

Lunch with a *Real* Network Guy (Separating the professionals from the amateurs)

The following story illustrates one of the challenges real IT network professionals face every day. This is a true story. Every detail of every event is real. It happened Jan. 20, 2004.

Definitions

As in any industry, IT network professionals have a unique language. Here are some relevant words and acronyms:

ISP – Internet Service Provider. ISPs connect organizations and individual users to the Internet. Qwest, Comcast, and Time Warner are ISPs, in addition to being phone and cable TV companies.

TCP/IP – the set of communication protocols that define the Internet. By now, the Internet connects every nearly every organization in the world to nearly every other organization in the world. Most organizations also use TCP/IP in their own in-house networks.

IP Address – Roughly analogous to a street address in the physical world. An IP Address is a number that (more or less) uniquely identifies everything connected to a TCP/IP network. ISPs assign IP Address ranges to organizations.

Firewall – A firewall protects an organization's internal network from intrusion across the Internet.

DNS – Domain Naming System. Since IP addresses are difficult to remember, most networks use DNS servers to translate names to IP Addresses. *Reverse DNS* is also becoming an important security screening tool. Reverse DNS translates IP Addresses to names.

Email Server – A relatively large computer system that handles email for organizations and end users. ISPs typically host email for individual home users and small organizations. Larger organizations tend to operate their own in-house email servers.

Microsoft Exchange, or just *Exchange* – Microsoft's email server software product.

The Story Begins

InfraSupport CTO Greg Scott's day started out like so many days before, with a meeting 25 miles from home with a potential customer. The next meeting was scheduled for 1:30PM, fortunately on the same side of town. No sense traveling all the way home and then back again, Greg thought. It was time to splurge on a leisurely lunch consisting of a double-whopper and BK Fish Fillet at nearby Burger King.

By now, it was nearly noon and as Greg waited in the fast food line, he noticed the restaurant was almost empty. Evidently, most of the lunch crowd had already come and gone. Greg

chuckled internally, remembering a lesson learned nearly 20 years ago about lunch in Minnesota – everyone in Minnesota goes to lunch at 11:30 to eat before the lunch rush.

Greg's mind was a million miles away from IT and business as he scanned the restaurant for a newspaper or anything to read while munching on the exquisite sandwiches he was about to order. He was almost to the front of the line, eagerly anticipating putting food – any food – in his stomach. As usual, he had forgotten to eat breakfast, trying to pack 2 ½ hours of work into 2 hours that morning before his meeting, and by now he was starving. But all that would soon be behind him as he enjoyed a well deserved lunch break in the relaxing ambience of a Burger King fast food joint.

That was when the cell phone rang.

Greg, startled out of his temporary respite, quickly answered, “Hello, this is Greg Scott”.

And a voice on the other end said, “Hi, this is Becky and we've got a problem...”

Becky was the IT Director for an organization and a longtime customer. Greg and Becky had become friends from facing many crises together over several years of working together. Greg was friends with many of his customers, but the relationship with Becky was special because it went back nearly 10 years.

“Hang on a second, Becky – I gotta order my food.”

The saga continues

After Greg straightened out a problem with the Spanish-speaking man behind the counter over whether or not to put cheese on his double whopper, Becky described the reason for her call.

Becky's ISP had done some upgrades overnight and changed its entire system. But the ISP made a mistake during its upgrade and forgot about this customer. The result was, Becky's organization had been offline all day and now the ISP said the only way to get this organization back online was to immediately assign Becky's organization a new batch of IP Addresses.

Greg's stomach tightened as he began contemplating the consequences of this ISP blunder. He longingly eyed his sandwich for a few seconds and then put hunger out of his mind. Food would have to wait. This situation needed attention right now.

The potential problems were enormous. First was the fairness issue. Why should a customer suffer through several hours of down time and then turn its operations upside-down to fix an ISP's problem?

But, as a practical matter, it would be possible to quickly change IP Addresses and get this organization back online. It would involve a few changes to the firewall, but Greg could talk Becky through it, keystroke by keystroke. Greg had built this organization's firewall and he knew its structure better than anyone else in the world. It wouldn't be easy, but with Becky at the keyboard onsite and Greg on his cell phone from Burger King, he could make this happen.

But what about email? Greg set up this organization's email server nearly two years ago and this would be a big problem. It wouldn't be difficult to make appropriate firewall changes to accommodate a new IP Address for email, but the DNS problem was insurmountable.

Every email server in the world has a DNS record describing its IP Address. This is called an MX record. Most organizations use web site hosting companies for DNS, and this organization was no different. Although it would be possible to contact the hosting company to update the MX record, the problem was the caches. Whenever anyone sends an email message, that sender's computer finds and queries the DNS server describing the receiver's email server. Once the sender finds the IP Address, the sender keeps a cached copy for a specified period of time. This period of time is called a TTL (Time to Live) and it is typically set for several days.

This meant that any of potentially thousands of people who had recently sent email to anyone in this organization would not query a DNS server to find the new IP Address. Instead, their computers would keep trying to send email to the old IP Address until the TTLs expired. This meant that this organization's email would be essentially offline, likely for the rest of the week.

This was absolutely unacceptable. In the 21st century, organizations depend on email every bit as much as telephone service. To knock email offline for several days is simply not acceptable.

Fix the Problem

As the adrenaline started to pump in Greg's veins, a plan quickly formed in his mind. First, talk to the ISP's engineers working the issue and find out first-hand what's really going on. Assess the situation from the customer's point of view and come up with a solution that will get the customer back online without losing email service. Greg was willing to work with the ISP, but only to a point. Compromising the email server IP Address was not acceptable. Everything else would be negotiable.

In any crisis situation, first-hand information and immediate and reliable lines of communication are vital. Otherwise, rumors start to fly and before long, the wrong people start making bad decisions based on questionable assumptions. It is also important for the right person to immediately take charge. Crisis situations are always urgent, always important, and often need to be handled right now. These are situations where the rubber really meets the road. The right person needs to take charge and assert himself right now, even if from a cell phone in the middle of a Burger King restaurant.

Becky gave Greg the contact information for the ISP engineer she had been working with and Greg wrote it down on a convenient napkin. Greg's fingers quickly flew over his cell phone keypad and before long, Becky and Greg were on the phone with Jay, a senior engineer from the ISP.

Jay's team had been working through the night and morning on upgrades to their system and Jay was in no mood to undo all the work he and his team had painstakingly put in. Greg was

equally adamant, explaining patiently but firmly the consequences of disrupting a major customer's email service for several days. Coming at the problem from opposite points of view, Greg and Jay negotiated a solution that would work:

"Why not just do some routing stuff to put this organization's subnet onto the new router?", Greg suggested. "Then we could assign a new IP Address range, schedule it a few days out, and manage the email changeover without disrupting anyone."

"We can't do that because they're sharing a slash 28 block with another customer. They have the lower half, the other customer has the upper half."

"So if they both have half, that means they both have slash 29 blocks, right"

"No because they're both using the same gateway. "

"So why not just change gateways?", Greg suggested.

"But you said you can't change gateways."

"No, I said we can't change email server IP Addresses. We can change gateway addresses. That doesn't affect DNS at all. I can talk Becky through it keystroke by keystroke; we'll be back online in a few minutes and then you can send your guys home."

Jay made his changes and Greg coached Becky, keystroke by keystroke, through the firewall settings. "OK Becky, now type this: 'pico slash firewall-scripts slash rc dot firewall' . . ."

After about 15 minutes of a conversation filled with slashes, dots, and words like "pico", Greg guided Becky through the appropriate changes. A few minutes after that, this organization was back online, pent-up email flooded in and out, and Greg wolfed down a well deserved sandwich.

Conclusion

This story is typical in so many ways. The situation was unexpected and acute. The customer had no way to anticipate or plan for it. It happened when InfraSupport was least prepared to handle it. But, despite all these obstacles, while sitting in a Burger King restaurant filled with screaming children and taking notes on napkins, Greg remedied the situation within 90 minutes of first notification.

Situations like these separate the real professionals from everyone else.

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