

# 3 KEYS

to success for your

# IOT PROJECT



Witekio

AN AVNET COMPANY

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# EXECUTIVE SUMMARY

IoT (Internet of Things) devices are experiencing an explosion in popularity.

In 2016 there were already nearly 15 billion IoT devices globally and by 2025 the number is expected to exceed 80 billion. Yet for all this expansion, the sheer number of devices belie significant frustrations in industry.

Cisco has reported that 6 out of 10 projects never make it out of the Proof of Concept (PoC) phase. For those that do, just 26% are judged successful, while a full third of projects are deemed entirely unsuccessful.

While there are many reasons that an IoT might fail, a major factor is a company's IoT strategy. As KORE has explained:

The foundation of any successful IoT implementation is an attainable, targeted, inclusive IoT strategy that accurately and honestly considers an organization's current IoT maturity level and resource availability, targets specific business processes, and covers all potential areas of IoT solution deployment and management.

Developing that strategy requires asking and responding to a series of questions about business maturity, systems understanding, and technology mastery.

At Wikteio, we've been helping our clients answer those questions since the first IoT devices emerged on the market.

In this White Paper, we will outline all of those core questions that must be answered before an IoT project is launched in order to ensure that the right expectations are set, the right team established, and the right technologies selected.

<sup>1</sup> CISCO. 2017. Cisco Survey Reveals Close to Three-Fourths of IoT Projects Are Failing. <https://bit.ly/2DbJ0og>

<sup>2</sup> KORE. 2018. Why IoT Projects Fail: Six Critical Capabilities You Need to Consider. <https://bit.ly/2Ylg1cr>

# BUSINESS MATURITY

IoT projects are increasingly popular across a variety of industries. The European Union, for example, has funded successful IoT for Industry projects across sectors as diverse as aerospace, healthcare, metal working, packaging, pharmaceuticals, and the world of food and beverage.

It is not the domain, then, that determines whether a project will be successful, but rather how prepared and mature a company is with regards to IoT. The more mature an organization is and the better prepared that company is for the specific challenges of IoT projects, the more likely it is that that project will succeed.

In **Section 1** of this White Paper, we identify five core questions that every IoT project sponsor should answer in order to establish their IoT project strategy.

## HAVE YOU DEFINED YOUR USE CASE CLEARLY?

The fact that there exists an IoT device or solution for thousands of different use cases should not encourage a project lead to define their own use case in only general terms; indeed, the opposite is true. A project with a clearly defined use case from the outset is far more likely to succeed than one that offers only a general outline or generic frame.

An apt metaphor to developing an IoT project is the process for building a house. The first step in building a house is to pour a strong foundation – make it strong, make it level, and you have the base for your dream house. For an IoT project, a clearly defined use case is that foundation, and you can use it to support the IoT project of your dreams.

As James Heumann of IBM explains, the best use cases are stories of how a business, system, or product and a user interact. The user must be central to the use case and the resultant value that is created needs to be clearly identified.

Your use case should not focus on the specific technologies available, the hardware choices, or the look and style of the end product. Instead, it should be a clear statement of who the **user** is, what their **challenge** is, what your IoT solution would help them achieve, and how this would generate **value** for them.

## IS YOUR USER EXPERIENCE WELL DEFINED?

The German military strategist Helmuth von Moltke the Elder is famed for his belief that no battle plan survives first contact with the enemy. A century later the American heavyweight boxing champion Mike Tyson offered a similar conclusion when he explained that every boxer has a plan until they get punched in the mouth. War and boxing are, thankfully, far from the concerns of most IoT project leads. However, the need to reflect on user experience long before you acquire those users is just as important as preparing for battle either in or out of the ring.

IoT project teams should be able to map out the journey their users will take and the different ways they will interact with their IoT device. Graphical tools can help sketch the interaction journey and choices and options for the user can be clearly defined on paper or on a screen long before technology choices are made.

A well-defined user experience considers the user journey, the pains that the user arrives with, and the gains that they will uncover by interacting with the proposed IoT device. Specialized UX designers can be a significant aid here, as can adopting a design thinking approach that allows you to “empathize, and to focus intensely on what is likely to have the greatest positive impact for users and customers”.

Clearly defined user experiences help anchor IoT projects and provides a customer focus. As Jeanne Liedtka has argued in the Harvard Business Review, an early focus on UX “helps teams further develop innovations and prepare them for real-world experiments” and sets innovation projects on the path towards success.

<sup>4</sup> IBM. 2008. Tips for Writing Good Use Cases. <https://ibm.co/3lnQBRM>

<sup>5</sup> Braineet. 2019. How to Use Design Thinking to Guide Your Company's Innovation. <https://bit.ly/3jt56SJ>

<sup>6</sup> Liedtka, Jeanne. 2008. 'Why Design Thinking Works.' Harvard Business Review. <https://bit.ly/3jmJabB>

## DO YOU KNOW WHO YOUR COMPETITORS ARE?

Apple is a company renowned for its innovative products. As Time magazine has reported, the release of the iPhone not only heralded a new era in mobile communication, it also disrupted proximate industries including personal computing, telecommunications, personal entertainment, gaming, and healthcare. Yet at its launch in 2007, the iPhone was 'merely' a smarter portable phone. How many in these other industries understood in 2007 that Apple's smartphone would end up being a major disruptor and competitor in their space?

The lesson? Don't fool yourself: there's always competition.

Before launching your IoT project it's essential to review the existing market and the competitive landscape. You should identify existing devices that offer similar functionality, similar offers from other companies either in production or coming to market soon. If there is a company or a device that seeks to solve the same problem that you are proposing to solve, you can count them as a direct competitor.

But don't forget the indirect competitors, too. A different problem and a different solution to it might end up impacting the size of the market you are seeking. Don't be blindsided by the iPhone of your industry: just because you're serving a different industry doesn't mean you can't be indirectly impacted by a solution elsewhere.

At this point, you are seeking to understand where your device will fit into the market. There's no need to be the first to move into a space; while there's often a first mover advantage to be leveraged, there's also advantages to arriving later but with a superior and more mature solution.

<sup>7</sup> Bjarin, Tim. 2017. 'How Apple's iPhone Changed These 5 Major Industries.' Time. <https://bit.ly/3I0hvm6>

## HAVE YOU ESTIMATED YOUR BUDGET ALL THE WAY TO PRODUCT LAUNCH?

Budgeting for your IoT project is an essential component of your overall project planning. Innovation, after all, doesn't have to be expensive but it does need to be paid for. Effectively and efficiently allocating funds to the project and agreeing on the milestones for that funding to be released will make it easier to absorb the direct costs of innovation and integrate any overages that might emerge over time.

There are any number of approaches to budgeting for an IoT project and it can be difficult to know where best to begin. One popular approach is to divide the global budget across different stages. For example:

DEVELOPMENT STAGE	% BUDGET
Specification	20
Design	25
Development	20
Integration & Testing	35
<b>TOTAL</b>	<b>100<sup>8</sup></b>

Defining your roadmap around such development stages and releasing your budget only when milestones are achieved is a good means of keeping your project on track as well as a means of ensuring that – even before beginning – you have thought through all of the costs associated with the project.

Another advantage of this approach is for first-time IoT project leads. Without experience in all areas of IoT project development it can be difficult to accurately forecast costs. However, if the costs of a specification can be determined with some accuracy, then costs for design, development, integration, and testing can all be anticipated and extrapolated from this specification figure.

The keyword at this stage is anticipation. The more accurately you anticipate the costs of your project, the more prepared you'll be going into the project and the less likely you'll be surprised by costs that emerge during the development of your device.

## **HAVE YOU CHECKED ALL NORMS AND LEGAL REQUIREMENTS IN YOUR MARKET?**

A good idea only becomes a great idea when you can take it to market safely and legally. Fail on either count and you'll be stuck in a regulatory limbo, cursing yourself for not taking the time to prepare for the restrictions that almost every jurisdiction place on IoT solutions.

Among the things you'll need to consider are data privacy and, if dealing with European customers, the constraints of the European Union's General Data Protection Regulation (GDPR). Planning what data you want and need to collect, how that data will be processed, and how it will be stored and secured is essential in the EU and, increasingly, in other jurisdictions, too – California's CCPA regulations are similar in scope, if less well known.

Different industries have their own norms and standards, too. The medical sector, for example, prefer that devices adhere to international standards such as IEC 62304 and ISO13485, while devices in the automotive sector are preferred to abide by the ISO 26262 standard. These norms and standards can have a significant impact on the architecture and functionality of your device and thus its necessary to investigate their implications early.

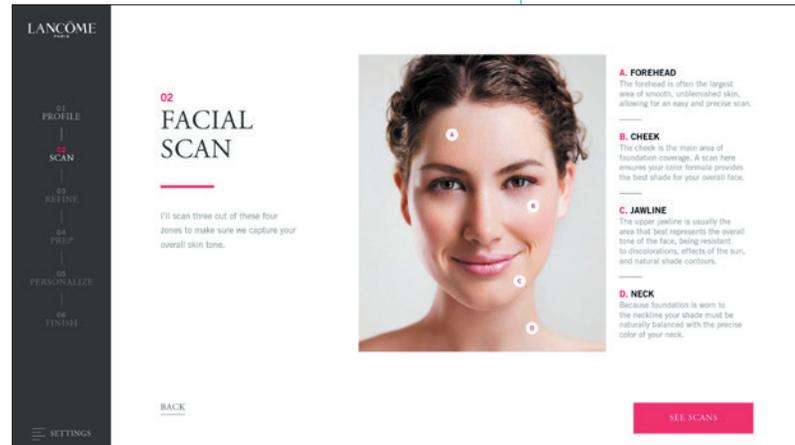
Also, consider labelling requirements for the final device when moving to market. CE labels in the EU and FCC labels in the US, for example, are affixed when devices meet the health, safety, and regulatory standards of those regions. Selling your device without meeting these standards is impossible, so being clear from the state about the production and labelling of your device is essential.

## AN IoT CASE STUDY: L'OREAL

**About:** The world's largest cosmetics company and a leader in innovation across cosmetics, hair colouring, skincare, make up, and perfumes.

**Challenge:** Le Teint Particulier is an innovative and personalized makeup solution based on skin type and tone. The solution consists of three steps: the client's face is scanned using a connected device, the data from the scan is transferred to an application for processing, and then the application returns a complete makeup solution based on the client's own skin tone and type.

**Solution:** Witekio developed a modern Windows application and seamlessly migrated this application to iOS with Xamarin. The application could then be deployed in-store on iPads that also act as the scanning devices. Witekio integrated skin tone and shade algorithms that enabled the creation of an infinite number of personalized makeup recommendations. The entire application was connected to the Microsoft Azure cloud with a customizable management system service. Finally, Witekio also connected the solution to in-store printers so that clients could generate a hard copy of their personalized make up package.



### Key Tech:

- Windows 8.1 and Windows 10 application development
- Application migration to iOS with Xamarin
- Fancy end-user HMI
- Fully customizable UI
- Cloud-connected application (Microsoft Azure)
- Bluetooth connectivity



*Samir Bounab*  
*Chief Revenue Officer*  
*Witekio*

## **SAMIR'S WORD**

I've spent more than a decade working in the technology sector. I've led teams in the Americas, the Caribbean and across Europe, worked in 20 different countries, and on more projects than I could possibly count. During that time, I've learnt what works and what doesn't, what separates effective planning from scraping by on a wing and a prayer, and how to transform a strategic vision into efficient operations.

As Chief Revenue Officer at Witekio, I've watched our teams work on hundreds of IoT and embedded software projects every year. Their commitment to best practice project planning and their focus on the user has helped deliver consistent success for our clients and, in turn, for Witekio.

With this White Paper, we're sharing the planning and principles that have helped us deliver thousands of successful IoT projects in recent years. Having seen the Witekio team ask themselves these same questions and work through these same steps with our clients, I know how effective they can be in turning a great idea into an even-better IoT device.

For some this White Paper could be interpreted as Witekio offering up the recipe for its 'secret sauce' – but I don't see it that way. Instead, this White Paper is a chance for us to explain the best practices that have helped make us the market leader in embedded software and IoT projects.

# SYSTEM UNDERS- TANDING

The hardware and software systems that are at the core of any IoT device both need careful consideration in advance of your project launch. Understanding how your system works, how the different elements interact, what is required and what is just nice to have – all of these have an impact on the eventual efficacy and utility of your device, and thus on the overall success of your project, too.

In Section 2 of this White Paper, we identify five core questions that every IoT project sponsor should answer in order to effectively plan their system architecture. Building on the questions in Section 1, the answers offered here will help you to define the scope of your software demands and evaluate constraints on your project that you may not have considered to this point.

## HAVE YOU DEFINED THE OVERALL SYSTEM ARCHITECTURE?

A good idea only becomes a great idea when An IoT system consists of hardware and software components, likely far more than you might realize on first glance. Besides the device hardware itself you need to consider other components such as sensors, mobile communication, embedded and application software, gateways, networks, cloud storage and processing, and much more.

In defining your system architecture, you need to ensure that the end product will be useable, relevant, and scalable throughout its expected lifetime. This demands a view of the system as a whole and an idea of how different components will change with time and technological advances. While your teams may have experience in some of these components, it could prove valuable to seek outside advice for fast-moving areas or adjacent technologies.

In responding to this question It's important to recall that IoT projects are not a choice between doing something completely new or entirely adopting an existing system architecture. Your project will likely demand a combination of already proven components integrated with something novel.

There are some clear advantages to choosing long-proven components with a track record of successful deployment. The downside, though, is that any long-historied component is likely closer to its end of life than a newly marketed alternative. Of course, choosing the latest component means facing the inevitable first-user bugs, and this is something that will detract from your user experience.

No matter whether you are relying on the tried-and-true or whether you choose to reinvent your domain, a well-defined architecture will be key to deploying a solution that will meet the goals set for it.

## HAVE YOU ANTICIPATED THE GO-TO-MARKET CHALLENGES AFTER P.O.C.?

A proof of concept, or POC, is only one step towards a finished product. No matter whether it is a single device or a small test network, it is still a long way from an in-production device ready for the market. Whatever challenges you've faced getting the POC up and running, it's almost certain you'll face more transforming your project from POC to production.

An IoT project is, after all, more than just hardware and software choices. Taking an IoT product to market means ensuring alignment of your hardware and software with a buyer persona, with user expectations, and having a means to onboard those new users. That's not usually the case for a POC where users are often early adopters that are willing to overlook bugs and UI challenges. If your POC is tested internally, you might never truly understand how a real paying customer might test or use your product. What's more, onboarding a handful of POC with a rudimentary UI might be possible via one-on-one sessions and a lot of hand-holding – but what about when your device reaches the market?

Thinking ahead in the lifecycle of your IoT project and anticipating the challenges to come means asking the business questions that will inform and improve the technology questions first encountered in the POC. Staying agile and prepared to react to changing circumstances is a plus here, as is being prepared to learn from the users of your POC device.

## DO YOU HAVE A ROUGH ROADMAP OF FEATURES AND PRODUCT VERSIONS?

There's a significant distance between an idea and a proof of concept (POC) but perhaps an even larger distance between a POC and a finished product. Having a roadmap to identify the features that you'll add to your device between POC and product helps you define development goals, allocate resources, and set expectations for testing and performance.

Your roadmap should begin by explaining which essential features should be included in your POC. You're testing your technology choices and assessing the feasibility of your approach, so you're unlikely to be overloading the device with features early on.

From your POC you'll seek to build your minimum viable product, or MVP. Unlike a POC, this is ready for use by a client as a product even if it is not as feature-rich as you intend it to eventually be. At this point, you are looking for usability, product-market fit, and gathering user feedback on the MVP's functionality and how it should develop.

Finally, you'll reach production but it's not the end of your roadmap. There'll be updates to schedule, new features to add to the device, and new versions of the hardware and software to deploy. A good roadmap includes a regularly reviewed backlog and a versioning plan, too.

## HAVE YOU ANTICIPATED YOUR COMPLETE PRODUCT LIFECYCLE (PRODUCTION, RUN, END-OF-LIFE)?

No IoT device is released, used, and retired with exactly the same software throughout its entire lifecycle. Instead, IoT devices see their software improved, updated, and patched across its useful life in order to keep it delivering the value that the user expects.

When planning your IoT project it would be unusual – even impossible – to plan out every update, every patch, and every new feature push for the life of your device. Problems emerge, software breaks, hardware underperforms, and security threat vectors need to be addressed when they are identified. What you can do, though, is plan the way you will support your device with updates and feature pushes across its useful life.

Software updates are commonly delivered wirelessly in a manner known as over the air, or OTA. OTA updates mean your devices will always be running the latest and most secure software and that downtime for your users will be minimal. However, like any software update, you need to be sure that you won't be 'bricking' the device for your users if the update – for some reason – fails.

Witekio's own Full Metal Update (FMU) tool is one way to avoid this bricking. FMU is designed to deliver the OTA update in such a way that it cannot leave the device bricked; if for some reason the device cannot or does not complete the update, the existing software or OS will remain, and the device will still be useful.

Making smart choices and taking the advice of experts that understand how to support your entire product lifecycle is a key plank in building your product strategy.

## **DO YOU HAVE RISK MATRIX TO ASSESS SYSTEM SECURITY REQUIREMENTS LEVEL?**

There's an old marketing adage that says there's no such thing as bad publicity.

In the world of IoT, however, that's just not the case.

While a great product, consumer device, or industry revolutionizing IoT approach might make the news briefly, the IoT stories that get the most coverage are the security problems, the device failures, and privacy breaches that are still all too common in the IoT world. It's no surprise that for many in the IoT world, the first reaction to hearing their company's name on TV is a sharp inhalation and a rising heart rate.

The value of IoT devices often lies in their capacity to collect, store, process, and transmit data. That data is valuable to its owners, but it is also a temptation for bad actors with their heart set on gaining illegitimate access to something that isn't theirs.

It's essential to assess how critical your IoT device, its platform, and the overall system is. Next, you can assess what level of security is most appropriate for you and your users, and what threat vectors to protect against. Experienced developers can help with testing and retesting, and developed security patches to protect your device from threats that evolve even after your launch day.

Finally, it is not possible to protect against every threat and defeat every bad actor. Using a risk matrix to assess which parts of your device and system are most critical and evaluate which security investments to make is an effective way to outline the security requirements you'll need.



## AN IoT CASE STUDY: EVOCA

**About:** A global leader in manufacturing specialized food and beverage vending machines.

**Challenge:** Evoca vending machines are deployed worldwide and set the standard for user experience and internet connectivity. Vending machine clients expect more from these machines, though, including innovations in product presentation, advertising, the user interface, and payment processing. Evoca needs to meet and exceed these expectations.

**Solution:** Witekio developed a common codebase and customized a Linux Yocto1.6 BSP to run on new Evoca vending machines. Witekio also enabled Wi-Fi and Bluetooth connectivity, and multimedia and video decoding. Witekio engineers used Qt to create an intuitive interface featuring a user-friendly 10" HD touch screen and integrated multiple payment systems (cashless, credit card, cash) to ensure Evoca never missed a customer. Witekio helped Evoca push OTA updates to their software on existing connected machines.

### Key Tech:

- NPX i.MX 6DualLite
- Linux Yocto1.6 BSP
- Qt
- Connectivity (Wi-Fi, Bluetooth)
- Payment processing and cloud gateways



## SEBASTIEN'S WORD

It's fair to say that I've long been passionate about innovation.

Long before I came to Witekio I have worked with teams, startups, and innovators across the entire technology ecosystem to help bring new ideas to fruition and disrupt industries. I've worked with teams that took great leaps forward in the tech space, with "garage style" startups and innovative spin-offs from blue-chip international groups, and with some of Europe's most ambitious entrepreneurs.

At Witekio this passion for innovation hasn't been tempered. Each year we work on hundreds of projects that are literally changing the rules for industries, redefining best practices, and solving problems for businesses and consumers alike.

One thing that has helped our clients succeed time after time is effective planning and mapping of their project. Starting with the why is always key: what problem does it solve? For whom? What are the relevant use cases and how will the product be used? This is one of the reasons that this White Paper lays out the steps in a successful IoT project starting with these fundamentals.

Make no mistake: the questions and the strategy for success laid out in this White Paper are the very same ones that our teams at Witekio ask and apply every day. By having a usage-oriented focus and a holistic approach we can confidently and consistently execute complex projects, bringing value to our clients and delivering that innovation I'm so passionate about to the market.



*Sebastien Chaillot*  
*Chief Executive Officer*  
*Witekio*

# TECHNO- LOGY MASTERY

IoT projects are a combination of hardware and software, as well as the expertise to deploy both to meet the goals for a device and the needs of the user.

Mature IoT developers marry the right hardware, software, embedded elements, connectivity options, and operating systems to support essential feature sets, maintain secure systems and ensure that updates and patches can be delivered as required over the air.

Mastery of the underlying technologies that modern IoT devices and networks demand is the sign of true IoT maturity and while it can be developed and maintained in-house, more often than not it is best to work with external experts that are always up to date and on the industry's cutting-edge.

In Section 3 of this White Paper, we identify five core questions that every IoT project sponsor should answer in order to make sure that their hardware and software choices are well informed.

## HAVE YOU SELECTED/ DESIGNED THE HARDWARE TO USE?

Some IoT devices are truly original. They demand not only software and connectivity expertise to build something new but also new hardware, too. Physical components – from chips to microprocessors, wiring to external cases – may need to be designed, prototyped, tested, redesigned, and perfected over months, if not longer.

But not every IoT device is an entirely original creation. More often the hardware can be selected from existing OEMs and boards connected with appropriate connectors and cases to create a new and evolutionary device. While perhaps lacking the commercial panache of an entirely new design, taking advantage of existing hardware options means being able to take a device to market faster.

And in a world where there is a distinct first-mover advantage, this could be very valuable, indeed.

Of course, if this is not your first IoT device then you might have other hardware considerations to keep in mind. If current users of your other devices are expected to upgrade to a new device then hardware choices can help convince them to make the change. If your new device uses familiar charging and physical interfaces to your existing suite of devices, then upgrading is a less frightening experience for your users. Considering this user upgrade experience during the hardware selection process is key for user retention and will make your onboarding processes a little easier to manage, too.

## HAVE YOU SELECTED MAIN EMBEDDED SOFTWARE PIECES?

The embedded software choices you make are as essential for the success of your device as the application software and hardware elements. Well-chosen embedded elements can make your device easier to use, can extend the useful life of your device, and can mean keeping options open for developing new post-launch features to be pushed to devices as updates.

Firmware choices are important, but just as important is being sure that your firmware can be updated in the future. For IoT devices, this will often mean OTA updates and while this is more and more feasible, it also represents a potential cost in data transmission.

Your IoT device might integrate an operating system, or OS, as part of its embedded software stack. If so, there are various choices on both the open-source and proprietary side. Linux and its derivatives have long been popular in the IoT world and a large community exists to support developers and device manufacturers who choose a Linux-based OS. Alternatively, many developers prefer to use a Windows OS, in particular the Windows 10 IoT Core, with its similarly extensive community and support.

Finally, while the user interface, or UI, that you choose will be key in defining the user experience for your device, the UI framework will have a large impact on how that UI is developed and presented to your user. While options like Qt and Altia are popular, there is plenty of competition in this space and making a thoughtful choice is important.

## HAVE YOU DEFINED YOUR HOSTING APPROACH (LOCAL, CLOUD, HYBRID)?

IoT devices are all about data and data needs to be processed – but where? Your options for processing the data have evolved in recent years and your choice will be influenced by security, scalability, and price.

A common option would be a public cloud service and, indeed, the explosion in IoT devices over the last decade has been matched by a similar explosion in public cloud offerings. While the market remains dominated by the so-called big three – Amazon’s AWS, Microsoft’s Azure, and Google’s Google Cloud Platform – other players including Oracle and Alibaba offer public cloud infrastructure ready to support IoT projects with rapid configuration and launch options. Scalable and priced like a commodity, public cloud options are a clear preference for many IoT developers.

Private clouds, on the other hand, have the scalability advantages of their public rivals but added security as your own company controls both the data and the cloud where it is stored and processed. The downside? Maintaining that cloud infrastructure can be expensive and customer expectations for uptime and service have been established by the big three, and you’ll be expected to match them. Scaling, too, is costly and represents a heavy capital investment ahead of revenue in contrast to the public cloud’s on-demand scaling.

Alternatively, you might consider edge AI solutions where the processing of the data is managed locally and on the device. Edge solutions and so-called TinyML approaches offer a clear pricing advantage as the device does not have to send and receive data from the cloud. While most continue to rely on a cloud solution for storage and while cloud connectivity is standard, the lower costs and simple scalability of Edge AI solutions are attractive for cutting-edge IoT projects.

## HAVE YOU SELECTED FRONT-END TECHNOLOGIES FOR YOUR BUSINESS APPLICATION?

An IoT device is only one part of your commercial IoT offer. On top of that device is an application that itself is composed of a number of front-end technologies and approaches. Getting this right improves the user experience and ensures that the IoT device you deploy is useful as more than just a data collection unit. Execute well and it’ll be a cornerstone in a business workflow, and this means improved customer retention for you.

Common front-end options for IoT devices include mobile applications and web applications. Both have their advantages and disadvantages, and customer research will help you choose which is right for your device. For example, if your IoT device is a specialized tool with a single specific use case as its target, and if your customer uses a particular tablet or handheld device as standard, you might find a mobile application capable of integrating with that device is your best bet. On the other hand, if your device is going to be deployed on a variety of handheld devices running varied operating systems, you’ll be expending time and resources to keep multiple versions of your app up to date.

A web application has the advantage of being device agnostic and, as long as principles of responsive design are adhered to, it might be your preferred choice. It does, though, mean that your users will have to be within network range to access your web application, and this might limit the use cases you can serve.

Having your device integrate with other tools and software solutions is also something to consider. Can data be easily exported into common business intelligence (BI) and analytics programs? Is it simple to process the data in a spreadsheet or use it to train machine learning tools? Making the right choices on the front-end often ends up being just as important as the development choices on the back end.

## HAVE YOU DEFINED YOUR CONNECTIVITY SCENARIO AND RELATED TECH REQUIREMENTS?

Choosing how your IoT device is connected to the cloud, to other IoT, or to other third-party devices is key in bringing your network to life. You have a variety of connectivity options and your choice should be made based on the specific requirements you envisage for the use cases you are targeting.

Consider bandwidth, for one. Do you need a high bandwidth network with heavy and regular network traffic? Or will you transfer smaller packets on a less frequent or irregular schedule? Choosing the right network type to suit your bandwidth needs is important so as not to lock in poor performance from the outset or, alternatively, to pay more for a high bandwidth network that is barely used.

Consider mobility, too. Will your users be in urban areas or rural locations? Will they be able to access consumer 3G and 4G networks or will they rely on satellite technology to communicate with the cloud? Will users and devices be mobile, or will they be able to use fixed Wi-Fi connections?

Power consumption, especially for battery-powered devices, is a significant consideration, too. Where a steady and reliable power source is unavailable, your connectivity choices can strongly impact the power consumption of your device. Taking the impact of network connections into account when planning your battery and energy use is important and minimizing the effect of network connectivity on power consumption is an easy way to improve the life of your batteries.

## AN IoT CASE STUDY: SOLVAY

**About:** An advanced materials and specialty chemicals company with customers worldwide.

**Challenge:** Solvay has spent recent years testing different off-the-shelf IoT solutions and developing multiple proofs of concept (POC) projects. Convinced of the value of IoT, Solvay wanted to develop a fully industrialized IoT service offer that would accelerate deployment of IoT solutions across the company while maintaining the highest levels of security.



**Solution:** Witekio acted as an external R&D team that could benchmark all relevant technologies, design a scalable and reliable architecture, and perform custom developments to bridge the gap between Solvay's existing infrastructures and the IoT technologies. Witekio adopted a four-step approach (need exploration, 360° technological audit, deep architecting, and platform development) and worked with third parties to build an IoT ecosystem around Solvay factories. The final IoT platform was capable of integrating use cases from across the company and expanding to support additional future IoT deployments.

**Key Tech:**

- Thingworx
- Sigfox
- Lora
- LoraWan
- Google Cloud Platform IoT



**SOLVAY**

asking more from chemistry®

## YANNICK'S WORD

I've spent my entire career in the technology sector and, in all those years, there's one thing that has become increasingly clear to me: if you don't plan to succeed, you'll only succeed in failing.

Planning IoT projects effectively is something that we've been doing at Witekio since the notion of IoT first emerged on the market. Since then our team has grown from a handful of engineers in a single office in France in 2002 to more than 100 engineer service team members across a half dozen offices in four countries. We've grown consistently and the projects we've taken on have increased in scope and scale, but we've never forgotten how important, how truly fundamental putting a good plan in place is before taking those first steps.

Today all Witekio teams, no matter where they are located, still heed the importance of effective planning. Preparation and planning help us to manage our resources and, importantly, means that clients know what to expect from our collaboration, when to expect it, what it will cost, and how it will look. We help our clients choose the right technologies, think through their software and device architecture, and align around a vision.

This planning, though, needs to be coupled with agile execution. Effective preparation will identify risks in advance, but nimble execution helps teams avoid the uncertainties that crop up along the way. With this White Paper we've laid out Witekio's most important planning steps in every IoT project, and I hope you'll enjoy the same sort of success that we at Witekio have achieved by putting them into practice.



*Yannick Chammings*  
*President*  
*Witekio*

# ABOUT WITEKIO

At Witekio, success starts with our core beliefs.

We believe that software is at the heart of all technology. Software has always been important, but it is becoming more essential every day as new devices emerge and the IoT expands.

We believe that the invisible code – the code that supports the entire system – is vital to the operation, security, and market perception of a device or system. Getting it right is non negotiable.

We believe that the best system designs emerge from creative thinking. Calling legacy systems into question and thinking outside of the box are key steps towards building systems that deliver.

And we believe that low-cost code can never contribute to the excellence or longevity of a product or system. Cutting corners is a short-term tactic and can only lead to long-term loss.

Over more than 15 years Witekio has helped deliver thousands of the world's most innovative IoT and embedded software projects. Every project is different, but every project is managed and delivered in line with the beliefs and values that define **'the Witekio Way'**.

Our commitment to high-quality code and stable, scalable, and efficient software is unwavering. We choose to work with companies that believe, like we do, that success for products and systems that you do see is built on what you don't see: the code that drives the system, powers a platform, and provides the basis for an ecosystem.

**18+** YEARS  
SOFTWARE SYSTEM  
EXPERTISE

**5** OFFICES IN EUROPE  
AND USA

**100+** EMBEDDED  
AND IOT SOFTWARE  
ENGINEERS

**200** INNOVATIVE  
DEVICES PROJECTS/YEAR



**Witekio**

AN AVNET COMPANY

Paris • Lyon • Frankfurt • Bristol • Seattle