

Characters:

1. Computer Science Genius—Mark
2. Computer Science Genie (or just Genie)—GWA

Overview:

After the Dorky Computer Scientist summons the Power Agile Genie (with the help of the crowd) he is granted three wishes. As a first wish, he wishes that his phone would do more and last longer. The Genie points out that this is actually two wishes but tries to comply. The Genie comments that if Dorky Computer Scientist's phone could transform itself to match the task that he is trying to perform that would allow power to be used more effectively. Some sample workloads are discussed and used to motivate the problem. To comply with the wish, the Genie assembles a huge class of devices and volunteers to follow the Dorky Computer Scientist around. This is the end of wish one.

As the second wish, the Dorky Computer Scientist wishes that the Genie would stop following him around, leading to a discussion of how to get all of the potential devices that the Genie is carrying into a single device. The Dorky Computer Scientist points out that most components have narrow power-performance ranges, leading the Genie to suggest a device that includes multiple components and switches between them. Discussion of the capabilities of this device and the transitions between components fits in here. With a Shazam, the Genie creates the phone of the future.

At this point we're close to being done, but as a third wish the Dorky Computer Scientist points out that this phone is now more expensive and complex. The Genie replies that he's the hardware guy and should figure out how to get power-proportionality out of single components. The Dorky Computer Scientist promises to work on this, and the session closes.

Directions

Most interaction is between Dorky Computer Scientist, the Genie and the crowd. Dialogue is primary. Slides are used to illustrate various points using cartoons or graphs and to allow the Genie to perform magic—having a mote or server “appear at his command. (Shazam!) Genie is triggering the slides with a slide pointer while DCS is triggering advance using the computer if necessary.

As the session begins, DCS stands in front of the crowd looking nervous. Genie is hiding behind the lectern or in some hidden place in costume. Dan Wallach introduces DCS also looking concerned, mentions that he thought that GWA was going to join Mark to give the talk. Perhaps Dan has actually paged GWA at some point with a few minutes left in the break to play along.

Introduction

This section sets the stage for the rest of the skit and introduces the Genie. GWA's laptop is set up and ready to go with the title slide. Mark is in the audience; GWA is hiding behind the door in costume with a microphone (hopefully). Dan is paging GWA to come and start the talk. Finally asks if GWA's collaborator is there and Mark comes forward.

Slide (Mark): Title Slide, very rudimentary, paper title and authors names and affiliations.

DCS: OK, well, um, I'm not sure where GWA is, but OK, I guess. These are his slides after all! But OK: I'll start. (*Clearly nervous, essentially reading slide.*) Today I am going to be talking about our work, "The Case for Power-Agile Computing." My name is Mark Hempstead and I am from Drexel University. This is joint work with my collaborator, Geoffrey Challen, at SUNY Buffalo. (*DCS advances slide.*)

Slide (Mark): No text, image of a magic lamp.

DCS: Hmm... um, this is what looks like a magic lamp. I'm not sure what to do. GWA writes really strange slide decks.

Genie: (Off stage) Rub the lamp!

DCS: I guess I should try rubbing the lamp. (*Makes rubbing motion towards lamp on screen. Waits a beat. Nothing happens.*)

DCS: (*To audience*) Maybe we all need to rub the lamp together? (*Audience and DCS make rubbing motion towards lamp on screen.*)

Slide (GWA): Lamps starts to smoke...

(*Genie appears!*)

Genie: Master, I am the Computer Science Genie, here to do your bidding! What do you command, Master!

DCS: GWA! I've always wondered when you would start calling me Master.

Genie: Yes, Master. Tell me what your dorky computer science heart desires!

DCS: OK, well, let's see... I wish my phone would do more and last longer!

Genie: Look, this Genie went to Harvard and can count, and that sounds like two wishes. But today is your lucky day! I shall comply. Here is your phone. (*iPhone appears on screen.*)

Slide (GWA): Phone appears on slide.

Genie: I will make it do more **and** last longer... Shazam! (*tMote appears on the screen. Genie looks impressed with himself.*)

Slide (GWA): Mote appears on screen.

DCS: Genie, that's a mote!

Genie: Yes! I hear it last for years!

DCS: But it doesn't do anything!

Genie: What! Call Phil Levis! OK, let me try again... Shazam! (*Laptop appears on the screen. Genie looks impressed with himself.*)

Slide (GWA): Laptop appears on screen.

DCS: Genie, I have one of those. It doesn't fit in my pocket, or last all day.

Genie: What! Call Steve Jobs! OK, let me try again... you're getting a lot of mileage out of this single wish! Shazam! (*Rack server appears on the screen. Genie looks impressed with himself.*)

Slide (GWA): Server appears on screen.

DCS: You think that this will fit into my pants pocket? Plus it only lasts 30 seconds on a battery charge!

Genie: What! Call Bill Weihl! OK, let me try again... Shazam! (*A huge assortment of devices with different performance characteristics appear—tMote, iPhone, MacBook, iPad, iPod, Soekris Box, desktop, rack server, etc.—appear on the screen, with the Genie's face in the middle of it all. Genie looks impressed with himself.*)

Slide (GWA): Bunch of different devices with different power-performance characteristics. Picture of smiling Genie with gold hat and twinkling teeth in the middle.

DCS: What is this?

Genie: Since no single device seems to exist that will do as you wish, I will follow you around with a whole array of computing hardware and transform your phone on demand. When you need it to act like a mote, it's a mote! When you need laptop-like powers, it's a laptop! Desktop! Server! Whatever! With a whole variety of machines we can match the power-performance of the device to the task at hand, one Shazam at a time.

DCS: Oh really? Let's try it.

Genie: Great! OK, it doesn't look like you are doing anything with your phone. Shazam!

Slide (GWA): Start new scenario slide with cartoon diagrams. Everything is very small, described as a mote.

DCS: Impressive.

Genie: Yes, I thought so. Wait... Shazam!

Slide (GWA): Continue previous slide. Everything gets to medium size, like a phone.

DCS: What happened?

Genie: It's running a background task. Should be just a minute now.

(DCS reaches in pocket for phone)

Genie: Shazam!

Slide (GWA): Continue previous slide. Everything gets large, like a laptop.

DCS: *(Annoyed)* What now?

Genie: It looks like you're about to run an interactive application!

DCS: I was actually going to play Angry Birds.

Genie: Shazam!

Slide (GWA): Continue previous slide. Everything gets huge, like a data center.

DCS: You do seem powerful Genie, but how will you know when to switch devices?

Slide (GWA): Start list of challenges. Transitioning between sets of components appears.

Genie: Well, you could just rub the device you're using when you get frustrated. Over time I'll start to learn your activity patterns and be able to anticipate the device you might need at any moment. I might need to embed hints in applications indicating their resource needs.

DCS: That sounds plausible. But how will you know what each application needs when?

Genie: Well, they'll have to tell me of course! Some applications will prefer performance to power savings. Others will be willing to trade off performance for power. I'll reward the latter and punish the former.

Slide (GWA): Challenges slide. Application power-performance metrics.

DCS: Well, you know that applications have unpredictable executions and might run in parallel with other applications!

Slide (GWA): Challenges slide. Selecting the right device (or set of components) for each application appears.

Genie: Look, I'm a Computer Science Genie, not a Computer Science Genius. You figure that out!

DCS: OK, right. But also, how you will move state from device to device?

Slide (GWA): Challenges slide. Choosing state transitions challenge appears.

Genie: You don't think that's covered by Shazam!?

DCS: It's a bit more complicated than that. It might be expensive too!

Slide (GWA): Challenges slide. Executing state transitions appears.

Genie: Sounds like another job for the genius then!

DCS: OK, well, assuming we can get this to work anyway, will you still have to say Shazam each time?

Genie: I'm a genie! That's how the magic happens!

DCS: I can see that this is going to get awkward really quickly. And not everybody has their own personal genie. Can we find a way to get you out of the picture!

Slide (GWA): Four-part slide showing people walking, having dinner, in bed and in class using their phones in each photo. In timed appearances the Genie's smiling head appears underneath a word bubble with Shazam written in bold letters.

Genie: That sounds like your second wish!

DCS: OK fine. I wish you weren't following me around any more saying Shazam Shazam! My wife thinks you're creepy.

Genie: What?! My wife loves Shazam. But OK, I'll try and help you out. Here are a few of the devices I had planned on carrying around with me.

Slide (GWA): Show several representative devices: mote, phone, laptop.

DCS: What, no datacenter!

Genie: Too heavy for me. I need to hit the gym more. Anyway, here we go... Shazam!

Slide: (GWA): Shows only the phone.

DCS: But that's just my phone! Where the the mote go?

Genie: Oh it's in there. This device sleeps like a mote!

DCS: OK fine. But where's the laptop?

Genie: It's in there too, but only comes out when you need it, like me!

DCS: What's the trick?

Slide (GWA): Show multiple components in each class, power and performance ranges for each.

Genie: Since the hardware guys haven't figure out how to get large power-performance range from a single component, I just took the components from several machines and collapsed them into a single device. It has two processors, two memory chips, two storage devices and two radios. It could have more, but even with just that set I can already transform this into 144 devices! Check out the range of power draws for all of the possible ensembles! Amazing!

Slide (GWA): Power envelopes for all 144 ensembles.

DCS: How does that happen?

Genie: Well let's start our earlier scenario again.

Slide (GWA): Use scenario from paper.

Genie: At the beginning everything is asleep. When the background task arrives, I fire up a higher-bandwidth radio to receive it.

Slide (GWA): Uncover scenario.

Genie: Now I'm doing some processing so I redirect power to the processor and shut down the radio.

Slide (GWA): Uncover scenario.

DCS: What if I suddenly start using the phone?

Genie: Check this out.

Slide (GWA): Uncover scenario.

DCS: I see you've started up a bunch of beefier components.

Genie: Right. And I can track the application state over time, redirecting power to various component subsystems as application needs change.

Slide (GWA): Complete scenario.

DCS: So by adaptively rebalancing power between different subsystems, you can keep up with application and user demands while keeping the overall power draw down. With 144 different devices to choose from, I bet you can find the perfect one for every moment.

Genie: That's right! And once you're finished with the interactive application, the background task completes and the phone goes back to sleep.

Slide (GWA): Complete scenario.

DCS: This is really cool. I'm still wondering about how you pick components for this device and manage the transitions between component ensembles.

Genie: Well, dorky computer scientists have to do something right? Call this the power-agile multicomputer. That's sure to catch on!

Slide (GWA): The power-agile multicomputer.

DCS: Also, won't this be more expensive?

Slide (GWA): Challenges slide. Include device complexity and cost.

Genie: Probably, but it might last longer because it will be able to keep up with changing application demands over time. The more power you give me the more performance I give you, and unless you have an Apple product, the battery is the easiest part of the phone to replace. Plus, your phone already has seven processors on it. Just figure out how to use them.

DCS: That's true. But you know what the best thing about this is?

Genie: What?

DCS: No Shazam!

Genie: Right. No Shazam.

Slide (GWA): No Shazam slide.

Genie: Well, we're almost out of time here, time for me to get back to the bottle...

Slide (GWA): GWA to the bottle slide.

DCS: Wait! I still have one wish left!

Genie: OK, quickly then...

DCS: I wish for world peace!

Genie: That's easy: Shazam!

Slide (GWA): Picture of Matt Welsh over the title of “Benevolent Dictator”.

DCS: I think that the Genie can stick around for a few questions...

Genie: Sure!

Slide (GWA): Summary slide triggered during applause. Shows title, main ideas, challenges, etc.