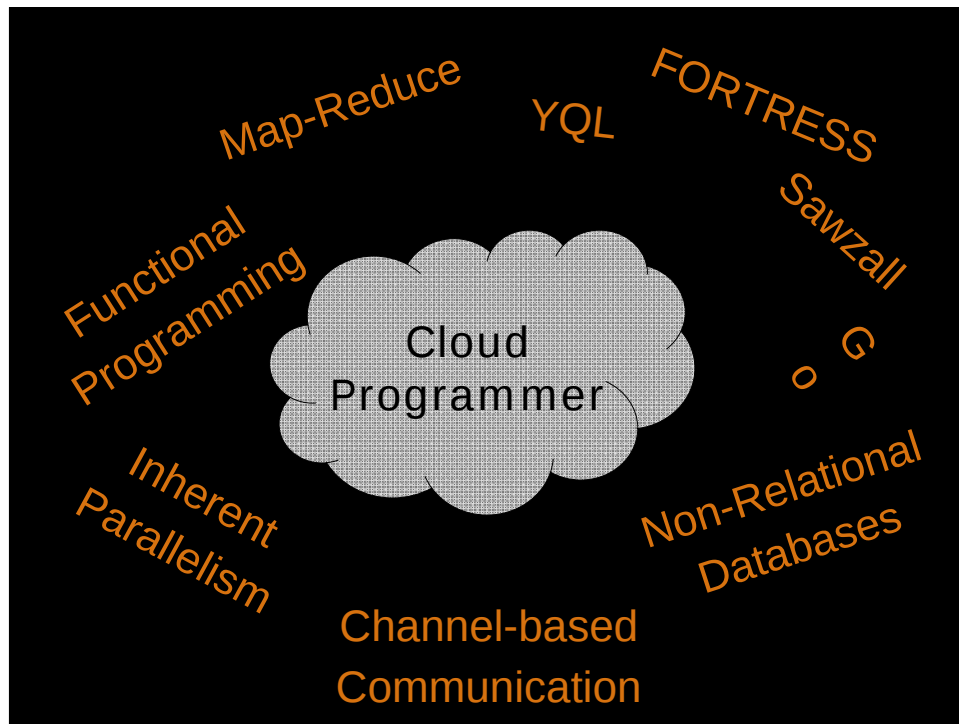
Gregor Hohpe



www.EnterpriseIntegrationPatterns.com

"If you are programming for
the cloud, you are not
programming for the cloud."

--Cameron Purdy



Internet as a Platform



Falling cost of
storage and
computing
power



Ubiquitous
broadband
connectivity



Democratized
tools of
production

~~Yesterday's~~ Software Environment Today's

- Collaborating services instead of monolithic applications
- The cloud as middleware platform
- Services are all about interaction
- Connected, but loosely coupled



Google.stanford.edu (Circa 1997)

Current Design

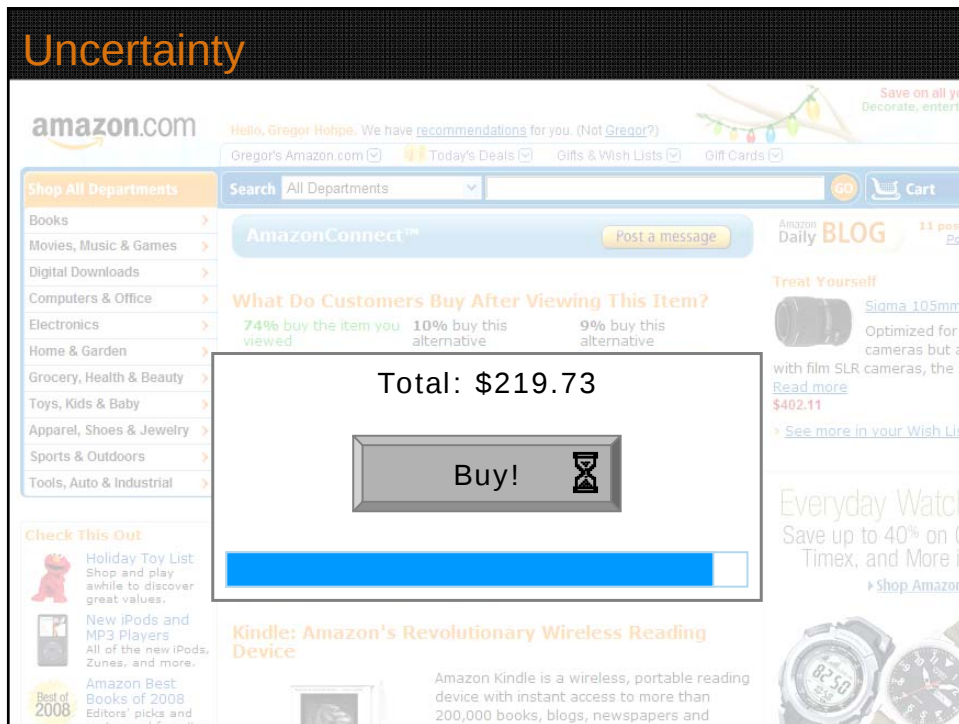
- Fault tolerant distributed disk storage:
Google File System
- Distributed shared memory:
Bigtable
- Parallel programming abstraction:
MapReduce
- Domain Specific Languages:
Sawzall



Programming the Cloud

- Uncertainty
- Asynchrony
- Interaction
- Back to Basics
- Empower the Run-time
- New Programming Models





Asynchrony

- Waiting for results is not a smart use of a 3 GHz processor
- Therefore, continue processing and handle results as they become available
- Becomes event-driven
- Out-of sequence, time-outs, conversation state
- No read consistency



Interaction

- Not free
- Conversations to overcome uncertainty
- Conversation State



Back to Basics

- Even simple things become complicated in a distributed environment
- Bigtable, not Bigdatabase
- A well understood failure scenario better than an incomprehensible and unproven “failsafe” system



Empower the Run-time

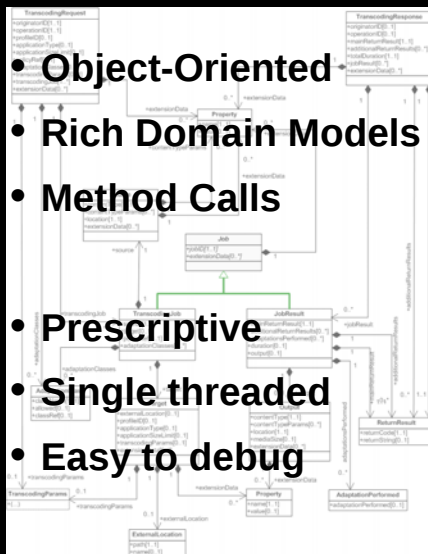
- Traditional programming often overprescribes
- Relax rules to enable parallel execution
- More difficult to understand and debug



New Programming Models

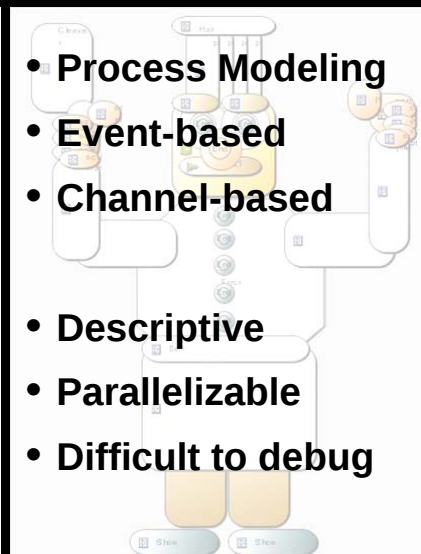
Before

- Object-Oriented
- Rich Domain Models
- Method Calls
- Prescriptive
- Single threaded
- Easy to debug



After

- Process Modeling
- Event-based
- Channel-based
- Descriptive
- Parallelizable
- Difficult to debug



Learn from the Real World

- Start making coffee before customer pays
- Reduces latency
- What happens if...

Customer rejects drink



Remake drink
Retry

Coffee maker breaks



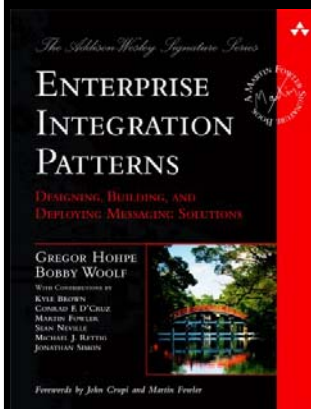
Refund money
Compensation

Customer cannot pay



Discard beverage
Write-off

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Thank
You!

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