# NetGear's Cable Modem Issues Won't Hurt Sales, Other MSOs

Companies: ARRS, CHTR, CMCSA, CSCO, MSI, NTGR, TPE:2332, TWC, VZ          **May 24, 2012**

Research Question:

**Will NetGear's cable modem issues extend beyond Comcast and Time Warner Cable during this year's IPv6 rollout?**

## Summary of Findings

➢ NetGear Inc.'s (NTGR) CMD31T cable modem IPv6 issues in California are not serious and will not affect MSOs other than Comcast Corp. (CMCSA) and Time Warner Cable Inc. (TWC). Four sources said the IPv6-compatibilty issues lay more with Comcast, which used NetGear as a scapegoat.

➢ NetGear's modem issues will not delay the U.S. IPv6 rollout, which is progressing gradually because MSOs do not have a deadline for compliance. Some small, regional cable companies do not expect to convert to IPv6 for up to a decade because they do not need additional Internet addresses on their networks.

➢ The modem issues also will not hurt NetGear's sales. The company's routers, which service providers use in the backbone of the Internet, are in high demand, including in Europe, which represented 38% of the company's 1Q12 revenue.

➢ The service provider segment is becoming more significant for NetGear. Sources said NetGear is shifting its emphasis from retail to ISP provider products, which posted record first-quarter sales and accounted for 37% of NetGear's overall revenue.

➢ Comcast is a leader in IPv6 implementation and is expected to continue to push its rollout throughout this year. Possible competitive advantages include share gains within the government sector and smart grid deployments, which will depend on IPv6.

## Silo Summaries

**1) CABLE COMPANY EXECUTIVES**
These four sources do not view the NetGear/Comcast outage as a serious problem that will affect other MSOs. The modem issues' effects will be minimal in NetGear's sales to MSOs, and will be mostly inconsequential because NetGear provides lower-end consumer products. IPv6 deployment also will not be affected because it currently is not completely necessary. Regional cable providers do not expect pure IPv6 to be required for a decade.

**2) CABLE INSTALLERS**
These three cable technicians said the modem problems were not widespread and unlikely to affect other MSOs; one of the three was not even aware of the issue. Another source said Comcast has been phasing out NetGear modems for a while and now comprises only 3% of NetGear's business. The third source said NetGear's routers are "world-class" and in high demand.

**3) NETWORKING EQUIPMENT COMPETITORS**
These two NetGear competitors said the NetGear/Comcast issue was an isolated event that is unlikely to affect other MSOs or even NetGear's sales. The sources also said Comcast's subscriber outages were due to Comcast's own carelessness. NetGear has limited business with most MSOs, but is strong in Europe and within the consumer market.

**4) INDUSTRY SPECIALISTS**
Four of five industry specialists do not think the NetGear/Comcast IPv6 issue will migrate to any other MSOs. The fifth source thinks the issue could become widespread and possibly affect Internet access in the future. Two sources said Comcast inappropriately blamed NetGear for the IPv6 compatibility problem. Still, NetGear is not expected to be hindered by the situation because it is shifting business away from modems and has substantial market share in Europe.

| | NetGear Problem Widespread | NetGear Sales Will Suffer | IPv6 Rollout Delayed |
|---|---|---|---|
| **Cable Company Executives** | ⬇ | ⬇ | ⬇ |
| **Cable Installers** | ⬇ | ⬇ | ⬇ |
| **Competitors** | ⬇ | ⬇ | ⬇ |
| **Industry Specialists** | ⬇ | ⬇ | ⬇ |

## Background

On March 21, an IPv6 problem with NetGear's CMD31T modem caused as many as 1,000 California Comcast cable customers to lose service. As a result, Comcast temporally rolled back its IPv6 launch plans until the problem could be resolved. The NetGear firmware fix to permanently resolve the IPv6 issue was released on May 14. With the World IPv6 Launch Day scheduled for June 6, questions surrounding Comcast's ability to participate in the rollout appeared in industry blogs and trade press.

### CURRENT RESEARCH

Blueshift assessed whether cable companies other than Comcast and Time Warner Cable would be affected by NetGear's modem issues and how these issues will affect NetGear's future sales. We employed our pattern mining approach to establish and interview sources in five independent silos:

1) Cable company executives (4)
2) Cable installers (3)
3) Networking equipment competitors (2)
4) Industry specialists (5)
5) Secondary sources (3)

We interviewed 14 primary sources, including two repeat sources, and included three of the most relevant secondary sources focused on the cable and Internet industries.

## Next Steps

Blueshift will monitor the IPv6 rollout and determine if any other MSOs have been affected by NetGear's cable modem issues. We also will gauge the modem issues' effects on NetGear's sales and market share. Finally, we will determine if Comcast's IPv6 leadership position will give the company a competitive advantage once the protocol is completely rolled out.

## Silos

### 1) CABLE COMPANY EXECUTIVES

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➤ **Network engineer for a Midwest cable operator**
The NetGear modem issue is insignificant and has not affected other cable providers. The source is surprised that Comcast is even trying to put IPv6 addresses on customers' cable modems because the protocol version currently is unnecessary. His cable company does not use NetGear modems.

- "Unless you're in Asia or somewhere where all you have is IPv6 IP addresses, to me this isn't a huge deal."
- "In the U.S., there are no companies that have only IPv6 addresses. They may have IPv6 in addition to IPv4, but they don't have only IPv6 IPs. We want to have IPv6 on the servers so people can get to our websites for advertising purposes or whatever."
- "I have not implemented IPv6 to our customers, but server-wise, we have done it."
- "IPv6 is something we need to work toward, but not something that

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>
> *Network Engineer*
> *Midwest Cable Operator*

needs to work right now for cable modems."

- "We don't use NetGear modems at all. We use Arris [Group Inc./ARRS], Motorola [Solutions Inc./MSI]. … I'm not the one making the purchases, but I think it's mostly because of cost."
- "I would not use NetGear cable modems anyway—but not because of this problem. I would agree [that NetGear's products are not high quality]. For example, if you try to put a SIP [session initiation protocol] connection, a SIP phone, behind a NetGear router, they don't play well together. With a Linksys [Cisco Systems Inc./CSCO], it works fine."

➤ **Vice president of operations for a regional cable provider; repeat source**
The IPv6 NetGear error is a relatively minor concern for the directly involved parties and a nonissue for everyone else. If anything, confusion over Comcast's difficulties have made small carriers more reluctant to shift to IPv6 networking until absolutely necessary. As a relatively small ISP, this source's company is not planning to roll out pure IPv6 any time soon.

- "I haven't heard of anyone but Comcast having trouble with any equipment, from NetGear or otherwise. On the other hand, I haven't heard of too many attempts to implement IPv6 on a systemwide level either."
- "We don't use NetGear equipment. Nothing against their hardware—we just went with Linksys equipment, and they work fine for us. That said, we hope to avoid needing to give our customers the IPv6 side of the network for at least a few years, so whether their modems are IPv6-compatible shouldn't be an issue."
- "We just don't need the addresses yet for the households we serve. We're a relatively small operator compared to a Comcast or a Time Warner, so we still have addresses we can assign. The problem for us is simply in tunneling our traffic to IPv6 addresses, but we can handle that internally, not at the modem level."
- "It doesn't inspire confidence, but it doesn't inspire terror among those who were using the NetGear modems either. This is not a huge scandal. Most of us are still trying to figure out where Comcast did it wrong, not why NetGear makes such bad equipment."
- "Nobody wants to implement a big IPv6 upgrade at the modem level. I'm curious why Comcast was doing that, if that's really what they were doing. The news has left us all less eager to jump into this project. It's going to be expensive in terms of equipment purchasing on our end, service installation calls and confusion. Hearing about the problems at Comcast only makes us think harder about pushing it back."
- "In terms of people who use NetGear modems, I think Time Warner uses some, and I recently meet another regional cable company that distributes them to subscribers. But they're at a level where they're not thinking seriously about pure IPv6 for at least another decade."
- "I don't see NetGear losing much business from this, at least from MSOs. Existing partners aren't especially concerned about the IPv6 issue. They know what they want from the equipment in the here and now. It may have an impact on their presence in the product mix going forward, but only for operators looking to implement pure IPv6 in the next three or four years. I don't know how many of them there actually are."
- "The timeframe is important. Figure a modem pays for itself over several years. If you have even a qualm about NetGear equipment and were considering IPv6 over that time span, you might not take the risk of cycling that equipment into the platform if you were considering the idea. Otherwise, it's not an issue."

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> *Vice President of Operations*
> *Regional Cable Provider*

➤ **Investor relations executive for a national MSO; repeat source**
Any reaction to the NetGear failure has been overstated. Outages happen in the industry. June 6 is not truly World IPv6 Launch Day but only a test, largely for site operators. Commercial network operators are not treating the event as any sort of deadline, and internal timetables are unaffected. Comcast's signing onto the event is evidence that it is taking the evolution toward IPv6 compliance seriously.

- "It's not a factor for Comcast or any other ISP. Outages happen."

- "There's no imminent deadline or disaster waiting for them or anyone. It was simply a short-term outage in some service areas that could happen to any operator, and in fact it happens all the time. It's not like they have to work overtime to solve a Y2K problem or anything like that."

- "Some of their subscribers had a legacy modem that didn't work right in the new network. As far as I know, Comcast was able to make sure everything else worked."

- "The only blowback from the Comcast outage was manufactured in the trade press, which NetGear's retail customers don't read. I think if this had become a viral story in which networks all over the country went down and the modem was blamed, you would have a backlash against NetGear modems. But that's not the story that actually developed. And since there won't be massive outages on June 6, it's not a taste of things to come either."

- "It's an incremental negative for NetGear but only a small one. Everyone knew those modems were old and being cycled out of MSO provisioning anyway as they reached the end of their service lives. Nobody was buying more, so it's not like the product had a rich life ahead of it and was suddenly doomed. NetGear is still on the list of vendors to look at when bringing new modems onto the network. Maybe some people have been spooked by the reporting, but they'll be back once everyone else in the business has been linked to similar outages. It happens."

- "Brand loyalty remains unaffected. Not many people actually recognize that they have a choice in modem manufacturers. They may think a NetGear or a Linksys is actually the name of the product category and that every broadband network requires a NetGear or a Linksys, or even one of each."

- "The World Launch Day events are designed to raise industry awareness. They're not rooted in any external constraint in terms of address availability or regulation or anything like that. Comcast was one of only a handful of commercial ISPs around the world that is even participating. Last I checked, probably half the networks that signed on for the event were academic networks, the other half were commercial ISPs or MSOs."

- "We have NetGear in our vendor mix, much like other MSOs of our national scope. It's a fairly small part of our overall technology footprint, but we try to diversify our equipment as much as we can. If a modem or router meets our specifications, we'll probably have a few of those devices in the network somewhere. This is also true on our side as well as within the client networks."

- "I'm not sure how big a piece of NetGear's business MSO sales actually are. I consider them more of a consumer brand. Usually when a consumer device fails, people blame obsolescence and not the device or the network. We expect computer equipment to get old and stop working. Or when we get frustrated and call the MSO, the service rep will say that the device is old and needs replaced."

> ### Network engineer for a national MSO
> The NetGear IPv6 issue will not be a problem for the source's company and other MSOs. Compatibility issues with hardware do arise periodically but usually are not serious.

- "I don't think there should be any issue for our network as modems are heavily tested in the lab before we allow them to be on our cable plant. Hopefully all issues will be vetted out in testing."

- "I don't think it is a very serious issue unless NetGear cannot resolve the problem. As with any new hardware, there are always some compatibility issues that will arise."

- "I do not know of any other MSOs affected."

- "If an MSO misses the world IPv6 rollout to avoid customer affecting issues, I would say that that is a positive thing for their customers."

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> *Investor Relations Executive*
> *National MSO*

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## 2) CABLE INSTALLERS

These three cable technicians said the modem problems were not widespread and unlikely to affect other MSOs; one of the three was not even aware of the issue. Another source said Comcast has been phasing out NetGear modems for a while and now comprises only 3% of NetGear's business. The third source said NetGear's routers are "world-class" and in high demand.

➤ **Comcast cable technician with installation experience**
Comcast has been phasing out NetGear modems for several years, at least partly because of concerns over compliance with IPv6. The defect was not surprising given NetGear's reputation for relatively low-quality hardware. Still, the glitch with retail NetGear modems should not be a significant issue for Comcast or any cable operator as they roll out IPv6.

- "The NetGear modem defect was serious enough for our region to stop stocking warehouses with NetGear devices, way before DOCSIS 3.0 was even deployed. The Greater Boston region stopped using NetGear as a modem vendor years ago. They had still used them as a router vendor, but even that is waning. Different regions in Comcast are fairly independent of one another, but I would imagine most other regions are doing similar under guidance from corporate."
- "Comcast has used multiple vendors as a means of forcing modem manufacturers to compete price-wise and demands-wise, as opposed to the STBs [set-top boxes], where they really can't force a price war between manufacturers without having to completely overhaul the head-ends and CPE [customer-premises equipment]."
- "NetGear's inability to convince management that they could have a stable IPv6 solution in hand for testing on corporate's timeframe basically just shifted that business elsewhere. Arris probably benefited the most, though SMC [Networks Inc.], Motorola and Ubee [Interactive] saw upticks as well."
- "Will it affect NetGear's relationship with Comcast? Like I said, in the short term, their products have been waning in numbers. Long term, if they can satisfy corporate by offering an inexpensive IPv6 solution, they could be OK, but they'll have to mend those bridges first."
- "I would imagine all of the cable operators have had similar roadmaps to IPv6 . IPv6 and DOCSIS 3.0 have been the big topics for years at any cable industry association events. I can't speak to large-scale specifics for other companies, but I know that both Charter [Communications Inc./CHTR] and Time Warner have been using similar vendors to Comcast for a while."
- "The issue won't hurt cable operators. This roadmap has been drawn out for a while. NetGear modems that aren't compliant have been on the end-of-life list for a while, and the few that are still in the field will quickly get pulled when they start dropping offline."
- "Most companies will have glitches, like anything that is newly deployed, but IPv6 has been a major topic for years. The IPv6 rollout as far as Comcast is concerned is going to happen in two phases, the first phase being a dual stack phase where both IPv4 and IPv6 will be used, so I don't think any noncompliant hardware is even going to cause any issues in the near future."
- "NetGear's reputation in the industry is for mass-produced, widely available, simplistic architecture designed primarily for retail purposes—essentially, the McDonald's of the modem and router world. They have some decent models, but since the cheap stuff is what sells, that's what the market is saturated with."

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>
> *Comcast Cable Technician*
> *Installation Experience*

➤ **Cable technician for a New England network design contractor**
New network deployments are being built with native IPv6 capability but largely are accomplished at the router level, making NetGear's modem trouble insignificant. Residential connections knocked out in the Comcast outage were not designed to operate in an IPv6 environment in the first place. Most IPv6 development is managed closely by consultants or in-house IT personnel, and NetGear's core enterprise customers are unlikely to change their buying habits.

- "I suspect the NetGear problem was a unique interaction with the way Comcast was testing their IPv6 protocols and not anything inherently wrong with the modems themselves. NetGear tested the modems. We've used them

in the past ourselves. They supported other forms of IPv6 environment just fine. If Comcast fixes their solution from their end, it will be a one-time problem."

- "We weren't really using NetGear modems in the kind of projects I work on. We use a lot of NetGear wireless routers but not so much the modems. The routers are world-class, and there's huge demand for them from new and old customers alike."

- "Having the IPv6 addressing in the router eliminates any concern that one modem or another will fail to support that side of the Internet as it evolves. And nobody's complained about the NetGear routers not working."

- "We never hear about a person or corporate customer asking to be moved up to IPv6, whatever that would entail. That kind of upgrade would be easy enough to enable on an equipment level by swapping out the router, but nobody ever asks for it because it's a provider issue, not an end user issue. They don't see much intrinsic benefit in it. Residential never asks for it. If they did, we'd just tell them it isn't ready in our area yet."

- "This is not going to change our rolling IPv6 deployment. We do build IPv6 into new commercial networks as a matter of policy, but even that's rarely 'pure IPv6' and more of a hybrid functionality, a dual IPv4/IPv6 stack. That's going to be the cutting edge for years to come."

- "People who care about IPv6 are people building out new commercial networks for large offices, healthcare facilities and so on. They're building to fairly detailed professional network plans, not just buying a few modems at Best Buy and cobbling the whole thing together. I think that's the difference. There's no confusion on which model of hardware they're buying or whether it works as specified with their ISP. Everybody already knows because it's already been tested in other deployments."

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>
> *Cable Technician*
> *Network Design Contractor*
> *New England*

➤ **National cable company installer**
This source was completely unaware of NetGear's modem problems within IPv6 because FiOS supplies modems for its customers. He expects Comcast to dump NetGear as a supplier and to advise its customers who opt to provide their own modem to stay away from NetGear products.

- "I never heard of NetGear and Comcasts IPv6 issues before."

- "My company provides the modem for its subscribers so we have everything tested out. We don't have this kind of problem."

- "My guess would be that if Comcast is using NetGear products they will stop and they will advise their customer not to install a NetGear modem."

## 3) NETWORKING EQUIPMENT COMPETITORS
These two NetGear competitors said the NetGear/Comcast issue was an isolated event that is unlikely to affect other MSOs or even NetGear's sales. The sources also said Comcast's subscriber outages were due to Comcast's own carelessness. NetGear has limited business with most MSOs, but is strong in Europe and within the consumer market.

➤ **Product executive for a network equipment manufacturer**
NetGear's position in the standalone cable modem segment already was deteriorating. Even the rumor of manufacturer-specific problems involved in the Comcast outage will affect MSOs' confidence in NetGear, but the true business effect should be limited. Relatively high-end equipment is becoming critical in commercial contexts as enterprise multimedia usage accelerates.

- "NetGear has essentially abandoned the standalone broadband modem market to competitors like us and Cisco. Their strategy is to focus on a streamlined all-in-one modem/wireless access point primarily for residential environments. That seems to be working for them, and we're happy to let them have it. We're primarily an enterprise manufacturer."

- "Comcast basically smeared mud on NetGear by blaming the modem and changing its story a few times. We just don't know what happened there, but it seems the modem itself is fine and was certified to work with the

existing Comcast network. Comcast changed a few parameters—ostensibly part of IPv6 tests—and suddenly the modem broke its certifications. You know who to blame there, but it doesn't inspire anyone to buy more NetGear."

- "That said, new MSO relationships aren't really a big part of the NetGear business as I understand it. It's not like a lot of people are new to the brand and were weighing its merits, then heard about the Comcast story. They have their fans, especially in Europe and in residential markets. I'd be surprised if Comcast stops buying other models from them, for that matter."

- "What's going to be interesting is when the relatively advanced side of NetGear's residential product line—the wireless-native modem/routers—comes back to the MSO provisioning decision. Vendors are courting MSOs that want to differentiate their service offering and we're coming up with value-added unique products to do that. More sophisticated products for heavy media consumers and gamers who need more data and less latency, or for enterprise customers that are now flirting with streaming video over the T1 and cutting the cable. Getting those subscribers a middleware solution better suited for their needs is the key."

> ➤ **Customer experience head for a network equipment manufacturer**
> The Comcast outage was likely an isolated event and unlikely to have much effect on NetGear's competitive prospects or the overall IPv6 rollout. NetGear has drifted away from wholesale broadband modem sales in recent years, so any backlash will be limited.

- "Network operators were already dragging their feet on IPv6, and the embarrassment for Comcast only serves as an incremental disincentive to rush. At this point, IPv6 adoption will be as gradual as the operators can possibly drag the process out. It's not NetGear's fault and not a NetGear problem, only confirmation of the mood that was already out there."

- "The only thing I can think of is if another major cable company tries to roll out a lot of IPv6 at once and the NetGear modems fail. But that's unlikely. What will happen is the deployment of the new protocol will keep rolling out gradually, site by site. If the old modem fails, it's a replace and the customer is charged. Old obsolete equipment. It happens all the time and won't raise any eyebrows, especially over a five- or 10-year period."

- "The ominous thing for [NetGear] is that Comcast doesn't seem to have factored these modems into their test planning, so everyone was surprised when all those customers raised their hands and said, 'You've broken the modem you said would always work on your network.' Reverse compatibility wasn't aggressively pursued. You could attribute that to carelessness or error, but you don't make errors about your core vendors' product lines. NetGear is on its way out across the Comcast network. It shows."

- "I don't know how big a piece of NetGear's business Comcast represents, but it's fairly small at this point. Their really big relationships are overseas, simply by default. I think Comcast may represent 3% of their business at the biggest."

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## 4) INDUSTRY SPECIALISTS

Four of five industry specialists do not think the NetGear/Comcast IPv6 issue will migrate to any other MSOs. The fifth source thinks the issue could become widespread and possibly affect Internet access in the future. Two sources said Comcast inappropriately blamed NetGear for the IPv6 compatibility problem. Still, NetGear is not expected to be hindered by the situation because it is shifting business away from modems and has substantial market share in Europe.

➤ **Commercial networking consultant**
IPv6 is not a concern for corporate network managers accustomed to waiting for ISPs to push new functionality. NetGear's modems are less popular than they were a year ago because of the company's shifting focus to the hot wireless router segment. Cisco's Linksys has gained share on the modem side. Wireless routers are in demand for established network environments and a necessity in new installations.

- "Nobody's worried that they're going to miss a June 'deadline' to be ready for IPv6 or else they'll drop off the network. That's not how it works, so nobody really cares."

- "What actually happens is that people let the ISP lead. If the ISP wants to roll out a new protocol, they'll bundle it with performance and pricing and let the customers and local consultants know it's available. These things rarely originate with the customer because most customers aren't studying the ISP trade sites and finding things in other geographies they want."

- "NetGear has lost a fair amount of share in modems over the last year. They still have a staggering amount of product in the field, at least as much as Linksys in this part of the country, but fewer of those older devices are being replaced with NetGear models as they drop off. A lot of the customers are going with Linksys as 'the other' utility modem. They like the Cisco muscle behind it and the way it interacts with other Cisco switches."

- "We recommend a few SMC and RCA modems as well, especially for smaller commercial environments. But in general it's NetGear or, increasingly, Linksys."

> " I don't know anyone beyond Comcast who's even gestured at a pure IPv6 rollout. I almost wonder if this wasn't some kind of PR stunt, a way to turn a normal service interruption into a triumph of their technology. Of course, they ended up blaming NetGear for having shoddy equipment they don't actually have.
>
> *Commercial Networking Consultant*

- "Where NetGear is triumphant is beyond the modem out in the wireless router. Everyone wants a wireless router now that iPads make it essential. Previously, commercial wireless was considered a luxury associated with image-driven technology and design start-ups. But with tablet computing moving into the office, you need a wireless connection. The iPad just doesn't plug in the same way even the sleekest laptop once did."

- "Eventually the ISP will drive IPv6 because address space is an ISP problem. It's becoming a global concern. But available space varies per ISP, so if the ISP still has space it's not perceived as a problem. Based on growth and usage, most ISPs figure they'll start running into the problem soon, but they're taking an evolutionary approach and not making it an all-or-nothing transition. Over the next few years, they'll build all the IPv6 they need to avoid running out of addresses."

- "I don't know anyone beyond Comcast who's even gestured at a pure IPv6 rollout. I almost wonder if this wasn't some kind of PR stunt, a way to turn a normal service interruption into a triumph of their technology. Of course, they ended up blaming NetGear for having shoddy equipment they don't actually have, but that's how it goes. If other people try similar stunts—or even actual IPv6 tests—they can't blame NetGear because the response will be, 'You knew this was an issue; why did you do it anyway?'"

➤ **IPv6 evangelist and industry commentator**
Coverage of the Comcast outage was sensationalized and somewhat unfair to all parties involved. An IPv6 deadline does not exist aside from the eventual assignment of all possible addresses. No MSOs are in danger of failing to migrate to IPv6; when migration does occur, hardware and middleware will be different. NetGear makes fine modems, but seems to be having trouble making the transition from basic telephony equipment to a more comprehensive infrastructure offering.

- "I didn't even cover the outage in San Francisco and had actually forgotten about it. If Comcast were racing to make a national deadline it might've been more serious, but they're not and it's not."

- "If only all the ISPs were racing to bring IPv6 online and end the dual stack regime. But there's no danger here to anyone. This isn't a Y2K type of artificial ticking clock—fail to hook everyone up and your network goes down. It's a more elastic issue of finding addresses for all the devices coming online in the next few years, the phones and smart meters and tablets."
- "The cable operators are so slow that by the time they feel the urge to have everyone on dual IPv6/IPv4 environments and can start pulling the IPv4 plugs, everyone on the network will have bought new modems, new computers; we will be in an entire new generation of hardware. With that in mind, all the NetGear devices that allegedly offended will be gone or in some relatively innocuous setting where their neighbors will do all the work for them."
- "I like NetGear's technology. I prefer Cisco as the long-term evolution, so to speak, but NetGear makes perfectly good devices and has an interesting install base in VoIP handsets and other categories you might not be thinking about. The problem is that they're so entrenched there that they sometimes don't seem to know where they're building from that base. ... Now they seem to be coming back toward the premise from the modem into the router, maybe even new phones."
- "What bothers me is that anything that slows the pace of true IPv6 adoption will keep us all on the dual stack that much longer. The dual connection and lookup are buggy at best. They chew up endless bandwidth that could be used to make faster connections."
- "This isn't bad because it encourages people to keep laying fiber and pushing bigger pipelines at the problem, effectively creating spare capacity for future demand. But it also means we can't enjoy better performance in the here and now. There's an artificial lag that will continue until IPv6 deployments can burst out of the dual constraint and actually talk to each other a lot faster than they do now. That will be liberating, I promise."

> **The cable operators are so slow that by the time they feel the urge to have everyone on dual IPv6/IPv4 environments and can start pulling the IPv4 plugs, everyone on the network will have bought new modems, new computers; we will be in an entire new generation of hardware. With that in mind, all the NetGear devices that allegedly offended will be gone or in some relatively innocuous setting where their neighbors will do all the work for them.**
>
> *IPv6 Evangelist & Industry Commentator*

➤ **Technology journalist and publisher**

Both Comcast and NetGear should share the blame for the failed IPv6 rollout. The lack of coordination sends a strong message to other ISPs and their subscribers that IPv6 is not ready for the mass market. The source does not expect the World IPv6 Launch to happen on schedule.

- "I was one of the people whose NetGear modem stopped working. It was a fairly new device. We only bought it last year, and now we had to replace it and get something else. I blame Comcast for not testing on that model and NetGear for failing to reimburse us. They're both liable, really."
- "This failure means delays and questioning about IPv6, and meanwhile the clock is ticking. Will we make it to the June 6 launch without Comcast rolling out on schedule? I don't think so. I think we're going to fail."
- "The Internet is running out of domain space. That's obvious. What happens when we run out? Well, obviously they won't be able to assign anyone any new addresses without automatically migrating them to an IPv6 situation."
- "I wonder if it'll be like New York phone numbers, people jealously holding onto IPv4 addresses they aren't using or even selling them to people who need to get online. Or people could get booted as new devices come online and steal their IP number. You could see cascading failures."
- "Time Warner was watching Comcast, and now they're delaying their IPv6 rollout too. I can't even find any record of Cox or Cablevision or the wireless networks beyond AT&T moving toward IPv6. It could be a disaster."
- "My readers weren't really fond of NetGear even before this happened. Now they're thinking twice. Who wants to buy a $200 modem and then

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>
> *Technology Journalist & Publisher*

have to return it in six months because your ISP decides after the fact that it doesn't work on their network after all?"

- "My readers like D-Link [Corp./TPE:2332]. D-Link is ahead of the game when it comes to IPv6. They were ready to meet the June 6 deadline."

➤ **Telecom industry analyst for a global consulting firm**
NetGear's strong presence in Europe indicates that its technology is better suited to IPv6 migration than the Comcast outage would suggest. Global deployment of IPv6 is theoretically complete at the backbone level and at the consumer level in most key Internet markets, but ISPs such as Comcast will continue to delay their rollout. No U.S. MSO or equipment manufacturer is uniquely exposed to the slow pace of migration although the rewards of early compliance could be considerable.

- "NetGear is a big deal in Europe and especially the United Kingdom, where IPv6 deployment is already well underway in government and academic applications and increasingly in commercial networks. I think Virgin [Media Inc./VMED] is NetGear's biggest single customer, buying well over 10% of their products and distributing them to its subscribers. If there was a problem with this equipment in relatively advanced network environments, Virgin would know and would stop buying."
- "IPv6 is already here. The backbone networks support the expanded address space. All major consumer applications support it. There are countries like Japan where major ISPs have provided IPv6 native options for over a decade. But until everyone is on the new system, the entire world is locked into a hybrid IPv4/IPv6 solution."
- "The problem is the ISPs. Nobody wants to be first. Comcast and Time Warner in the States are actually among the most progressive of the major operators. Comcast is at least running trials. Time Warner started running trials at about the same time. With rare niche exceptions, the rest is silence. The capability exists, but until consumers demand it or governments require it, it won't be put into practice."
- "With that in mind, failing to support native IPv6 is not going to hurt anyone. I see that the modems that failed Comcast were last updated last September. That's five years after the backbones had to be all-IPv6 compliant. Arguably the NetGear devices were IPv6-compliant, but the application failed for some non-hardware reason."
- "Unless you want to sell to the government in the United States, a lack of proven IPv6 compliance only hurts with very long-view IT purchasing decisions. But for those who would like to sell to the government, this is essential. The Department of Defense is on IPv6 because it doesn't need absolute transparency; connecting to the outside world only by tunnels is actually an advantage for them."
- "Eventually the smart grid will also need IPv6 simply because of the number of devices coming online there. Companies that want to support the grid—hardware, bandwidth or both—will need IPv6. For now, none have stepped up to the challenge, but perhaps in a few years it starts becoming important."

> **"** The problem is the ISPs. Nobody wants to be first. Comcast and Time Warner in the States are actually among the most progressive of the major operators. Comcast is at least running trials. Time Warner started running trials at about the same time. With rare niche exceptions, the rest is silence. The capability exists, but until consumers demand it or governments require it, it won't be put into practice.
>
> *Telecom Industry Analyst*
> *Global Consulting Firm*

➤ **Independent ISP consultant and noted industry spokesman**
Realities of daily blog coverage pushed the trade press to magnify the importance of the Comcast outage in order to manufacture discussion. In reality, Comcast simply bungled a firmware update and blamed the equipment manufacturer. Follow-up coverage further confused the situation and spooked subscribers. The net implication is negative to Comcast given its demonstrated lack of message control and weak execution of what should be a routine procedure. Commentators have broadly overstated IPv6's impact.

- "When you're running a blog, you make your own news. You speculate, you grind your teeth on every nugget or factoid that comes your way. In this case, a reporter's connection went down and he was compelled to track down the reason. That's a good impulse. But from there, the blogs spun the story well beyond its actual stature."
- "NetGear isn't really a big player in terms of new modem purchasing. Their real strength now is wireless. What this means is that Comcast is effectively kicking obsolete equipment to the curb. They're within their rights. They

control the upgrade cycle. But the apparent confusion in how they did it is a red flag for me. They actually didn't know what was going on."

- "Maybe one in a million Comcast households had a problem. Maybe 10% at the very most could have had a problem if the exercise was extended to nationwide. But people who heard that NetGear modems were failing weren't exactly filled with confidence."

- "Comcast committed a cardinal sin: They believed the bloggers more than they understood their own position. That's a shocking thing from one of the most ruthless and disciplined companies in the universe, and it makes me wonder what other cracks are in that facade. Technology glitch, blow it off, apologize and move on. Turn a technology glitch into a point of contention and fear—NetGear modems are failing, we won't make our deadline—and that's not a world-class shark of a company talking anymore."

- "NetGear barely supports this product anymore as it is. They handled it with a bit more grace, especially under the circumstances. I hope their network partners are intelligent enough to realize that even if a legacy product fails in a Comcast exercise, the new generation of all-in-one wireless access points and DOCSIS 3.0 modems are as advanced as anything else out there."

- "I remember hunting rumors of a regional ISP here or there going down. By itself, it was never more than a 50-word update, a new headline on the home page. In the aggregate, you could see patterns: some equipment fails more often than others, some tier 1 relationships are less stable than they claim, some network configurations are better or worse. But one outage never made a trend. What they did here was create a trend and decide that suddenly Comcast was putting its IPv6 migration on ice and NetGear had somehow sold thousands of bad modems."

- "Comcast launched this IPv6 'migration' back in November. It took them five months to bring roughly 100 residential subscribers onto the new address protocol. This was not a gala launch or even a full-scale test. This was a proof-of-concept run, and they took their time with it before pushing the button. You'd think they would have used one day in that time period to call every single household they were upgrading and check what equipment everyone was using. For a dry run, it's not inspiring."

- "Comcast passes 41 million households. If it takes them five months to migrate 100 of those households and then have a dozen or so of those households fail, I think they have more serious issues when it comes to meeting any June 6 'deadline' than NetGear dropping the ball. They're not going to be fully IPv6 native on June 6. They were never going to be fully IPv6 native on June 6. That's the bloggers speculating again."

- "The rollout is not even IPv6 native. Every household that got hooked up was dual stack. This is evolutionary, not revolutionary. With dual stack you have two layers of address translation. It's a nightmare from the software side, which is probably where Comcast finally failed these modems five months into the migration. It caught everyone by surprise because the modems were truly certified. My guess is that traffic started looping between the IPv4 and IPv6 sides of the stack, and the feedback knocked the modems off the network. It happens."

- "We will see more careful IPv6 conversions after this, thanks to the hype around the story. That's the real takeaway. Nobody wants to repeat this. If they do, I hope the market punishes them."

> ❝ When you're running a blog, you make your own news. You speculate, you grind your teeth on every nugget or factoid that comes your way. In this case, a reporter's connection went down and he was compelled to track down the reason. That's a good impulse. But from there, the blogs spun the story well beyond its actual stature.
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## Secondary Sources

A review of secondary sources revealed that NetGear released a firmware patch to correct the IPv6 problem experienced by some of Comcast's customers. Having worked on the integration of IPv6 protocol for the past seven years, Comcast is

expected to be the first ISP in North America to support native IPv6 protocol. Comcast expects improved performance reliability and faster Internet speed, which may give the company a competitive edge.

➤ **May 7–18 posts on Broadband DSL Reports forum**
Forum users reported that NetGear had released the firmware fix for the IPv6 problems on May 14. One member said the modem could not automatically upload the fix but that NetGear's website held instructions on installing the fix manually.

- ▪ "New Firmware for NetGear CMD31T Device Released said by Comcast: Monday, May 14, 2012. NetGear and Comcast have completed emergency testing, certification, and field soak with their new firmware that resolved the previous IPv6 defect. This new firmware should now be running on all CMD31T devices operating in our network. In addition, NetGear has updated their existing unsold devices, some of which are now available at Walmart stores around the country. We appreciate NetGear's close cooperation to bring this to closure."
- ▪ "Comcast/NetGear has finally released the IPv6 firmware for the Comcast supplied WNR1000v2-VC router. The new version is 1.2.2.56NA, and it can be downloaded from »support.netgear.com/app/answers/~id/20757 (the automatic upgrade search in the router does not yet find this firmware version, but the instructions at the link explain how to install it manually). FWIW, I could not test it for functionality with Comcast's IPv4/IPv6 dual stack because my area does not yet have it."

➤ **April 25 Comcast Voices post**
Comcast expects to be the first North American ISP to support native IPv6, which could give the company a competitive advantage because its customers will be able to experience fast and direct Internet services.

- ▪ "We are the first ISP in North America that has launched support for native IPv6 for both standalone computers and customer home networking. This follows our November 2011 production deployment for standalone computers. So whether a customer in a pilot market connects their home gateway device (a.k.a. router) directly to a cable modem or connects a single PC to their cable modem, they now can use IPv6 if their equipment supports IPv6."
- ▪ "We also believe that this strategy will over time will *meaningfully differentiate* our service from our competitors in a way that customers will greatly appreciate. Our native dual stack Xfinity Internet service will provide customers with direct IPv4 and IPv6 access, without the need to use a tunnel, proxy, network address translator, or other inefficient, outdated, and error-prone middlebox. That means customer Internet access will continue to be direct and fast. And because middlebox solutions are not used, customers avoid the risk that certain applications slow down, fail to work, or experience other annoying errors. Since two of the main reasons customers buy our Xfinity Internet service is reliability and the speed—and this approach ensures that we maintain both while other ISPs may face challenges doing so over time—we think our strategic approach to IPv6 will be a winner in the marketplace in the coming years."
- ▪ "This deployment will occur first in our existing pilot market areas, which initially includes parts of Illinois, Pennsylvania, and New Jersey. In the coming months one of our biggest objectives is continuing to expand this deployment to more and more of our network around the U.S."

➤ **April 11 post on the Broadband Technology Report**
The NetGear CMD31T modem that reportedly caused IPv6 problems for some Comcast network customers in California was corrected within five days. Comcast is one of the leading IPv6 implementers, and its rollout plans for the protocol have not been set back.

- ▪ "By the next day, NetGear had provided a temporary configuration change to make the device IPv6 capable. Comcast tested it in the lab and at some of its own offices in Denver and California. 'Less than five days later, we had pushed the configuration out into California to make sure anyone who could be potentially affected would be protected,' [said John] Brzozowski [Comcast's chief architect for IPv6]."
- ▪ "Comcast has been one of the most aggressive cable operators on the IPv6 front and says this glitch will not interrupt its plans. 'Most importantly, we are still on track to achieve our goals for the World IPv6 Launch event,' he said."

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# NetGear Inc.