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## **Flashpoint**

# Emerging wireless protocols

Evolving technologies prompt new thinking  
on application and business model designs

# Evolving platforms prompt new thinking

In the future of connectivity, businesses and consumers will continue to see massive potential for all sorts of wireless device types – from new forms of mobile entertainment to autonomous machine interaction to Internet of Things (IoT) applications that can deliver new insights and capabilities, better quality and control, and new efficiencies.

While wireless expands as the preferred medium to exchange data with and between devices, connection options are also expanding as specialised protocols emerge, as regulations change, and as other new enabling technologies and businesses appear on the scene. Amid the changes, making critical decisions can become more difficult as you attempt to sort through the various technology features and marketing buzzwords.

As your organisation seeks to use new wireless capabilities for new applications and new business models, you will have to make bets on potentially unfamiliar protocols like LTE, Wi-Fi, Narrowband IoT, 5G, near-field communication, ZigBee, or

LTE-U. Consolidating them into a handful of “archetypes” under which they may fall, based on a key set of attributes, can help guide your decisions and reduce the risk of picking technologies that cannot meet the demands of your application.

But the strategic decision-making process will require more than understanding how to classify or structure the numerous connectivity technologies and protocols. You will need to develop a keen understanding of the broader ecosystem and how its pieces fit together. The last thing you need is to invest in dead-end technology or an ecosystem that can't sustain your business needs. Here's a look at some key issues and topics that are in play with wireless protocols today.

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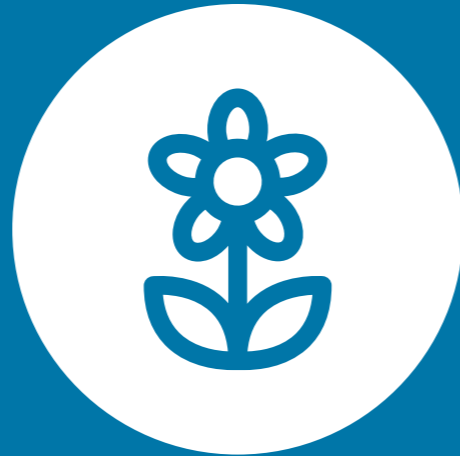
Every day brings new ideas and possibilities to the Technology, Media, and Telecommunications sectors. *Flashpoints* is your tool for gaining the context you need to make sense of these critical developments – as they emerge.

# Key observations



## Understanding the technologies becomes imperative

In the hyperconnected future of connectivity, businesses will rely on multiple protocols for multiple applications. Understanding how these protocols relate and differ by bundling them into a set of “archetypes” for comparison becomes essential.



## It's all about ecosystems

Protocols today are part of something far bigger. As concepts such as IoT and other digital ecosystems become pervasive, mindsets and power centers are shifting, upending traditional value chain economics.



## Business design is a big deal

In the rapidly evolving digital landscape, moving effectively requires an ability to think ahead of challenges – to select protocols and design business models based on business design and requirements.



## Good partners matter

In the extended wireless connectivity ecosystem, many new potential partners will emerge, bringing radical new concepts to the communication services realm. Find them.

# Understanding the technologies

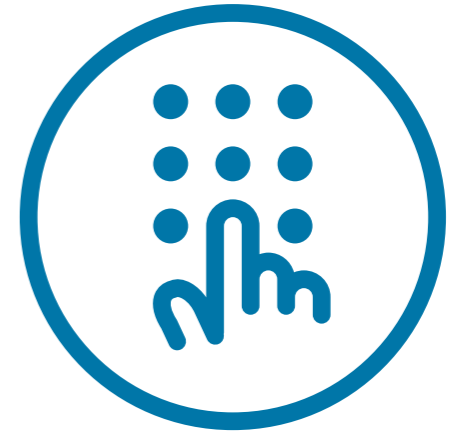
It's not enough to understand what you want to do on the wireless connectivity front. You should strive to understand what each protocol does, what it can offer, and the tradeoffs involved—because in the hyperconnected future of connectivity, no single business is likely to rely on a single protocol. Grouping the protocols into archetypes, starting with comparative speed and reach capabilities, will help simplify the decision. Understanding the maturity of specific protocols—whether LTE-U, Wi-Fi, ZigBee, or something else—as well as the related technologies can serve as the foundation for future decision-making and prevent you from becoming “stuck on an island”—relying on a protocols that may not operate with other key enabling technologies or that make it difficult to engage in new business models.

Before selecting a protocol, start with understanding the need you are trying to address and the application you are trying to bring forward. If you are eyeing an application

that will support millions of IoT devices, versus an ultra-HD video application, the considerations could look very different.

Dig in to find out how extensible protocols are, how seamlessly they connect with other technologies, and what infrastructure they depend on. You will need to get smart on range, throughput, security, latency, resilience, flexibility, power consumption, and more.

As you dig in, consider six wireless archetypes and how they align with today's applications—low-throughput/short-range (example: near-field communication), low-throughput/medium-range (example: ZigBee), low-throughput/long-range (example: NarrowBand IoT), medium-throughput/medium-range (example: Wi-Fi), medium-throughput/long-range (example: LTE), and high-throughput-long range (example: 5G).



In the hyper-connected future of connectivity, businesses will rely on multiple protocols for multiple applications. Understanding what each protocol offers—and understanding the trade-offs—becomes essential.

# It's all about ecosystems

Realize that interoperability is important, but understand that ecosystem maturity is equally or perhaps more important. Consider a potential user base such as a police department. Department leaders would want to know that there is a good base of devices – from wearables to terminals to smartphones – that can support any new wireless application they might be considering. If device makers aren't manufacturing products on a mass-market scale, for example – or if intellectual property is locked up with one company, or if orchestration platforms to support protocol interaction are not in place – then a mature ecosystem might not emerge. You and customers will want to know that the manufacturers are ready to go and that there are alternate sources for key components.

As traditional value chain economics evolve, you will have to answer questions such as: What does a technology actually do? Will it support the needs of my application? Does it interact well with other technologies I depend on? How many chip makers exist for the

technology? How many devices are shipping? What kind of support does the technology have from major companies and industry groups?

Know also that the model for creating and managing ecosystems is changing. Before, standards bodies took a lead role. Today, standards continue to compete with one another, but we also see operator-led and vendor-led ecosystems. Additionally, reference implementations and open source for wireless protocols are entering the mix, and many ecosystems are coming to be software-centric rather than hardware-centric. Amid these changes, choosing the "right" ecosystem becomes suddenly far more complex than in the past. And as the ecosystems evolve, new layers of risk could materialize—new potential points of failure, consequences of failure, security and privacy concerns, and so on.



Protocols today are part of something far bigger. As concepts such as IoT and other digital ecosystems become pervasive, mindsets and power centers are shifting, upending traditional value chain economics.



# Business design is a big deal

A protocol strategy in many ways will serve as the connective tissue for new business models. Your protocol strategy, therefore, should be strong and forward looking – based on business-focused research, not just an understanding of technologies. Before you make a technology investment or base a new business on a particular set of protocols, know how and where you will make your money. Know where you fit in any given ecosystem and how the money will flow. Understanding where you fit and where the tangible opportunities are will shape your decisions on protocols.

In the rapidly evolving digital landscape, moving effectively requires an ability to think ahead of challenges – to design business models based on insights into technical factors, ecosystem development, potential partnerships, and long-term business viability. It's about more than simply reacting to events as they occur.

To move forward effectively, think in terms of business design. Know what business you want to be in. Understand what capital or operating investment is required and

whether the revenue model of that industry supports the investment. Assess how effectively your current business model matches those demands and whether the power center of the ecosystem is consistent with your strategy. Then, and only then, move to design the business model that works.

For example, advancements in medical technologies can allow doctors to remotely conduct new minimally invasive procedures with assistance from next-generation micro tools. But the sensors for those tools will produce large amounts of data that need to be processed in real time at low latency. If your core business is to provide infrastructure to support such surgical applications, you will need to pick protocols that support sub-millisecond latency, steering clear of unlicensed spectrum. From there, you will want to look at the infrastructure required – making network-related decisions that support surgeons' critical need for real-time data. Such a business design approach can help guide all the protocol and technology-related choices you will have to make.



In the rapidly evolving digital landscape, moving effectively requires an ability to think ahead of challenges – to select protocols and design business models based on business design and requirements.

# Good partners matter

It's not enough to pick the right protocols and know where you fit in the ecosystem. Whatever path you take, chances are you won't be walking it alone. For example, you may be relying on a host of partners to produce, collect, enhance, disseminate, and analyze data, information, and content – as well as partners for developing devices and technologies.

In the extended wireless connectivity ecosystem, many new companies and business models will emerge, bringing many radical new concepts to the communication services realm. These partners will be critical to your future success. New players – as well as nontraditional players – might be looking at the problem you are attempting to solve in an entirely different way. It's tempting to select a protocol or set of protocols based on what you already know – for example, to adopt a high-throughput protocol for streaming certain content. But strive to set

aside assumptions. A potential partner might have a compression algorithm that would change your protocol needs entirely.

You can manage risks by understanding what you are good at on your own and where you will need help. For example, do you have the in-house expertise to pick a protocol, to upgrade infrastructure, and to maintain it? 4G has always worked on licensed spectrum, but next-generation 5G technology straddles licensed and unlicensed and encompasses a broader array of protocols.

Ask yourself, “What am I not seeing?” And then seek partners who can help you envision new possibilities and new solutions.



In the extended wireless connectivity ecosystem, many new potential partners will emerge, bringing many radical new concepts to the communication services realm. Find them.

# Let's talk

As the connected landscape continues to evolve and as leveraging the right wireless protocols becomes increasingly integral to building successful business models, your organization will face big decisions on technology enablement, market opportunities, and more. Navigating tomorrow's challenges will require more than a vision for what's possible. It also will require an ability to develop insight-driven strategies and to execute them effectively. We can help. If you want to know how you can unlock new value and gain an edge in the rapidly evolving future of connectivity, we should talk. Contact us to get the conversation started.

## Contacts

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### **Arun Babu**

Africa Telecommunications Leader  
[arbabu@deloitte.co.za](mailto:arbabu@deloitte.co.za)

### **Neville Hounsom**

Director: TMT – Strategy & Operations  
[nhounsom@deloitte.co.za](mailto:nhounsom@deloitte.co.za)

### **Arun Abraham**

Senior Manager: TMT – Strategy & Operations  
[arabraham@deloitte.co.za](mailto:arabraham@deloitte.co.za)

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