White Paper

Intel® IoT
Intel vPro® Platform

Smarter Service of IoT Endpoints

Ensuring device uptime and performance with Intel® and Box Technologies

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Executive summary

As retailers transform their businesses to embrace multi-channel, digitally enabled 'experiential' retail concepts, they have the opportunity to look again at new device and maintenance service models.

This white paper looks at how Box Technologies is innovating in device maintenance using critical operational data produced by each device. The efficiencies of proactive maintenance vs. reactive or scheduled maintenance bring many benefits to retailers, including operational savings that directly impact the retailer's bottom line. Using key data, the Box Technologies solution looks at a more holistic way of sustaining a retail business with minimal device downtime.

The connected nature of devices, not to mention increased device intelligence, paves the way towards a more proactive service model, one that reduces downtime and increases the longevity of valuable equipment

Digital transformation

Coming into 2020, digital transformation was a key component in many retailers' long-term strategies. The impact of the pandemic has brought about several changes, accelerating digital transformation and increasing awareness of current technology gaps.

Online channel sales grew faster than ever before in 2020[1] , as online shopping was the only means of engaging with customers during lengthy lockdowns. Digital solutions for social distancing in stores and restaurants were quickly added, while mobile applications were swiftly developed for picking up groceries and food from restaurants. Elsewhere, employee and customer safety measures were improved to adhere to country specific policies, as well as general safety. Contactless interaction, including contactless payments, was introduced, as was integration to third party delivery services and other third-party solutions.

The pandemic has fueled this digital shift. Nobody knows what the new normal will be like, so retailers have the opportunity to rethink their longer-term strategies with new data. COVID-19 isn't the first global crisis and it probably won't be the last. Therefore, retailers need to build more resiliency into their operations today. They need to know what services they can offer during a crisis and how to keep staff and customers safe. Crucially, retailers need to have the right partners supporting them if they want to remain successful.

This focus on resilience typically means being better prepared for the future, with much more rigorous business continuity plans. So, there is a real opportunity here for retailers to rethink their strategies and enable their businesses to thrive. It's not a question of having digital channels or digital enablement of everything. It's more

fundamental than that. The focus should be on investing in the infrastructure that is required to provide services on a continuous basis. But at the same time, businesses need the flexibility to grow and bring in new solutions with ease.

Intelligence across the store estate

Physical stores are best placed to offer experiences and social buying interactions that cannot easily be replicated online. There's no doubt that customers will return to stores. But they will also be looking to engage with retail across mobile devices, interactive kiosks, digital signage and online through the web. Consequently, customers will expect a consistent experience, irrespective of the channel in which they engage with a business.

Figure 1: Omnichannel interactions

In store, the role of staff will change to deliver additional value on products, providing information, as well as suggestions and alternatives that customers would not always be able to get on their mobile devices. Real time shop floor inventory visibility and warehouse stock availability have been crucial for both in-store and online fulfillment. While the use of robotic process automation for repetitive tasks is increasing.

Similarly, showing contextual information on products available in stock at the store is far more important than disappointing customers when products are promoted but not in stock. Engagement online can be further increased by leveraging the digital elements used in the store to provide a better digital shopping experience. This requires data sources that can be consumed across customers, workforce and operations, making for a seamless experience.

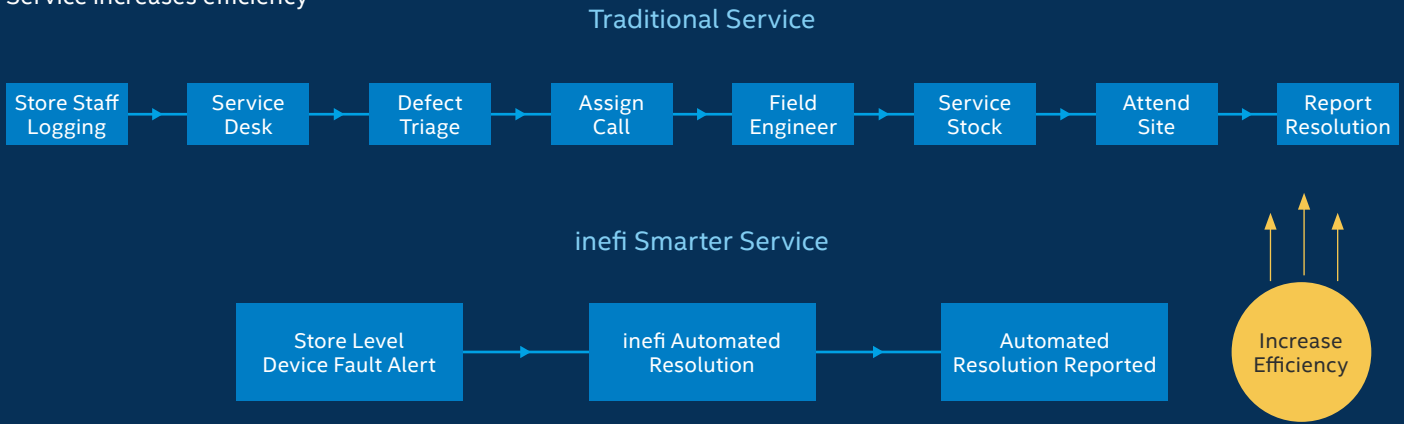
For the engagement described, retailers will need lots of data, including data that has context and is not stale. So, where is this data generated? In short: It's generated across all the interconnected sensors and devices in stores, plus online engagements and data from fulfillment centers.

We started this white paper by talking about the opportunity available to retailers to rethink their long-term strategies. For data, infrastructure is key to its long term and adaptable use. For it to work well, retailers must think deeply on what data they need. For example: What sensors and devices do they need? Do they have a robust mechanism of ensuring that they work optimally without failure and with a clear disaster recovery plan?

Ensuring device uptime and performance

Data is paving the way for all retailers to show how they can serve their customers consistently, run their business optimally, re-engineer processes, plus increase brand awareness and loyalty. Therefore, it is important that retailers include mechanisms that will ensure the continuous generation of data is not impeded by mechanical failures. They can do this by engaging in a comprehensive infrastructure effort on device performance and uptime.

Figure 2: inefi Smarter Service increases efficiency



As the number of devices continues to grow in store, the underlying infrastructure should be able to maintain the health of each device in the network. Traditional service models include the logging of a ticket, which gets sent over to the support team who then prioritize the issue. The majority of issues are normally resolved by sending an engineer on-site. In most cases a faulty device is simply replaced and operations are restarted.

But from the time the device stops functioning and until it is fixed, it is unavailable to perform. So, the data it would have been generating is no longer being produced. This, in turn, would mean that existing systems would need to take on the additional burden. Or customer service will need to be slowed due to the reduced capacity.

A common problem often raised by retailers is their inability to rectify device issues or even replace devices in a timely fashion. The root cause of device failure can be diagnosed by running certain system tests. In many cases, the root cause is due to one or more components breaching certain manufacturing thresholds or firmware patches not being applied on time.

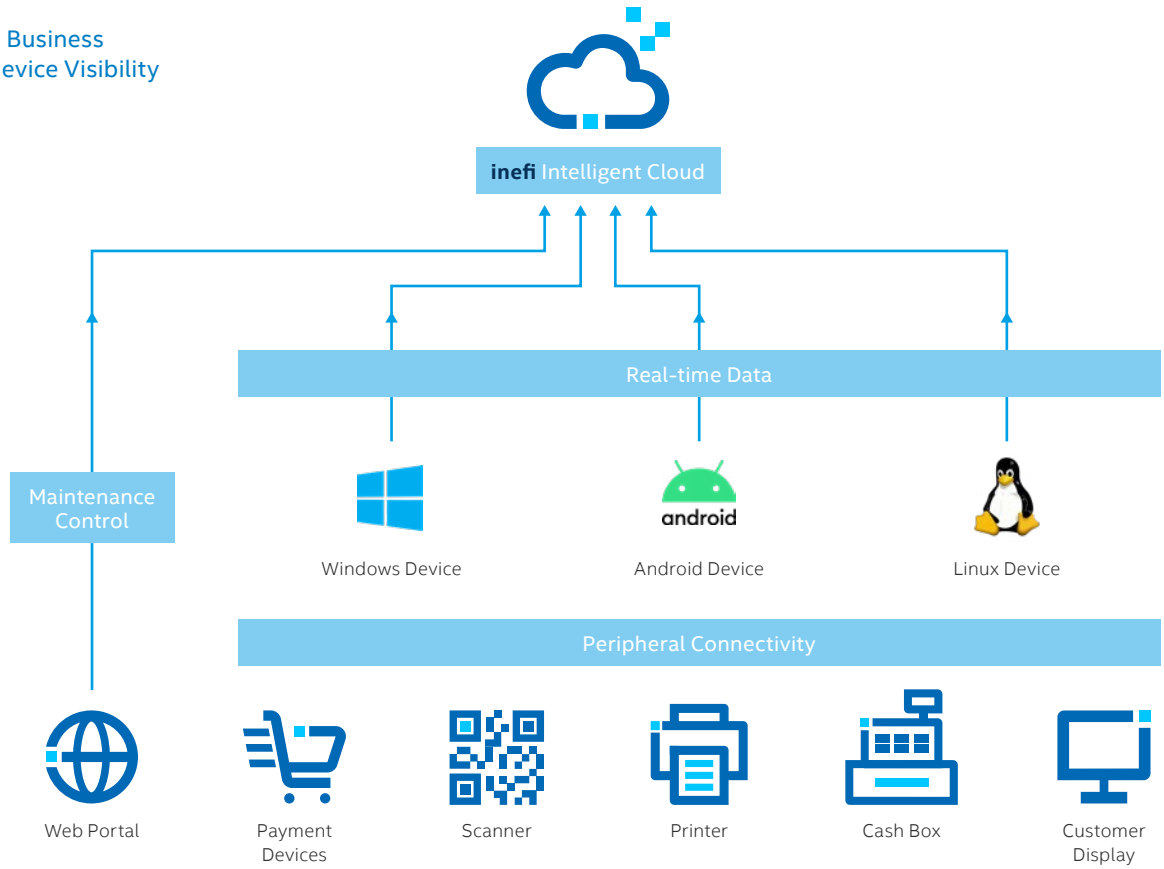
As devices have become more intelligent, they can provide internal statistics on their usage and potential for failure. So, we now have the best opportunity to move away from pre-scheduled maintenance windows and reactive fixes. Instead, we have the option to use operational intelligence to proactively fix issues before failure occurs and to constantly monitor the health of devices.

Of course, as intelligence varies from device to device, the amount of information that can be retrieved will be broad, with some devices able to provide detailed information from the device motherboard and component level information. Usefully, a large list of rich information can be extracted from the motherboard, while information that can be extracted from peripherals will depend on the intelligence incorporated by the manufacturer. But there is a lot more available than is being used today.

As device sophistication continues to increase, we are now able to understand usage frequency, thresholds of critical components in a device, the peripherals attached to the device, and the ability to determine failure states well before they occur. With the right infrastructure in place, we should be able to monitor all devices in a typical store and truly understand each device, enabling us to take proactive steps ahead of any failure.

The ability to monitor devices and their various components opens up the potential for new service models. We can know, for example, which components in the device are approaching end of life. Or where certain parameters are increasing that, if left unfixed, would breach manufacturing limits. This enables service contracts to be put in place with more confidence and increased priority by device type.

Figure 3: Business Critical Device Visibility



The new Inefi Smarter Service model

Inefi Spotlight is a new product created in partnership between Box Technologies and Flytech. Inefi has re-invented the service model rulebook by using vital operational information to better understand device health. Inefi Spotlight brings an additional dimension to the new edge compute architecture, where its goal is to provide device availability at all times.

Box Technologies took inspiration from the airline industry to deepen its knowledge of every device/component deployed and to avoid operational failure by monitoring critical information produced by each one. Through manufacturing and deploying various types of devices, Box Technologies has the expertise to bring predictive maintenance to the retail vertical, avoiding costly downtime.

By leveraging Box Technologies' and Flytech's deep connections within the embedded engineering field, Inefi uses industry standard and supported protocols to pull additional peripheral data. This can include: Firmware versions, serial numbers, thermal temperatures and mean time between failures (MTBF) counters. Once deployed on a device, Inefi Spotlight is able to receive configuration change commands and remote resets of critical failures, ensuring speedy recovery and minimal loss of data.

The capabilities outlined above facilitate a change in operation, from the traditional service model outlined above, to a 'smarter service' model that is outlined in Figure 4.

The platform aims to provide a single view of all devices deployed in the field. To this end, Inefi Spotlight works across devices manufactured by Box Technologies and those manufactured by third parties.

Smarter device intelligence

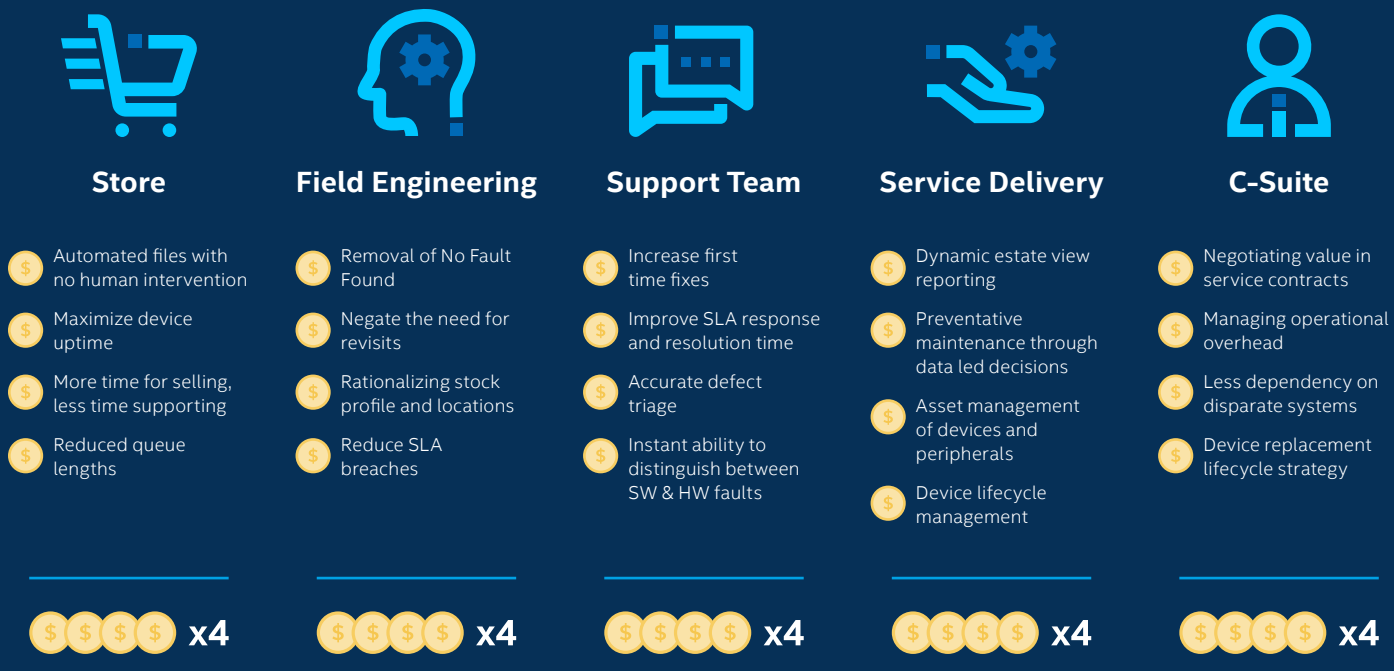
Years of manufacturing capability, ranging from motherboards to fully fledged IoT devices, has enabled Box Technologies to extract vital information by supporting most known protocols and standards. However, it should be noted here that the information extracted will always be dependent on what services and intelligence have been incorporated into devices by each manufacturer.

This information can be as deep as controlling out of band features when you have no access to the operating system layer remotely. Or it can enable you to control the power to USB ports, enabling and disabling ports and adding additional UEFI/BIOS information. Deep integration with touch controllers, meanwhile, can detect water, dirt or other errors on screen.

A complete list of the types of data that can be extracted is discussed more generally in the Inefi Cloud product guides for Box Technologies manufactured products. General guidance is also provided on the integration of third party products with the system.

The current integrated vendor ecosystem can be found at www.inefi.com.

Figure 4. inefi Smarter Service ROI



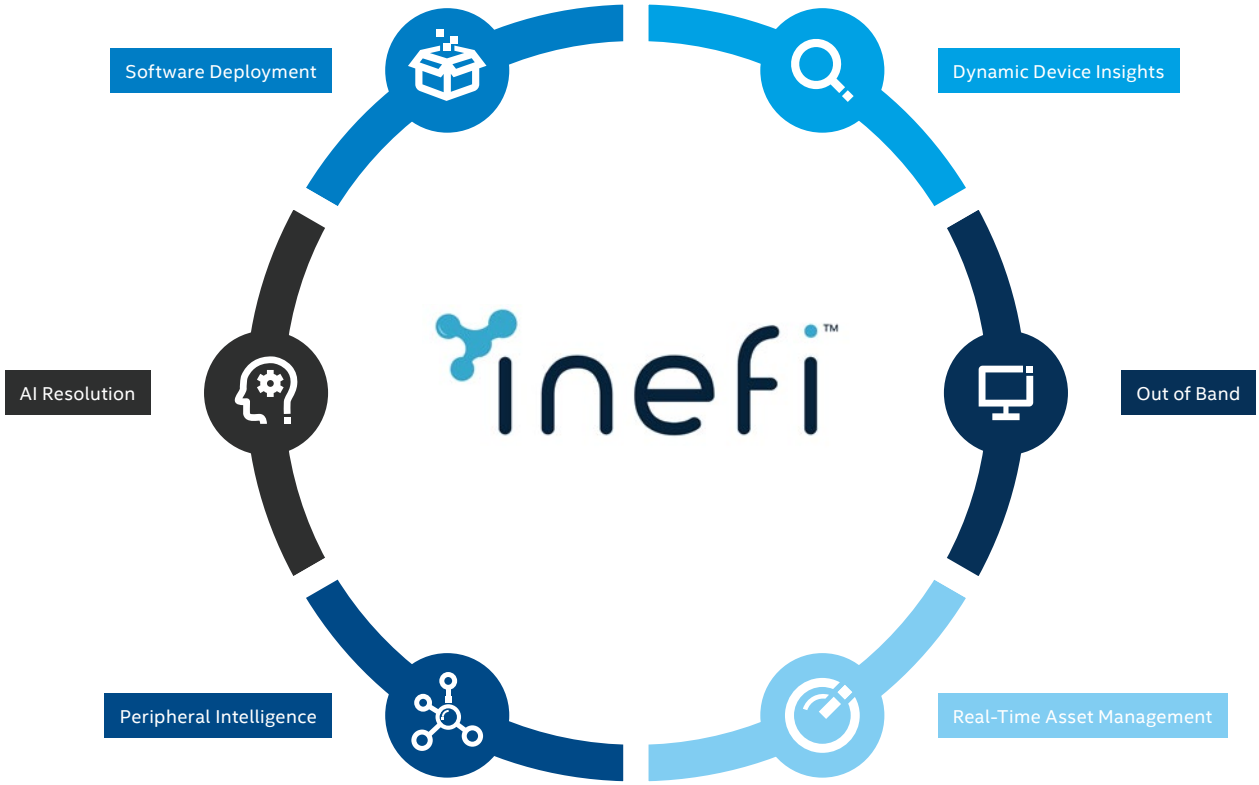


Figure 5. Inefi Spotlight capabilities

Inefi Cloud in operation

Inefi enrolls each device and their peripherals through a single distributable MSI for Windows or through a standard image provided through Box Technologies for Android.

The Installer package is run on each edge device, where it queries available ports for any attached peripherals. Once these peripherals are detected, Inefi sends data into the cloud. Once devices are connected to the Inefi Cloud, Information Technology teams on-site and/or located remotely can take advantage of the following platform features to manage the devices:

1. Dynamic Device Insights

Dynamic Device insights include real-time device telemetry information such as CPU fan speeds and temperatures. Other information available can include: Hard drive status, S.M.A.R.T. data, as well as peripheral status and communication status.

2 .Software Deployment

Inefi supports distribution of installers and packages via the Inefi Cloud. Software distribution can include APKs and Operating System updates for Android devices, as well as BIOS updates, executable files and installers for Windows.

3. Real-Time Asset Management

Inefi collects and reports trackable asset information such as motherboard and peripheral serial numbers, available memory expansion slots and current device and peripheral configurations.

4. Peripheral Intelligence

Every peripheral attached to a critical device can also be monitored through the platform. Peripheral status information, such as detailed printer status, scanner status, screen resolutions and touchscreen states can be monitored. This enables remote fixes and the ability to recover peripherals from known failures.

5. AI Resolution

The product uses Inefi's automated recovery system to attempt fixes based on previous errors without user intervention or by going through the traditional approach of logging tickets. The system attempts to resolve the issue and, if successful, logs this information so recurring issues can be addressed with a more formal resolution before it impacts the next device.

The Inefi automated recovery system enables total control over automated resolutions by allowing the user to enable and disable each device and peripheral for automated recovery.

6. Out of Band

Inefi leverages Intel vPro® for all out of band capabilities. Inefi seamlessly moves between the Inefi in-band capabilities and Intel® AMT technology for out of band solutions. Inefi with Intel vPro enables the pairing of automated recovery, dynamic device insights and peripheral intelligence. It also supports advanced out-of-band features, such as power management commands and remote control

Inefi runs on Microsoft Azure cloud services and is available to end customers and managed service providers as a subscription service. The service model is a Software as a Service (SaaS) offering. This provides advanced insights and control for end-users and service capabilities for service providers and system integrators. Please refer to the Inefi website for further details.

Conclusion

Data is driving retail businesses and bringing together new customer experiences, automation, and improved performance. Proactive maintenance of devices is central to the continuous evolution of retail, as it is the source of all the data generated.

Therefore, the uptime of all devices and peripherals in a retailer estate should be without interruption. Inefi is a next generation intelligent device platform that enables maximum uptime for retailer estates. Proactive first-time fixes and peripheral intelligence ensure engineering visits are needed only for genuine hardware errors.

This not only reduces the device downtime but, according to current work carried out by Box Technologies, it could also represent an average saving of £100 – £150 per engineering callout. Real customer data analyzed by Box Technologies found that Inefi Cloud could perform a 33% increase in remote fix capability. This can significantly reduce callout charges and directly contributes to a retailers' bottom line.

Learn More

You may find the following resources useful:

- www.inefi.com
- www.inefi.com/support
- www.Boxtechnologies.com
- Intel® Technology for Retail
- Intel vPro® Platform

1 https://internetretailing.net/industry/industry/online-sales-record-highest-growth-for-13-years-in-2020-imrg-22546

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