



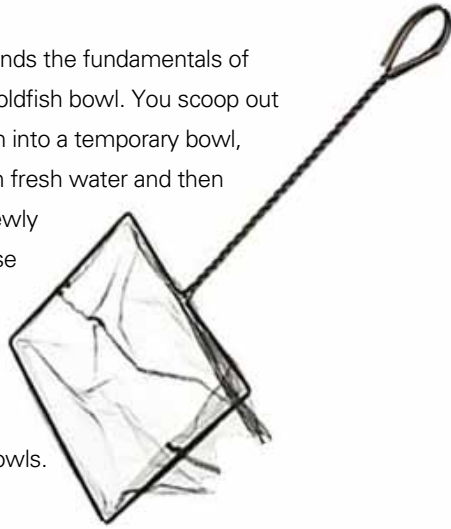
EASYSTREET
ADVISOR SERIES

Core Network Upgrade:

How to increase capacity, improve speed and low costs while causing no network disruptions for your customers.



Nearly everyone understands the fundamentals of changing the water in a goldfish bowl. You scoop out the little fish and put them into a temporary bowl, replace the old water with fresh water and then replace the fish in their newly clean world. Now, suppose you had to clean the fishbowl without disrupting the goldfish in any way. No scooping them up, no temporary bowls.



That's similar to the challenge that recently confronted EasyStreet® Online Services, Inc. of Beaverton when the company substantially upgraded its network. EasyStreet is Oregon's leading independent Colocation and Cloud Services provider, which means EasyStreet's business is focused entirely on its network. All EasyStreet customers are connected to it and EasyStreet's excellent reputation is based in part on the fact that its network has been operational — nonstop, without interruption — since 1995.

So, how do you replace stacks of routers and other critical IT network gear without disrupting customers, without lifting them out of the goldfish bowl?

"You plan and plan, then plan again," answers Rich Bader, the company's president, CEO and co-founder. "Planning for how to upgrade our network actually began nine years ago when we established the network's initial architecture. For this major upgrade, we spent hundreds of hours in planning, in developing what-if scenarios and working on additional configuration factors before we actually went forward."

"Our goal was to upgrade the network with the absolute minimum of customer disruption," Bader emphasizes. "Because our customers rely on the Internet to do their business, no disruption — no surprises — was our overriding concern for every phase of this project."

After nearly a year of systematically performing the upgrade, EasyStreet's customers and its management consider the

project a great success. Before the upgrade, the network's capacity was 450 megabits. Today it can grow to 13 gigabits. Installing a new generation of network equipment has resulted in faster speeds. Plus, improved economies of scale have meant lowered network costs, with EasyStreet passing on the savings to its customers.

"The extensive planning provided a roadmap for us to follow, made sure everything got done the way it was supposed to, and that bad things did not happen," Bader says. "Our customers are pleased with the results and so are we."

AN UPGRADABLE DESIGN

EasyStreet's network was first designed with upgrades in mind, which was a good thing because its technology had become outdated in recent years and an increasing number of minor upgrades had been necessary. EasyStreet's management team determined that the company had reached the point where incremental upgrades were no longer efficient in terms of power consumption, physical space or management philosophy.

The overall network upgrade involved three independent projects. The first was increasing the network's upstream capacity. Second was upgrading the network's customer-facing equipment, involving considerable

"For this upgrade, we spent hundreds of hours in preplanning, actual planning, developing what-if scenarios and on additional design before we actually went forward."

interaction with the customers themselves. The third and final stage was upgrading the network's core, the clusters of routers connecting the upstream components with the customer-facing equipment.

"EasyStreet was able to perform a non-disruptive network upgrade because the initial design of the network allowed growth," explains Steve Knipple, EasyStreet's vice president of engineering and operations. "It's a tiered network with three layers—the upstream connection, customer connection, and core—with each tier redundant within itself and designed so you could keep adding components. This meant we could add pieces, wherever they were needed, without shutting down the network."



Today, though the components are now upgraded, the network's design remains essentially unchanged."

UPSTREAM IMPROVEMENTS

With its steady growth in customers along with either managed or colocation servers, EasyStreet sought additional bandwidth from its upstream providers—the telcos who each have their own equipment that attaches to multiple components at EasyStreet. As the first independent project in the overall upgrade, the upstream improvements were minor in operational impact, but a major consumer of project time.

The fundamentals were simple — connect the new upstream to a new router, turn up the circuit, turn up the routing, make sure everything is working and then turn off the old router. Yet timing was critical, making sure the turn-ups and turn-downs were appropriately coordinated.

Considerable hours were spent working with the upstream providers in specifying and ordering circuits. Providers often required 60 to 90 days to create a circuit EasyStreet had requested. Most also required at least a 30-day turnoff notice, creating a challenge for EasyStreet's network technicians to make sure they didn't incur costly and unnecessary overlaps of upstream providers during these waiting periods.

"It becomes a balancing act as you make sure you're dealing with the financial fact of having an extra provider on for a month or two as opposed to assuming it's just going to be a simple swap of devices," Knipple adds.

CUSTOMER INVOLVEMENT

The second project in the network upgrade concerned customer-facing equipment, another area where the age of

the network was beginning to create complications.

While the equipment was rated for 100-megabit capacity, useful capacity had dropped to about 30 percent of that. Meanwhile, EasyStreet was fielding more customer requests for

increased capacity. Ten years ago, a two-megabit customer was considered high speed, while today a 10-megabit customer is relatively small and some want 200 megabits or more.

"This was where our customer-support team took the lead," Bader recalls. "We had hundreds of customers who needed to move to new equipment and we wanted to hold their hands through that."

EasyStreet built new customer-facing equipment and then systematically moved customers to the new configurations — sometimes singly, sometimes in small groups — over the course of several months. The actual switchovers occurred at times convenient to customers, often on weekends.

As part of the process, some customer inefficiencies in their network connections and configurations were revealed. EasyStreet technicians worked with them to redesign or reconfigure their networks to take advantage of the upgrade for even greater capacity and lower costs.

"Our customers were great about it," Bader recalls. "They were excited about the upgrade and the increased capacity it would bring them, so they willingly worked with us every step of the way."

CONNECTING THE CORE

The final phase in the overall upgrade concerned the network's core, the routers connecting the upstream routers with the customer-facing gear.

"The upstream routers only talk to the upstream provider, and the customer connections only talk to the customers," Knipple

"Our goal was to upgrade the network with the absolute minimum of customer disruption because our customers rely on the Internet to do business, and that was our overriding concern for every phase of this project."

KEY PROJECT BENEFITS:

- The upgrade to current devices makes routing faster
- Fully redundant 1 G/10 G switching infrastructure
- Greater capacity to 13 Gb
- More carriers available to customers

explains. "It's up to the core to make the routing decisions, to implement network policy and actually add the redundancy. Having this type of core makes the network configuration simpler and much more resilient."

Upgrading the core also was the one area where EasyStreet planned in advance for some minor disruptions of the network — usually lasting no more than five minutes — where individual paths could sustain momentary outages.

"The core was where the biggest potential for problems existed because it's the in-between piece — if it goes down, it doesn't matter what you have on either side," Knipple says. "But again, because we have multiple core devices already in place, we were able to add a device, make sure it worked, and then remove the old device. Other than some very small, unavoidable disruptions, it all went amazingly well."

LONG-TERM BENEFITS

A major advantage of EasyStreet's upgrade was the opportunity to replace former network gear with technologically current devices. For example, the new routers are significantly faster. Over the past five years, routers have evolved from software to hardware devices, driven by a general-purpose CPU that sends highly repetitive commands to the router hardware. This reduces the problems associated with software-driven routers while increasing speed and reducing cost.

The upgraded network has Cisco 4948 aggregation switches and new Cisco 7609 edge routers with the SUP 720 processors. This configuration enables capacity expansion via cards instead of requiring additional devices.

Bader says the upgrade also resulted in some improved EasyStreet procedures for overall network operations.

"The upgrade certainly showed the strength of the network



EasyStreet uses a variety of network providers, each with diverse entrances into Data Center 1 and/or Data Center 2.

design," Bader says. "Everything is modular, layered and independently redundant so that some components could fail, some hardware could fail, there could even be an upstream failure, and yet everything is covered by additional capacity or additional gear somewhere else on the network."

"That's the real meaning of redundancy and reliability," he adds. "And that's what allowed us to do this upgrade because, if you think about, an upgrade is an induced equipment failure as you switch over to new devices. We purposely failed some of our equipment as part of the upgrade, no problems resulted, and in the end we have significant improvement across our entire network, to our customers' benefit."



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