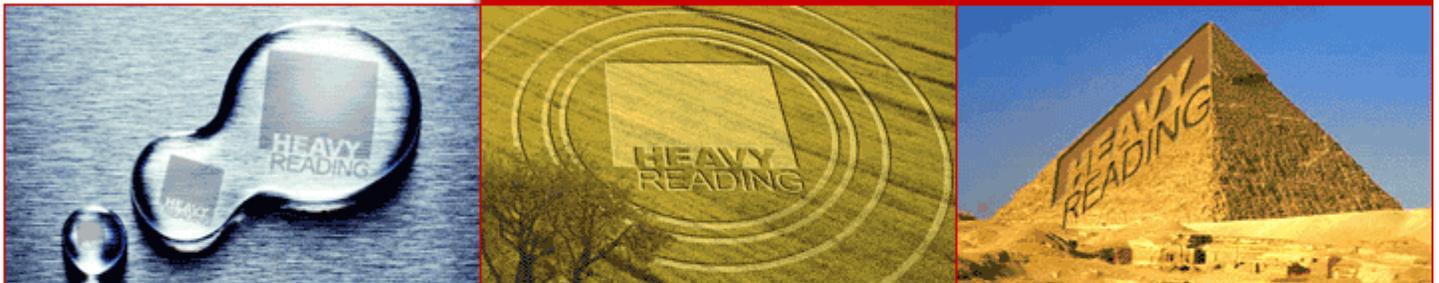




White Paper

Embedded DPI: An Industry Survey



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September 2011

Executive Summary

The deep packet inspection (DPI)* industry, still only about 10 years old, is on a roll, and its use is likely to widen even further over the coming years. As this happens, new players that are part of an emerging DPI ecosystem will likely play an increasingly important role.

These are the main conclusions of a major new industry survey conducted by *Heavy Reading* in the summer of 2011 to gauge industry plans for and opinion about the use of DPI.

Heavy Reading's Deep Packet Inspection Market Tracker has shown that network operator market revenue for DPI-based products grew by value in 2010 by just more than 21 percent, and we expect it to continue to spread inexorably through the telecom ecosystem. In particular, we anticipate that it will be used end-to-end in a much wider range of equipment than hitherto. As this evolution takes place, so the DPI value chain is undergoing major structural change, raising new questions for vendors about the best way to build DPI capabilities into their solutions.

In order to test opinion on this evolution, our survey looked in particular at the use of "embedded DPI" which we define as DPI deployed in a wide range of telecom equipment, rather than in standalone DPI appliances, and at associated plans to use third parties to supply the required expertise in this area.

We conclude that while some vendors still want to keep DPI expertise in-house in order to retain control over a technology widely seen as strategic, there are very strong counter-trends and tendencies that are likely to push more vendors to outsource key DPI capabilities to emerging suppliers in the new DPI ecosystem.

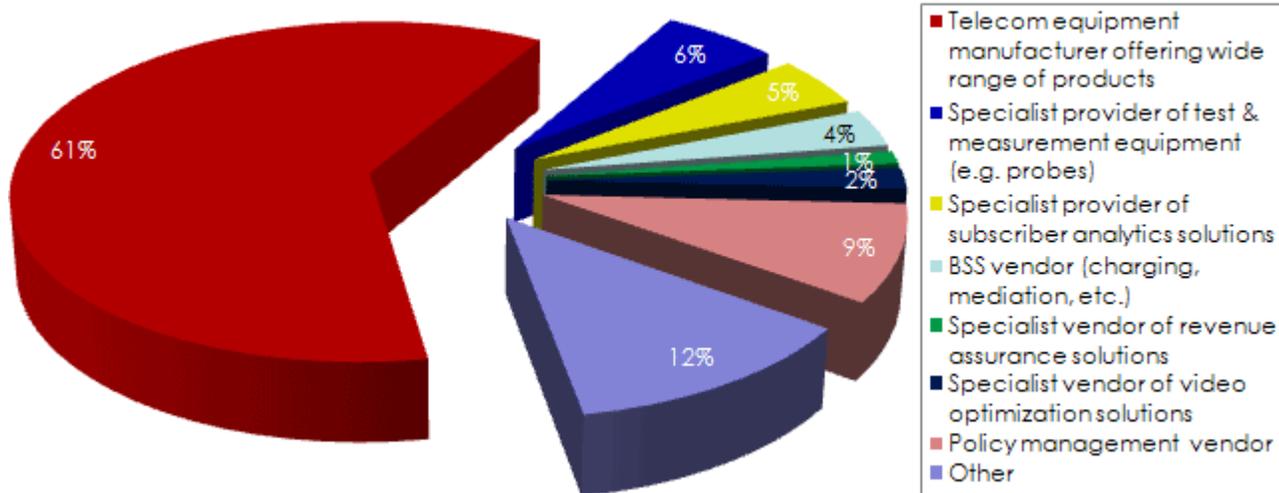
In particular, almost all survey respondents say that it is getting more difficult to keep up with changes in protocols and applications. And for most, getting products or product enhancements to market more quickly is an increasingly important objective, and one that they believe that third parties can help them fulfill. As a new DPI ecosystem with these core skills matures, we expect to see equipment vendors make greater use of DPI component specialists in future.

* We define DPI to include all techniques used to determine, at the greatest possible granularity, what a packet is, to what service or application it belongs, which subscriber sent it, and what type of data the packet contains.

Survey Demographics

The survey was conducted in August 2011 and drew 258 individual responses from executives working for 122 different telecom hardware and software vendors. It therefore constitutes a comprehensive and definitive overview of industry opinion in this area. **Figure 1** shows the types of companies that respondents worked for.

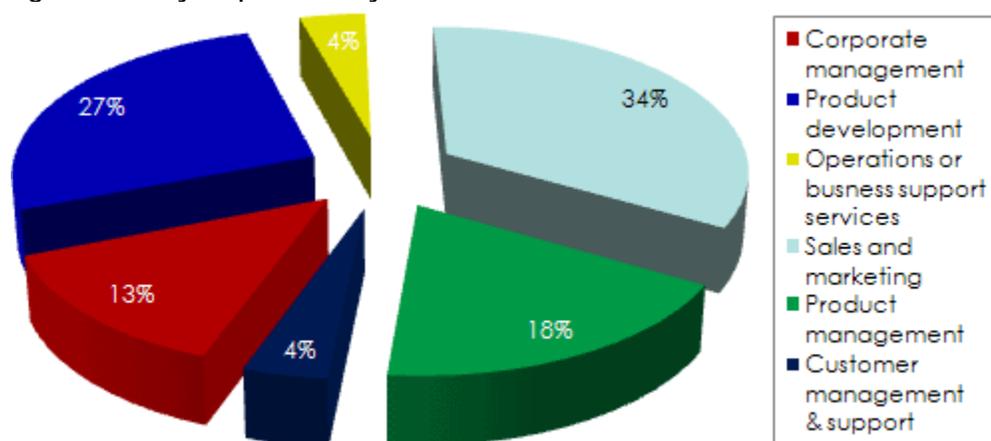
Figure 1: Survey Respondents by Company Type



Source: Heavy Reading

The respondents constituted a good mix of decision-makers in these companies, with 58 percent working in corporate management, product development or management roles (see **Figure 2**)

Figure 2: Survey Respondents by Functional Role

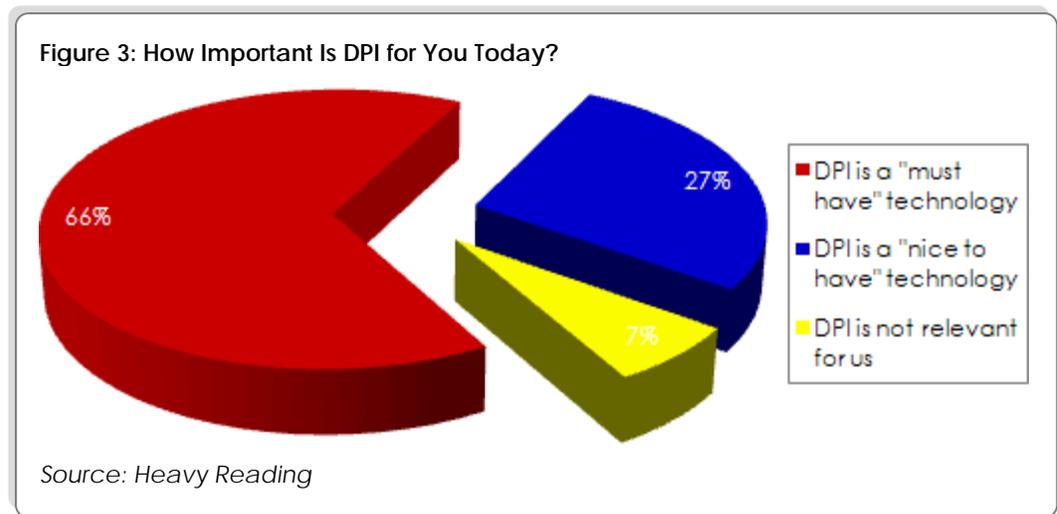


Source: Heavy Reading

About 40 percent of respondents worked for larger companies, but there was good representation from smaller vendors too, with about 25 percent of respondents working for companies with less than \$50 million in revenue. In terms of location, just under half worked for companies headquartered in the Americas, about one third in EMEA and about one sixth in Asia.

DPI Now a "Must-Have" Technology for Most

The first questions in our survey sought to establish how far DPI is already being used and embedded by vendors, and how important it now is to the industry – and as **Figure 3** shows, most respondents regarded DPI as a "must-have" technology: almost two thirds now see it this way, showing just how far DPI has come in the past few years in vendor thinking. Again, larger companies were even more enthusiastic, with over three-quarters saying that DPI was a "must have."



Another question produced an even more decisive result (**Figure 4**) – and suggests that even more vendors will rate DPI as a "must have technology in future. These findings reflects wider *Heavy Reading* research in this area that has shown that DPI has become a lot more important over the past five years and will continue to become more important in the future.

Respondents tended to regard DPI as a "must-have" technology: almost two thirds now see it this way

The main reason that more vendors are embedding DPI in their products is, of course, that their customers increasingly require it. The reasons for this vary, but in the network operator market which *Heavy Reading* primarily focuses on, the key drivers are:

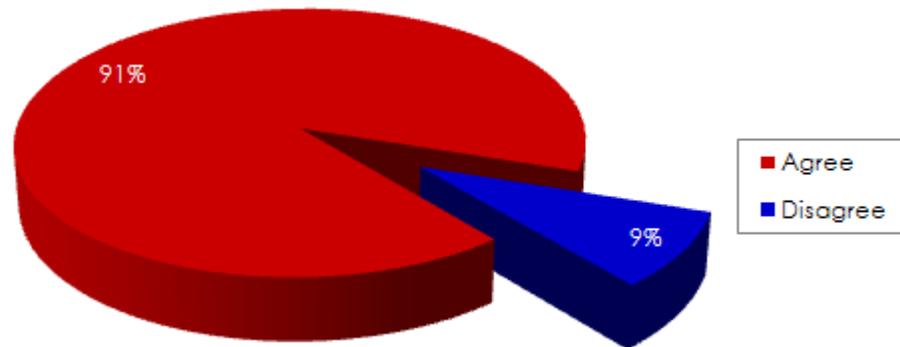
- The need to identify and manage P2P and video streaming traffic in order to reduce its impact
- The need to understand what customers are using and doing (using the monitoring & analytics capabilities in most DPI software) in order to offer more appropriate and personalized service packages to them
- The need to apply more sophisticated "fair use management" policies to mobile data customers, in which specific allowances are applied to some applications

- The need to protect networks from spam, viruses, DDoS attacks and so on, using DPI to identify threats
- Widespread deployment of the 3GPP Policy Control & Charging (PCC) standard, with DPI acting in the policy enforcement role
- Regulatory drivers such as the requirement for lawful intercept

All of this has driven the need for equipment vendors to develop DPI capabilities or embed third-party DPI software to perform one or more of these tasks. Hence DPI is now, for instance, a standard capability in 3G Gateway GPRS Support Nodes (GGSNs), an essential element in any 3G network, so all major vendors that supply 3G core network equipment have embedded DPI in their products.

The fundamental driver here is the transition to flat all-IP networks and an open Internet applications environment, already ubiquitous in fixed networks but now spreading rapidly through mobile networks. With the imminent transition to 4G LTE, the requirement to develop fine-grained policies on a per-subscriber, per-service and per-application basis will become even greater, enhancing the role of DPI and related technologies further.

Figure 4: Do You Agree or Disagree With the Following Statement: "DPI Is Becoming More Important for Our Products"

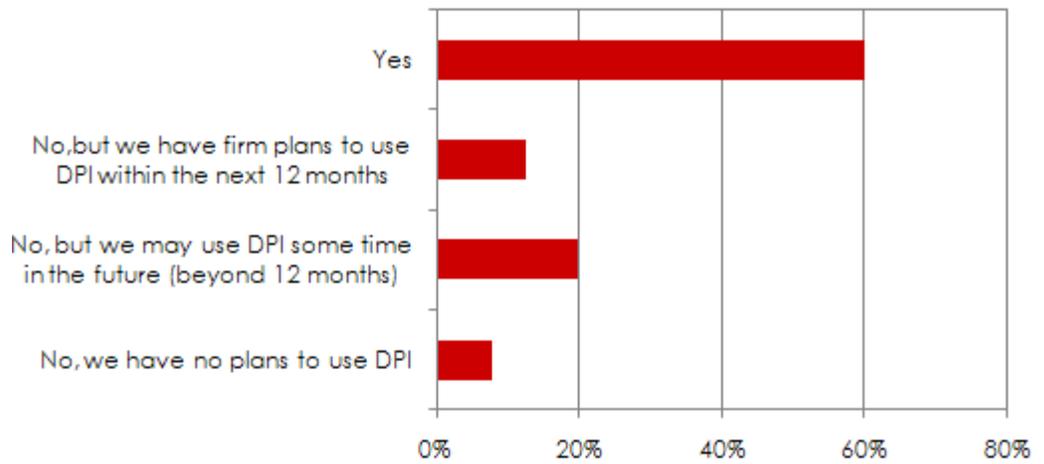


Source: Heavy Reading

In view of this, it is perhaps not surprising that six out of 10 respondents said that their companies were already embedding DPI in some products, and most of the rest were planning for it or considering using it, as shown in **Figure 5**. This gives a strong indication of the degree to which DPI has already become a standard technology in the telecom industry.

Larger companies were more likely to be using DPI, with nearly 80 percent of those with revenues above \$1 billion saying they used DPI already. Conversely, among companies with revenues of less than \$50 million, only 50 percent were using DPI. Because larger companies offer a wider range of equipment, they are more likely to see a requirement for DPI somewhere in their portfolio. And smaller companies may be operating with limited resources and in sectors where they have not yet seen a compelling need to add DPI capabilities.

Figure 5: Is Your Company Using DPI Software Embedded in Any of Its Products?



Source: Heavy Reading

Insourcing & Outsourcing DPI

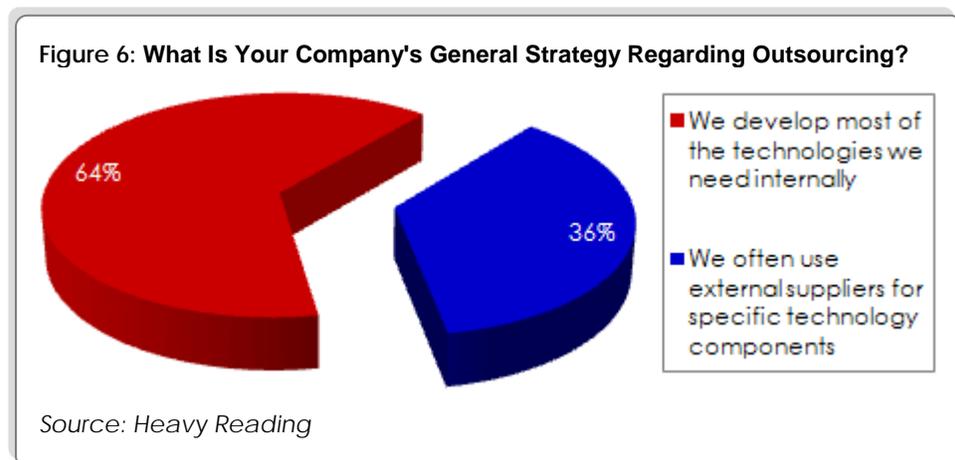
As discussed in a previous *Heavy Reading* White Paper, **The New DPI: Challenges & Opportunities in the LTE Era**, there are some important industry trends that are tending to move companies in the direction of outsourcing of certain key product technologies and capabilities.

We argued in that paper that mainstream equipment vendors will likely outsource more capabilities to third-party niche specialists, for four main reasons:

- Market and technology development cycles are both speeding up, requiring continual upgrades and shorter release cycles in this area
- There is a requirement for a wider set of capabilities than hitherto to meet overall customer goals, demanding more specialized IT skills and straining internal capabilities
- Internal cost and resource constraints are increasing as competition intensifies
- The existence of a flourishing supplier ecosystem and standardized approaches to hardware design allow for easier integration of third-party technologies

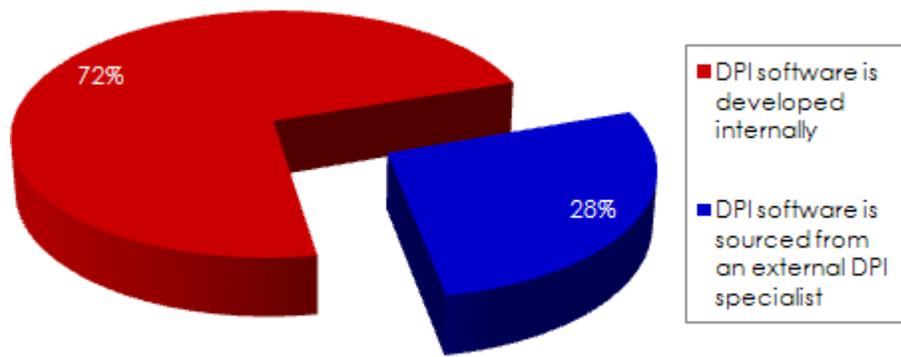
In order to assess industry opinion in this area, we asked a series of questions that sought respondent views on insourcing and outsourcing DPI capabilities.

As **Figure 6** shows, we found that about one third of respondents said that their companies tended to "often" use external suppliers for specific technology components, but two thirds said that they still developed most of their technologies internally.



In the specific area of DPI, among those companies that said they were already using DPI, almost three-quarters said it had been developed internally, as **Figure 7** shows. Again, larger companies tended to do their own development, while smaller vendors were more inclined to outsource: 35 percent of vendors with revenues of less than \$200 million said they had outsourced DPI.

Figure 7: How Is Your DPI Sourced Today?



Source: Heavy Reading

What underlies these findings? Other research conducted by *Heavy Reading* strongly suggests that had we asked this question three years ago, the proportions would have been more heavily in favor of internal development. As discussed in our previous White Paper, as well as in *Heavy Reading* reports – for example, the *Heavy Reading Insider*, **DPI Appliance Vendors Face an Off-the-Shelf Challenge** –

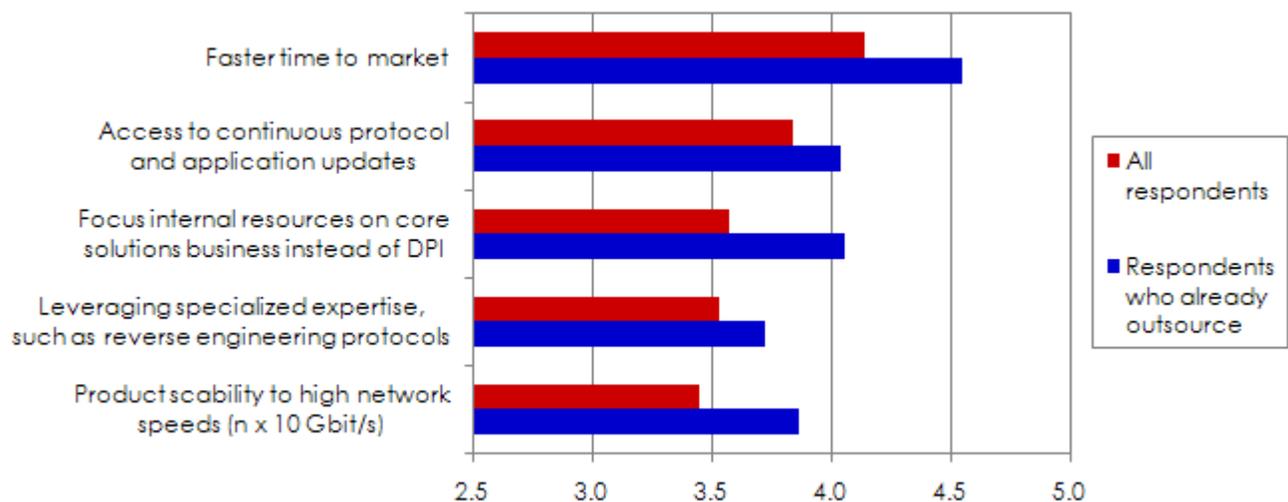
a whole ecosystem of suppliers has risen up to provide different piece parts, making it easier for vendors to buy in expertise than hitherto.

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To explore this issue further, we probed opinion on what motivates insourcing and outsourcing approaches, and which capabilities are most

important for a third-party supplier hoping to exploit the outsourcing opportunity.

Figure 8: Rate the Importance of the Following Reasons to Develop DPI Externally



Source: Company or Heavy Reading

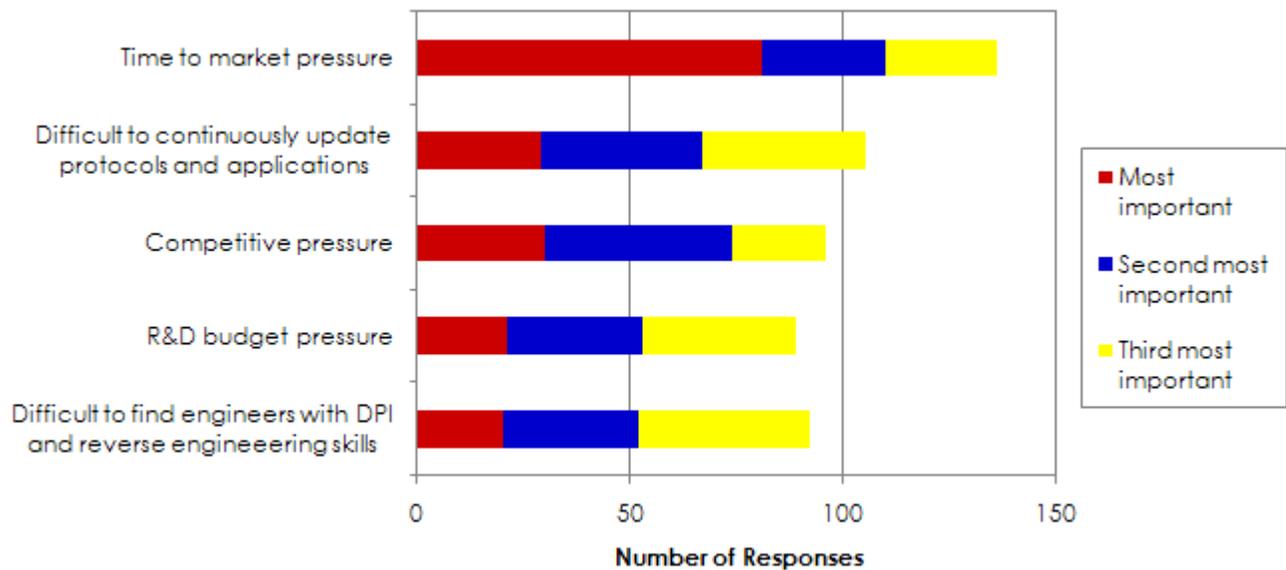
Figure 8 shows the key reasons to outsource. It shows there was some support for all of the possible reasons we offered, but particularly strong support for "faster time to market," with 80 percent of vendors scoring this 4 or 5 on our 1-5 scale – suggesting how important (and difficult) it has become for vendors to keep up with the dizzying pace of change in customer requirements. And the second highest scorer, "access to continuous... updates," offers evidence of the difficulties that keeping up with change can create for DPI developers. Note also that internal resource constraints scored high as a motivator among those who have already outsourced DPI.

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To get further insight into the outsourcing decision, we asked respondents to identify the key challenges that might lead them to outsource, as shown in **Figure 9**. This strongly endorses the findings shown in **Figure 8**: time to market pressure, it finds, is the biggest challenge which outsourcing might help to resolve. And as in **Figure 8**, the problems of keeping up with the relentless mutations in protocols and applications also scores highly here.

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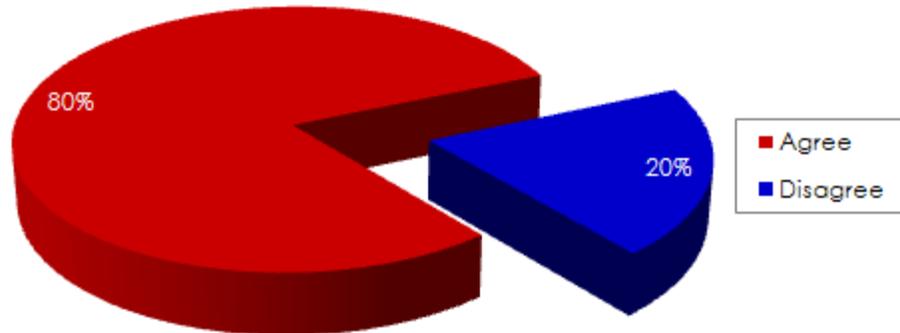
Figure 9: Which Challenges Would Be Most Likely to Lead You to Outsource DPI Technology?



Source: Heavy Reading

In fact, as **Figure 10** shows, the sample overwhelmingly saw the rate of change in protocols as an increasingly difficult problem – a finding consistent with our own research on this topic. The range, complexity and speed of development of new applications, protocols and sub-protocols is increasing rapidly, and increasing numbers of these try to disguise themselves or are mashed up into other applications, making the task of successfully identifying them increasingly difficult and expensive. Third-party providers that can help equipment vendors meet this challenge will be in a strong position as potential suppliers going forward.

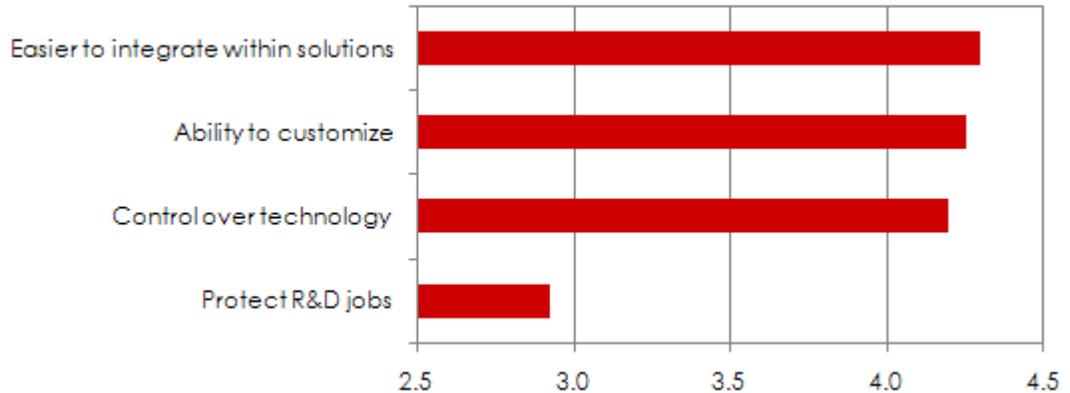
Figure 10: Do You Agree or Disagree With the Following Statement: "It Is Becoming Harder to Keep Up With Rate of Change in Protocols (Especially P2P and Social Networking)"



Source: Heavy Reading

Meanwhile, as **Figure 11** shows, there was strong support for three possible motivations to insource: simpler integration into existing equipment; ability to customize; and control over the technology.

Figure 11: Rate the Importance of the Following Reasons to Develop DPI Capacities Internally



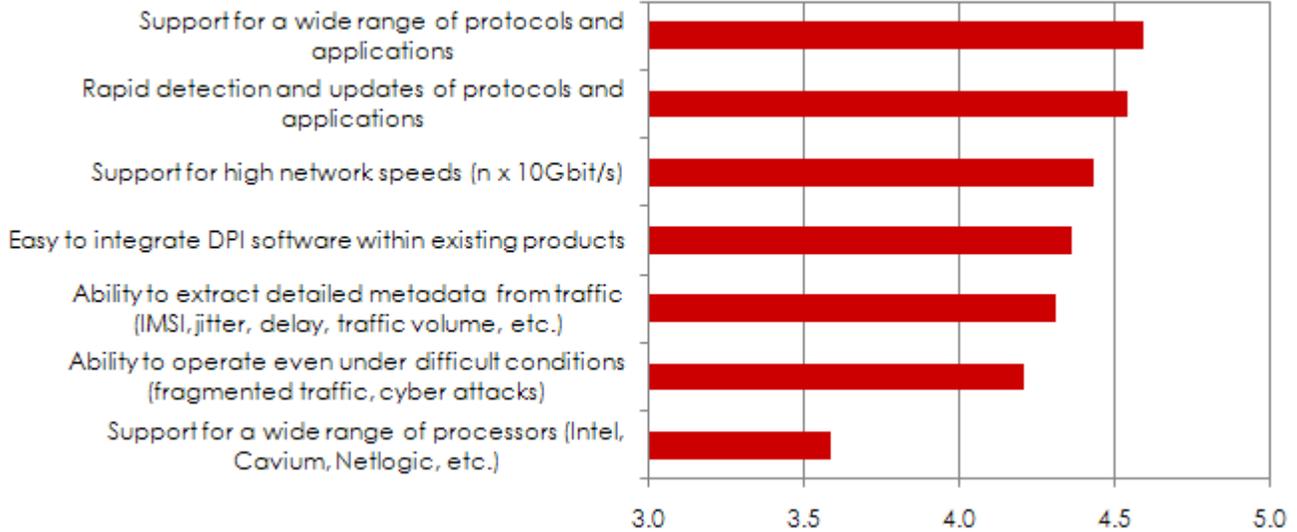
Source: Heavy Reading

These findings give a good indication of the key areas in which third-party suppliers need to focus their attention. While the transition to ATCA and COTS is making things easier in this regard, our findings suggest that the new ecosystem vendors must be able to demonstrate that they can cost-effectively integrate with a wide range of existing equipment types. And they must be able to provide rapid ongoing support for the customization needs of their customers, to counter the perception that this is best achieved in-house.

In a final question around this theme, we examined in more detail what vendors want from potential suppliers of DPI software. As **Figure 12** shows, a range of

possible capabilities all scored very high on a 1-5 scale, with more than 80 percent of respondents scoring **all** of the factors except "support for a wide range of processors" either as 4 or 5. Of these factors, it was the core capability to support, detect and update information on protocols and applications that scored highest of all, but other capabilities, including ability to support high speeds, and to extract detailed metadata, also scored highly.

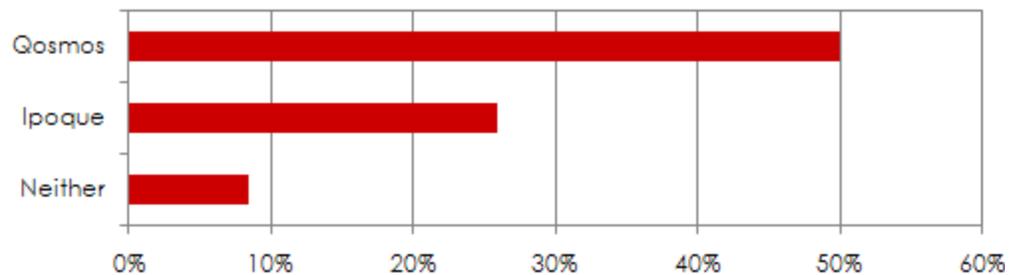
Figure 12: Please Rate the Importance of the Following Capabilities That You Expect From a DPI Software Vendor



Source: Company or Heavy Reading

Finally, **Figure 13** shows that equipment vendors are developing good awareness of some key specialists in this area with these kinds of capabilities. Qosmos and Ipoque are part of an emerging ecosystem of DPI vendors that are having a significant impact on the DPI market and the way DPI is used. This ecosystem includes vendors offering software development kits (SDKs); off-the-shelf application pattern and signature databases; packet processors, accelerator boards, cards and blades; and passive probes or non-passive DPI appliances. This will enable solutions to be brought to market faster, and will likely mean that DPI is integrated into a wider range of network elements than is practical today.

Figure 13: Which Specialist Suppliers of DPI Software Have You Heard Of?



Source: Heavy Reading. Note: Only Qosmos and Ipoque were included in this question

Conclusion

In this paper, we have shown that while many vendors continue to prefer to develop key DPI-related capabilities internally, there are important and growing pressure points that may lead them to outsource more in the future.

The arguments for insourcing tend to focus on the perceived need to control one's technological destiny, as well as the belief that it will be easier to customize solutions and build DPI into existing equipment platforms.

Set against that, outsourcing helps solve several pressing issues, including the need to accelerate time to market, meet increasingly intense competition, and keep up with the relentless pace of change, especially in third-party applications and protocols.

As we have shown, vendors overwhelmingly acknowledge the challenges here, and as we have set out in **DPI Appliance Vendors Face an Off-the-Shelf Challenge**, a new ecosystem of suppliers has emerged over the past year or two, providing off-the-shelf DPI building blocks, with the potential to change the way DPI is deployed. In particular, we believe, this new ecosystem will make it possible to bring solutions to market faster, integrate DPI into many more network elements, and integrate it from the outset into next generation equipment.

As the challenges continue to grow, the opportunities for both equipment vendors and the new ecosystem suppliers will continue to rise too.

In approaching these issues, equipment vendors looking to add DPI or enhance existing DPI capabilities should take the following key factors into account

- Do we have the core skills in-house?
- Can we keep pace with rapid evolution in protocols and applications?
- Will the cost of insourcing exceed the cost of outsourcing?
- Can we easily acquire these capabilities from third-party suppliers?
- Can we easily integrate a third-party product into our solution?

Our sense currently is that there is a trend to make greater use of niche specialists in the DPI area, and we expect this trend to strengthen as the pressure on DPI engines increases inexorably over the next few years. This does not mean that equipment vendors will not do any internal DPI development, but it does mean that they will likely seek partners to fulfill more advanced capabilities (and in some cases, **all** capabilities in this area). Outsourcing highly specialized technical capabilities allows vendors to focus on overall solutions development and professional services, areas where they have been very active and increasingly successful recently.