NEW RESOURCES CONSULTING

Executive Briefing: From Padlocks to IoT: Master Lock's Keys to Digital Transformation

John T Bartucci, Vice President Connected Products, The Master Lock Company presented *From Padlocks to IoT: Master Lock's Keys to Digital Transformation*. The presentation examined the critical building blocks necessary to expand an organization's focus from a purely mechanical product to digital products and software in the Cloud. The presentation highlighted Master Lock's key strategic decisions along the way, including brand and company alignment and critical skillset investments.

Below are some highlights from the presentation:

- Master Lock is a century old organization that has conveyed peace of mind and security to millions around the world. Their new Master Lock digital solution allows customers the ability to rewrite their operations manuals and explore new business models to give them greater control of their assets.

- Master Lock has had to ensure that their new digital solution fits their customer's expectations. If the strategy and the solution were misaligned with their mission and vision, they were more likely to repel than attract customers.

- Not only does duplicating and distributing keys create a vulnerability in an asset, but one of the biggest reasons that companies move towards digital keys is the enormous cost every year to replace them. The country of Brazil announced two years ago that they are moving towards a keyless society primarily due to the cost of duplicating keys.

- The first Master Lock digital system was launched in 2015 with the ability to securely provide digital keys. Lock owners could now know who accessed the lock, when, and where. It was directly in line with Master Lock's services.

- Master Lock Vault Enterprise is a recent solution that was built from scratch in the Cloud. With this system, customers now have the ability to create their own accounts, add users, add locks, make distinct groups, etc. – all on their own without Master Lock's assistance. The system provides unique digital keys, temporary codes, location information, audit trails, primary codes, and secondary codes.

- An example: the City of Tolleson, Arizona was having an issue managing their alleyways – including concerns with the homeless as well as citizens dumping their garbage. The City implemented a solution that was acceptable from an appearance perspective, as well as one that maintained security. The City included the Master Lock system as part of their solution. The City won an award earlier this year recognizing excellence in the management of their City. Master Lock was asked to share the stage with them for their award acceptance.

- While everyone else jumped into the IoT in 2014, placing communication with each other's devices as a top priority to rush into the market, Master Lock actually took a step back to discern the security vulnerabilities in separate system components and edge devices. It was more important to take the time to build a robust end to end security system, than it was to rush into the market as many others were doing without any security precautions. By doing this, Master Lock built a very strong patent portfolio and a patented methodology for creating end to end security for data in transit and at rest throughout the system.

- In the period of 2012 to 2016, Master Lock was heavily invested in building a highly secure online access control system for a major telecom provider who was experiencing issues with break-ins at their cell towers. They wanted the capability to allow technicians to call into their interactive voice response (IVR) unit, obtain a code, enter the code into the keypad, and then enter the cell tower. The corresponding audit trail would allow the telecom provider to confirm who came in and when. Master Lock was able to develop the prototype system within three weeks – an aggressive timeframe – to win the business. Over time, Master Lock secured over 15,000 cell sites and generated substantial top line revenue from this business. Ultimately, Master Lock exited the business in 2018 as it did not align with their mission.

- However, the stars were aligning for much more starting in 2014 as critical components of the IOT – Internet of Things – started coming to fruition. The critical linchpin for Master Lock was the fact that low energy Bluetooth was now available in phones. When putting electronics into a very small package, you need a battery to run it without causing a big energy drain. Low energy Bluetooth gave Master Lock the opportunity to take the technology built for the telecom industry and pivot it towards something more in line with Master Lock's mission – ultimately becoming Vault Enterprise. Master Lock had been circling around the idea of portable access control for a number of years, until they were able to finally hone the message of simple and convenient, portable access control for both consumers and commercial customers.

- Vault Home was launched in 2020. Master Lock was able to achieve a sustainable, scalable portfolio of solutions for consumer and commercial customers, leveraging the same technology footprint.

- Master Lock learned that it is critical to optimize your architecture to get the most out of it on a very small footprint and only grow as the system needs and load dictate. Many people get caught up in putting something into the Cloud and then believe they are done. The reality is that technology is constantly evolving. It is important to understand technology trends and be able to take advantage of them. Otherwise, you will spend a lot of money in the Cloud and the business that you are trying to launch will never get out of the red.

- The concept of data, one of the key tenets of IoT, can get lost in the excitement of the solution. For example, Master Lock knows that every minute there are four and a half lock openings happening. While that is not substantial now, it is anticipated that as the commercial system grows, more and more locks are going to be used. Knowing the data can help plan for power management, cycle testing, durability improvement, etc. It also highlights service industry usage to be able to see the patterns of where lock usage happens throughout the day, week, month and year – all very interesting to Master Lock as they design more comprehensive solutions based on the industry type.

- Insourcing versus outsourcing resources has often been discussed. When Vault Enterprise was launched in 2018, the first thing they did was bring in experts on database technology. They were looking at a brand new database technology that had only been around for a couple of years and felt that it was going to be necessary to add it to their system due to its scalability capabilities. One value of outsourcing is that when you bring in an expert, your team learns. This approach helps you develop your core team and continue to innovate while augmenting when necessary with outsource talents when you need certain capabilities or need to add bench strength in a period of heavier development.

- You have to critically understand the skill set gaps in your company and how you plan to mitigate them long before you launch. Master Lock set up work streams a year in advance of the enterprise launch for every functional area to map out what the needs were going to be, where the skillset gaps were, and how they were going to mitigate them either internally or by bringing in additional people.

- Examples of necessary upgrades in Master Lock's skillsets included marketing, sales, customer service, manufacturing, and supply chain. Marketing for a system solution is different than marketing for a simple padlock. The buyers are different, the decision makers are different, the capital outlay is

different. Master Lock brought in digital marketing skillsets to help them reach a different target audience. The salesforce had to be upgraded to those that are familiar with system oriented sales techniques. The decision makers are investing in a technology which ultimately means that they are investing in your roadmap. Customer service had to be upgraded to people with system level computer-based skills that have a basic understanding of technology and can do some basic troubleshooting. Manufacturing (new lines and flow) and supply chain (incorporating chip suppliers and providing better forecast demand) were also upgraded.

- One large concern with Master Lock Vault was the ability to test the mobile apps and ensure global coverage. They were initially going to simply 'throw a lot of testers at it to do functional testing' but realized that wouldn't solve the problem of testing on telecom networks around the world and ensuring the necessary coverage to deliver mobile digital keys. Master Lock engaged Applause, a global organization who had a unique way of 'testing in the wild.' This exploratory testing was different than typical script of testing. Exploratory testing treats the system as a consumer would as they are just truly getting it out of the box without knowing the system. While scripted tests are great for functional verification of what you built, they can fall short of what an actual user does with a product. Utilizing Applause, they were able to get the testing set up within two months – very easy – and the Applause testers tested so many variables Master Lock otherwise would not have been able to test including different mobile phones, languages, networks, and browsers.

- The testers were also able to document their experience. This helped Master Lock understand that the customer journey was not just about the devices or the software – it was about the entire experience.

- Master Lock's best practices for IoT testing includes functional testing and regression testing on the production code in the QA environment on Sprint one. Sprint two is the same – functional test Sprint two, regression test Sprint one and Sprint two against production code. Sprint three is the same – except this time, there is typically more substance to it where exploratory testing can be started. Multiple cycles and sprints are completed to ensure that the product is ready for launch.

- In addition, Master Lock does automation testing, performance testing, and security testing. Accessibility testing has also been added to ensure those who are disabled are able to use their system.

- The launch of Vault Enterprise showed a considerable maturing in Master Lock's approach to the user experience, as it incorporated much of the customer's feedback. You need to really listen and incorporate thoughts from your customers.

- Critical importance is the design of the User Experience. As technology becomes much more natural, much more human, and much more ubiquitous, users see less of the UI and more of an intuitive and integrated experience. Master Lock views the disciplines of User Experience and Engineering as more of an integrated experience now, melding the physical with the digital.

- As digital and physical merge, designers need to think about seamless integration. You have to allow the physical and the digital to do what it does best while enabling a convenient and seamless and natural interaction to take place using the best tools available for the job.

- Be relentless internally to keep building on your vision. Remember, digital is different than just building mechanical products and shoving them down a channel. It is a fundamental shift in how business is done. This can mean a lot of different things to different companies.