A Day in the Life 2010

Alan H. Karp
Hewlett-Packard Laboratories

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Abstract

In April, 1995, I was asked to explain what I meant by the term "The Global Computer" [1] and what the implications were of building one. Feeling particularly clever, I put together what I loosely call a screenplay. Our intention was to put on a show at a coffee talk, but we never got around to it. (My manager was going to play the cat.) I present it here as originally prepared, with only some typographical errors fixed. Footnotes contain comments added for this report. The play is quite silly, but it demonstrates a vision of the future that seems more probable now than it did seven years ago.

[1] http://www.hpl.hp.com/personal/Alan_Karp/publications/global.pdf

1 Introduction

It's hard to remember what the world was like in 1995. Newt Gingrich and Bosnia were hot topics, and Bob Dole appeared in the news section, not in advertisements telling us more about his personal life than we care to know. The O. J. Simpson trial was garnering a lot of air time, and Timothy McVeigh and Waco were on people's minds.

Computing was quite different than it is now, too. A 90 Mhz Pentium was a hot machine. A gigabyte was a lot of disk space; 32 megabytes, a lot of memory; and 56 kilobytes per second was considered high-speed Internet access. The failure of Apple's Newton a couple of years earlier killed PDAs for a number of years; Palm was still 3 years away. Unix appeared to be dying, soon to be replaced by Windows NT 3.51. Netscape had 90% of the browser market, and there were no active web pages, no streaming media, no big web server farms. Saying you were wireless meant that your home telephone didn't have cord. A phone in your car was a big deal, and a cellular phone was a rarity. Maybe it was the $1.00 per minute charge.

That was the context in which I wrote what follows. I certainly did not come up with the concepts; many of the ideas were widely talked about, but not necessarily thought practical. I recall one idea in particular that generated a negative response. As you read, you'll see that I've assumed that being connected is the normal state and being disconnected is an exception to be corrected as soon as possible. That assumption was roundly criticized in 1995. It is a state of the world that we now eagerly anticipate.

Why didn't I publish this tech report back then? Maybe I felt it was too silly to commit to paper. Maybe I didn't want to embarrass myself in public. Why am I publishing it now? I guess I've gotten more used to public humiliation over the past seven years. Also, we're now halfway there, so it seems an appropriate time for a review.

When you read what follows, accept it in the lighthearted manner in which it was written. And don't forget that all predictions are wrong, including this one.

And now, without further ado, on with the show!

A Day in the Life - 2010

Cast Members

Alan	Account rep for a textile manufacturer
Nancy	Research chemist for a pharmaceutical company
Joey	Age 6, first grader interested in sports
Nite	Feline
Muggy	Stuffed monkey
Carol	Dental hygienist
Mr. D	Joey's teacher
Dr. Watters	Dentist
Klaus	Nancy's coworker (German)
Miguel	Nancy's coworker (Spanish)
Anna	Nancy's coworker
Andy	Joey's best friend
Aggie	Nancy's coworker (seen only on screen)
Bill	Alan's coworker
Dot	PE teacher at Joey's school
Alicia	Security guard at Nancy's office
Juan	Global computer support person
Yolanda	Global computer security person
Mohan	Global computer support person

Scene

An average weekday in 2010 somewhere in America.

The number of computers is approaching 100 per individual[2]. Since these computers are always in contact with each other, share a common name space[3] and execution environment, and can replicate data to where it is needed, it appears to most users as if there is only one computer in existence.

[2]This number seems quite small today.
[3]I'm not so sure that a global name space is appropriate in a dynamic environment.

Act I - Early morning

Scene 1

The time is 6 AM on a Tuesday. The whole family is asleep. We are in the master bedroom. Sound of an alarm. Alan turns to look at clock.

Alan (muttering): What's going on here? It's 6. That damn alarm isn't supposed to go off until 6:45. I'd better see what's up.

He pushes a button on the alarm and studies the display.

Alan (under his breath): Oh, well, that's a different story. I'm glad the dentist was able to fit me in. I'd better get moving. Ahh, I smell the coffee brewing; I'm going to need it.

Alan gets up and enters the bathroom.

Everyone has a personal calendar on-line. By granting permission to his dentist to make an entry in one of a designated set of time slots, Alan finds out that he now has an 8 AM appointment and won't have to reschedule that meeting with a client. Since there is only one name[4] for Alan's calendar no matter who is accessing it, the dentist has no problem filling the specified slot when another patient cancels.

Alan has linked the early time slots to his alarm clock so he doesn't have to worry about over sleeping. Of course, the coffee machine starts up when the alarm goes off so the brewing will be done by the time he is dressed.

Scene 2

The kitchen. Nancy is fixing a peanut butter sandwich for Joey's lunch. Joey enters.

[4] Here's that naming point again. A better approach might be for Alan to give the dentist a handle for the calendar along with the permission to insert an appointment.

Joey (in a whiny voice): Mo-o-o-om. Not peanut butter again. I just had it yesterday.

Nancy pushes a button on a console in the wall.

Nancy: Nope. The cabinet monitor says the peanut butter hasn't been used since Saturday.[5] Hey, it also says we're almost out of Cheerios. I'd better order some or your dad will have a fit. While I'm at it let's see if the Safeway has my Snapple for the rain check. Hooray! It's in at last.

Nancy pushes another button to add Cheerios to her grocery store delivery and hold the precious beverage so it doesn't disappear before the delivery date.

A device is embedded in the labels of all items sold. It acts much like the bar codes used years before except that it is active.[6] Sensors on the grocery checkout pick up its transmissions instead of scanning printed material. In recent years, sensors have been added to refrigerators, cabinets, pantries, etc. The full inventory is available to the home processor. The inventory includes ages and usage patterns as well as amounts to help with purchase decisions.

Nancy's raincheck is a book entry in the computer. When the merchandise arrives at the store, her requested amount is set aside for a limited time. She can tell the store she still wants it from her home system. Stores of all kinds have found that making their inventory records available to customers has increased satisfaction of both customers and employees. The presumed loss of business due to impulse purchases made when the desired item was not in stock never materialized; people still like browsing.[7]

[5] I don't recall if I stole this idea from Marcos Frid's HeHaW. Most likely I did. See http://cooltown.hp.com/dev/wpapers/jam/HHInv.asp.

[6] We have them today.

[7] Could this be one reason Webvan got into financial trouble?

Act II - Morning

Scene 1

The waiting room at the dentist's office. A beep comes from Alan's pocket. He sits down at the portal in the waiting room.

Alan: Good! That search finally finished. Let's see, it took 19 hours, well within the 24 hour window I specified. Not too bad for cross correlating all cash register sales in the last 6 months in all metropolitan counties in the US with the type of fabric. Maybe now Jordache will believe that silk items are sold mainly through stores, not catalogs. Hey! Let's see if there's a correlation with price.

As far as Alan is concerned, THE computer is accessible anywhere. In fact, all devices that connect into the system are called **portals**[8] *whether they have local computing capability or not. Alan can log into the system from the dentist's office because there is only one security system. His files were moved to storage close to the dentist when the system noted his appointment time. Hence, he saw almost no network delay.*

Since this job involved searching several terabytes[9] *of data, it was actually run on a highly parallel database query engine in Zaire. His company will receive a bill for the resources used. Because there is a single execution environment, the scheduler found the most cost effective machine. He can start the job from any location and retrieve the results from anywhere he happens to be.*

Alan's company does relatively little computing, just billing and accounting. Peak load is handled by buying time as needed on the net.

Carol: You're next.

[8] I recall that coming up with this name took a good bit of effort.

[9] This doesn't sound as impressive today as it did 7 years ago.

Scene 2

Joey's classroom at the start of the day. The students are sitting at their desks while Mr. D, the teacher, walks through the room.

Teacher: You all did a good job on your homework last night. You'll see where I explained why most of you got the wrong answer on the third problem; I purposely left out a key piece of information. I noticed that those of you that got it right worked together. Good for you.

I also enjoyed your stories about the trip to the opera. I turned on your spell checkers so you can see your mistakes. Take a look now and write each misspelled word 10 times. You don't have to do any words not on the first grade list, though.

A beep is heard.

Teacher: Hey! Quit passing notes.

The children's work is available to the teacher as soon as they finish it. He was able to correct their work in the evening so they had the results that morning. This immediate feedback has improved learning dramatically.

Mr. D. was able to track the on-line communication between the students, so he knows who worked together. Of course, he did not get to see the nasty notes the kids sent back and forth complaining about his dirty trick; they remembered to hide those.

Mr. D. is able to control the student's use of on-line tools like calculators and spell checkers. (The kids can always cheat by using Mom's, and some do.) He is also able to use a customized dictionary set up by the school board.

Since passing notes in class is not allowed, the teacher is warned when it happens. Unlike the old days, though, he doesn't get the chance to read it to the class.

Scene 3

Dentist's examining room. The dentist is staring at a screen.

Dentist: I see why you saw a dentist on your trip to Paris. That broken tooth must have hurt a lot. The X-ray shows that a pin was put into the tooth. That's just what I would have done.

The dentist turns back to Alan and picks up a nasty looking instrument.

Dentist: This won't hurt much.

Alan: Mffmff

All of Alan's medical records are on the system. If he wanted to, and was authorized to know, the dentist could have checked the results of Alan's last blood pressure reading. The information could prove vital should Alan start bleeding while getting a filling. Also, should the dentist need to prescribe some pain medication, he can check for drug interactions without being privy to a list of Alan's other medications.

Scene 4

Nancy's office. She is working at a portal which is equipped with speakers, a microphone, a video camera, and 3 displays.[10] On one display we see faces of 3 co-workers; the second shows a volume rendering of two complex molecule docking with each other. The third is a set of overlapping windows.

Nancy: So you see here in this window, where the coefficient should be 5κ. Let's see if that helps.

Klaus: Right where the cursor is. I see. I was sure the problem was the software upgrade yesterday. I'll try the change tomorrow. Support will be doing my regular backup tonight so if I mess up I'll be able to restore to today's version. Besides, it's past dinner time here.

[10] Not at all unusual today, but it seemed pretty hi-tech to me back then.

Miguel: How's the simulation coming? Should be about half way done by now.

Nancy: Yep. Look at how those babies are lining up. See right here where I'm pointing. I think it's going to fit.

Miguel: I'm not so sure. The tabulated data shows a rise in the potential that may block the binding site.

Anna: Yeah, I saw that, too, so I set up a snooper to check for similar cases. It's still searching, but in 5 of the 8 cases it found the potential rose a bit, but then stabilized.

A tone sounds and a window appears with a red, flashing border.

Yolanda: Security here. Got a minute?

Anna: Go ahead.

Yolanda: Just want to let you know that we picked up an unauthorized attempt to access one of your secure files. We tracked it down and think it was a poorly written snooper. Just in case, though, you might want to step up to the next safety level.

Nancy: What do you guys think?

Miguel: Nah, too much trouble.

Anna: I agree. Unless it happens again, of course.

Nancy: OK. We'll leave it as it is unless Klaus disagrees.

Yolanda: Up to you. We'll keep you posted.

The window disappears.

Nancy: Now, where were we. Oh yeah. Any way we can speed this thing up? I just checked. In the last 2 days, we only got 1,200 hours of CPU time on this job. Some of it was on HP Series 82s, so that helped, but the damn budget restriction I had to put on the job ended up having most of the work done on those slower Cray 17s. Still, I'm glad Seymour pulled through back in the '90s. Otherwise, we'd have ended up running on even slower machines.

Anna: Let me check with Rajiv to see if he'll up the allocation. We seem to be making progress. If this baby docks, we ought to make a billion more if we get to market this year.

Nancy's work group includes people from Germany and Venezuela. They are collaborating on a new drug to reverse the effects of arthritis. In addition to basic chemistry and laboratory work, they are doing a lot of computer modeling. Each model requires some 20,000 hours of computer time on the fastest machines available.

They are able to connect any screen to any machine in the group. Hence, Klaus is able to see Nancy point to the possible error in his equation.[11] *They are in the middle of a large simulation involving the movement of nearly 10 million atoms.*[12] *They have structured the job so it can run in parallel on a heterogeneous set of machines.*[13]

The single name space for files makes sure that the application can find its inputs and that its outputs are available to all collaborators. The important files are replicated to the 3 sites for availability, protection from loss, and interactive access by members of the group.

Everyone has a number of snoopers (called agents in the 90's)[14] *searching. Once they became easy to configure back in '05, people set up so many of them that they clogged the net. It wasn't until expiration dates became mandatory that things returned to normal.*

[11] This idea is based on work done by Ming Hao, http://www.hpl.hp.com/techreports/94/HPL-94-37.html.

[12] This number was considered really big in 1995.

[13] Today, we'd say the job was done on the Grid.

[14] Today we'd call them web crawlers.

Files are backed up on a regular basis by the compute supply company. The supply company also provides automatic software updates as new versions become available. Nancy's group subscribes to MCI although ATT has been trying hard to get their business back.

There is a billing model that attempts to find the most cost effective computing platforms given dynamic load, machine performance, and budget constraints.

Act III - Lunch time

Scene 1

Joey's school. The children are eating lunch on picnic tables outside the classrooms.

Joey: Hey, Andy. Can I come over today?

Andy: I'll check with my Mom; you check with yours.

The boys poke at the portals on their lunch boxes.

Both: Yes!

Joey: My Mom said OK, but she's working late. I've just told Dad where I'll be. Maybe he'll take us to the park on the way home.

A fully functional portal is built into the boys' lunch boxes. With it they can communicate with anyone on the net, including their parents. The electronic notes they leave can be read later. In this case, Nancy thought that they might want to play together so she set up an automatic response. Had Joey wanted to go to Marty's house, the answer would have been no; Marty lives too far away.

Scene 2

Nancy is sitting at a portal in the cafeteria. There's a place for her tray, some paper and pencils.

Aggie: Looks good. I wish us guys in the boonies got such fancy food.

Nancy: All you have to do is leave your Pacific paradise and move here.

Aggie: No thanks. I'll make do with sandwiches. Now let's get to work.

Nancy can sit down at any portal in the world and have full access to her work environment. In this case, she simply walked away from her desk and attached her display to one of the shared machines in the cafeteria.[15]

Scene 3

Alan and Bill, a co-worker, are approaching a fast food joint.

Bill: Hey, did I tell you what my snooper found?

Alan: Which one?

Bill: The one looking for a fade-proof red dye.

Alan: I was hoping it was your stock tip snooper.

Bill: No such luck. I missed the HP stock split by 8 seconds. You know those guys in the financial houses have lots of bucks to throw at building better snoopers. I only get to work on mine a couple of hours a week. Anyway, look at this.

[15] This ability was relatively easy to add to our Client Utility demo, but ATT beat us to market with VNC. See http://www.uk.research.att.com/vnc/

The both look at Bill's portal.

Alan: I'll be damned. I bet Nancy doesn't even remember that tech report. That was her first or second year of grad school. Zap it to her, will you?

Bill: Done.

Alan: So, what would you like? You paid for lunch yesterday; today's on me.

Bill: Big spender. We had salmon at Fresco yesterday. I'll have the big burger and a chocolate shake.

Alan enters something into the portal he pulls out of his shirt pocket.

Alan: You got it. I'll have the salad and some coffee. I've got to lose at least 20 more pounds.

They walk up to the counter where their meal is waiting, then walk away without paying.

Almost all carryout restaurants have on-line ordering and paying systems. When he ordered the food, Alan authorized a deduction from his bank account to cover the cost.[16] *Of course, he knew immediately how much money was left. In this case it was a lot because his employer had just deposited his paycheck.*

Act IV - Afternoon

Scene 1

Alan is walking up the stairs in an office building on his way to see a client. (Remember those 20 pounds!) A double beep comes from his pocket.

[16] I don't recall if this was written before the widespread use of debit cards, but the idea is similar.

Alan: Yes?

Dot: Hi. I just want you to know that Joey took a spill during a basketball game. He's OK, but he got a scrape bigger than we like to handle. Should I take him to the Emergency Room or to his doctor?

Alan: Just a second.

Brief pause while Alan pokes at his portal.

Alan: OK. I've booked an appointment with the doctor in 30 minutes. See the address and directions? I've authorized you to describe what happened. Do you think he can go back to school after?

Dot: He's more scared than hurt. I'm sure it'll be fine, but I'll buzz you if there's a problem.

Alan: Thanks. I'll be with a client, but I'll let your call through. To himself. **Now, where is that conference room?**

He pokes at his portal.

Alan: Thank God for these on-line maps. I never would have found that place.[17]

The school has access to any of the parents at the push of a button. In this case, Alan had arranged access to the doctor's calendar for making appointments. He saw a display with open slots, one of which he took. Dot, the physical education teacher, will be able to describe Joey's injury so the doctor's office can have everything ready by the time they arrive. Normally, Alan would block interruptions during a meeting with a client, but he's worried enough to let Dot's call through.

[17] Here today.

Alan's portable portal has access to maps and floor plans of any building he needs. In this case, he could point to his calendar and ask for a map showing how to reach the room for his meeting.

Scene 2

Nancy is walking through the lobby of her building on the way to an off-site meeting. She stops and looks at her portal.

Nancy (to her portal): Nellie, when you get there, please put the lasagna in the oven. It's all programmed and ready to go.

Alicia, the security guard: I didn't know you have a maid.

Nancy: Oh, Nellie's just the cleaning lady. She's supposed to be cleaning now, but she's always a little late so I left her a message.

Nancy looks at her portal again.

Nancy: Damn. I've got a flat, and I don't have time to wait to get it fixed. Alicia, can I sign out a Company car until 6:30?

Alicia: You're in luck. One just came in. Let me see if it's ready to go. Yes it is, but it's a little low on gas. How far are you going?

Nancy: Only to HQ.

Alicia: No problem. Here's the keys.

Nancy: Can you give my keys to the AAA guy when he shows up? I've taken care of everything else.[18]

Alicia: Did you remember to give the map coordinates? Remember what happened the last time? And don't forget to check the road. Right now I see an accident has the freeway blocked just south of here.

[18] I really should have had Nancy authorize her car to open for the repair guy.

Nancy: Thanks, Alicia. I don't know what I'd do without you.

Nancy (to herself as she rushes out): I'm glad Alan was able to take care of that little emergency with Joey. I hate to be late to a meeting when I'm asking for money.

The processors in the cars have been added to the network. Nancy could check the status of her car from anywhere in the world; it's been a great deterrent to theft.[19] *The Auto Club is able to accept repair requests that include an authorization signature. Nancy had her car transmit its map coordinates to the repair truck. Road conditions are available, as well. Of course, Nancy was able to follow the exchange between Alan and Dot.*

Scene 3

The boys are outside drawing pictures in the dirt with sticks.

Andy: Hey, did you see the Little League scores from yesterday?

Joey: No, how did you?

Andy: Mark set up a snooper for me.

Joey: Must be nice having a big brother.

Andy: Sometimes it is and sometimes he gives me royal noogies. Anyway, Round Table Pizza won, so we're still in second place.

Joey: Too bad. Hey, let's go over to Toby's house. He's got that new basketball hoop.

Andy: Yeah. Let's go.

Note here that Joey forgot to tell any adults where he was going.

[19] Almost here today.

Scene 4

Alan is wending his way through rush hour traffic.

Alan (to himself): I'm going to murder that kid of mine. He forgot to tell me he was going to Toby's. Well, at least he left is tracker on.

Just then the traffic light, which had been green for about 3 seconds, goes red.

Alan: Great. What now?

About 30 seconds later an ambulance races by.

Alan: I can understand changing the lights for emergency vehicles, but we could have gotten another 6 cars through this light.

People carry locators around, authorizing whomever they like to see where they are. Alan and Nancy usually leave theirs off, but they insist that Joey keep his on. Fortunately, he did on this occasion.

Emergency vehicles use the net to control traffic lights they'll pass on route.[20] *Just to be safe, they change the lights well before they get to the intersection, much to the dismay of the drivers.*

Act V - Evening

Scene 1

The kitchen a little after 7 PM. Alan is carrying the lasagna to the table.

[20] Here today but without using the Internet.

Nancy: You guys don't know how lucky you are to get dinner tonight. I completely forgot about setting up the oven. Good thing I could do it from work and that Nellie was coming today. Otherwise, it would have been Senor Taco again.

Joey: Yuck. I hate tacos.

Nancy: And Mickey Dee's for Joey.

A bell sounds.

Joey: Let me do it.

He rushes to the door and lets in Nite, the family cat.

Alan: How did your meeting go? Did you get the money?

Nancy: Not yet, but it's looking good. Rajiv wants some more data so I have some work to do after reading time.

Alan: And Joey. Any homework?

Joey: I don't know; a little, I guess.

Nancy: The last time you said that you were up until almost 11 getting it done.

Alan: Don't worry. This time I'll just get him up at 4 AM.

Joey: NOOOOO! I'll do it right after dinner.

Nancy: By the way, Joey. Grandma loved the picture you did in art class. It was so nice of you to set up the system to let her see what you do.

Joey wolfs down the last of the lasagna on his plate.

Joey: May I be excused, please?

Nancy: Not until you finish your peas.

Joey makes a face.

Nancy: If it kills you, I promise not to make you eat peas again.

Joey: Mo-o-om.

Joey eats the peas, makes a face, and leaves the table. From off stage we hear Joey calling.

Joey: MUGGY, MUGGY, MUGGY. Daddy, I can't find Muggy.

Alan (to Joey): Just keep looking.

Alan (to Nancy): Can't we get a locator for that damn stuffed monkey?

Joey enters hugging a rag that looks like it once may have been a stuffed animal.

Joey (almost purring): Muggy.

The family oven, like most home devices, can be set and monitored from anywhere. Should the freezer have broken, Alan or Nancy would have been notified before any food spoiled.

The cat's collar has a device that rings the doorbell when she stands in a particular spot. It also allows her to be tracked which was particularly useful when she got locked in the neighbor's garage.

On Grandma's birthday, Joey's present was access to his art work. She loved it.

Scene 2

It is now 8:30. We are in the family room. Joey is doing his homework; Nancy is preparing her report; Alan is paying the bills. The TV is droning in the background.

Alan: Can't you turn off the TV?

Nancy: I don't want to miss any of the O. J. trial.

Alan: They've had 8 hung juries already; they'll just end up with another one. I think they're dragging it out because it's the highest rated show on the air.[21]

Nancy: Ha-ha-ha. Very funny. There. Are you happy now?

The TV goes off and a quieter but still noticeable sound comes from her portal.

Joey: See Andy. This is what Mr. D wants. How's the science project going? Can I see what you're thinking of doing? Yeah, but don't you think it'll carry more weight if we add wings to the side like this.

Alan: What's that you guys are designing?

Joey: We're having an inventions day and Mrs. Webber gave each team a certain amount of clay and the one that floats with the most pennies wins and me and Andy...

Nancy: Andy and I.

Joey: Whatever. We're going to use some of our clay for wings so the boat won't tip over.

They all go back to work.

Alan: Hey, what's with this cable bill. We've never paid this much for compute services before!

Nancy walks over and presses a button on Alan's portal.

[21] Who would have thought it would end so quickly!

Nancy: See, right here. I told you that chess tournament would cost a bundle. Next time make sure your opponent doesn't run on such expensive computers.

Alan: Yeah, but the only way to rack up the points is to lose to at least a 10-ply machine.

Nancy (under her breath): Whatever that means.

Alan: What was that?

Nancy: Nothing, nothing at all. Anyway, you should look into switching to another company. We got $50 for the last switch. Maybe we can get paid again.[22]

Alan: Oh yeah. I forgot to tell you. That snooper I sent out for bids on the new roof came back with a really good price. The references looked good. Should I tell it to close the deal or keep looking?

Nancy: Do it. I'm sick to death of talking about it. You spent more time configuring that snooper than it's going to take to do the job.

Alan: I know, but it's fun.

The boys can work together on their science project as easily as Nancy can with her colleagues; the mechanism is the same.

Since the world chess champion has been a computer for the past 10 years, chess tournaments are scored with more points going to those who lose the slowest.[23]

[22] This was written back in the good old days when AT&T, Sprint, and MCI paid you to switch long distance service.

[23] We're almost there today.

There are 4 major and a dozen minor service providers bidding for clients. They compete on price and features. They all provide certain services, such as SABRE access, but some have unique selling points. For example, one provides DOOM as part of its base fee; another charges per use.

Scene 3

It's now well past midnight. Joey and Alan are fast asleep in their beds. Nancy is still working at her portal in the family room.

Nancy: Now what's going on?

Nothing happens for a few seconds.

Nancy: Whew, there it is. I'd sure hate to lose access to that data. Support, are you there?

Mohan: Oui, Madame?

Nancy: Support, please turn on your translator.

Mohan: So sorry. I was just helping someone in Tahiti. I don't even know anyone who speaks French here in Kabul. What can I do for you?

Nancy: What's going on with my data access? It seems to be taking a long time.

Mohan: Just a moment while I check. Pause. **OK. There it is. It looks like power went out at the data site nearest you. You just accessed the copy in Munich.**

Nancy: Thanks. At least I won't panic next time.

Mohan: De nada. Buenos noches.

Nancy: I told Rajiv that replicating those files was worth the money. We'd have no chance of getting funding if I couldn't get this report ready. We might have lost the data altogether.

Availability to data is guaranteed by maintaining multiple copies at geographically dispersed locations. Owners decide on how much redundancy they are want for each piece of information.

Support is available around the clock, but support staff only work normal hours; it's Noon in Afghanistan.