Nymi Enterprise Edition
Value Overview

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Executive Summary

The value of a particular solution to a particular company or process will be a unique associate for that business. What is consistent across Nymi customers is a strong understanding of quantifiable and qualitative benefits that Nymi solution provides.

Nymi Enterprise Edition™. Is a new category of Enterprise Security solution that lies at the nexus of a number of imperatives for highly regulated organizations, these imperatives include:

- Desire to increase security (often specifically biometric)
- Desire to increase data integrity
- Desire to increase productivity

In addition to these imperatives is often the desire to increase employee satisfaction and wellbeing.

This discussion paper sets out a preliminary assessment of benefits that current Nymi customers have articulated back to Nymi – they cover quantitative as well as quantitative areas of value.

While each company and process will continue to have a unique set of reasons for implementing Nymi, it is hoped this paper will help organizations investigate the potential that Nymi offers to them.

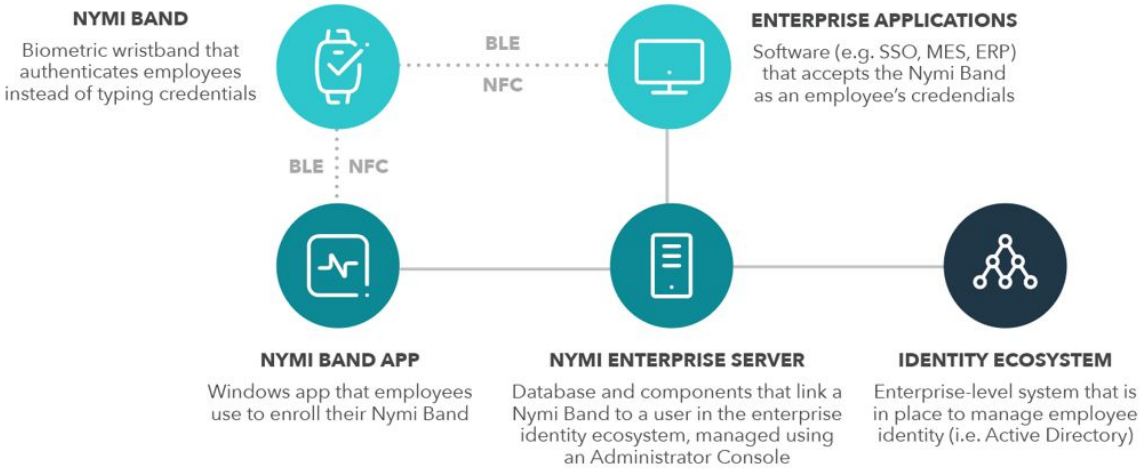
Nymi Solution description and value

Nymi Enterprise Edition™ Overview:

The Nymi Enterprise Edition™ is an authentication solution featuring the Nymi Enterprise Server, Nymi Band application and the Nymi Band.

- Nymi Band - Biometrically authenticated wearable for users to interface with Nymi-integrated workplace software
- Nymi Software development kit (SDK) - Software development kit for integrations with common enterprise software
- Nymi Enterprise Server (NES) - Backend software that runs the Nymi solution, consisting of a server and management software.

- Nymi Enterprise Server (NES) – Database and collection of services that allow secure communication between Nymi Bands and shop floor terminals. Includes an Administrator Console (NEM for Admins), a web interface for administrators to manage users, Nymi Bands, and policies
- NEM for Employees/Nymi Band Application – Windows app that employees use to enroll their Nymi Bands



Application Integration

The Nymi SDK provides developers with tools to integrate the following applications with the Nymi Enterprise Edition solution:

- Single Sign-On (SSO)
- Manufacturing Execution System (MES)
- Enterprise Resource Planning (ERP)
- Human Machine Interface (HMI)

The SDK offers the following components:

- Nymi Runtime - Facilitates communication between a Nymi Enabled Application (NEA) and Nymi Bands. Install the Nymi Runtime on the developer machine and on any machine where the NEA will run.
- Nymi API (NAPI) - Provides developers with the ability to interface with the Nymi Runtime and communicate with Nymi Bands.

NAPI exposes a very simple C interface that provides the following benefits:

- Minimizes the complexity of the integration and allows bidirectional communication by exchanging messages in JSON format.
- Supports the use of foreign function interfaces (FFIs), which enables developers to use the SDK with any language or environment that supports linking with C libraries.

Nymi SDK supports the following platforms:

- Microsoft Windows 10, 64-bit

- Microsoft Windows 7, 32-bit and 64-bit

To develop NEAs on Windows platforms, you can use:

- Any Microsoft-supported version of Visual Studio
- Visual Studio Code (or any other code editor)

Nymi Enterprise Edition™ Business value:

Nymi Enterprise Edition™ solves the data integrity challenges that are found in complex manufacturing facilities by providing the world's only authentication solution that addresses security, compliance, productivity, and ease of use challenges, all at the same time. Nymi Enterprise Edition combines a highly secure wearable IIoT device with an easily deployable enterprise-grade software solution, to significantly minimize compliance impacts and security risks to any manufacturing facility, while improving productivity by providing user-centric interfaces to all employees. The Nymi Band IIoT wearable device was designed with a security-first mindset and, in combination with the Nymi software suite, ensures only correct operators can perform the approved tasks.

Typically, Quantifiable (see later section):

- **Productivity**
  - Time saving while logging-in or providing an e-signature – savings quoted range from 10 to 27 seconds per time
  - Time saving by reduction / removal of user authentication errors due to mis-spelt username or password (typically around 7-10% of the total number of authentications)
  - Time / cost saving in reduced password resets (often due to complex difficult-to-remember passwords or policies that require frequent password changes)

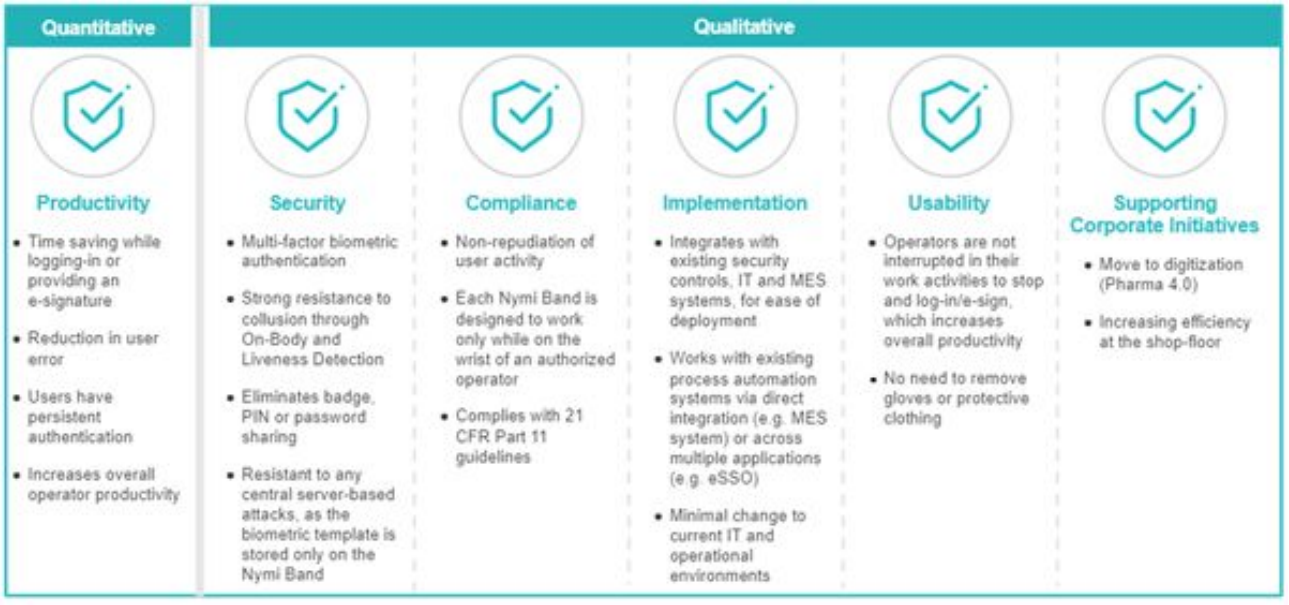
Qualitative:

- **Security**
  - Enhanced security via use of multi-factor biometric authentication
  - On-Body and Liveness detection provides a strong resistance to collusion (criminal intent/fraudulent users)
  - Nymi Public Key Infrastructure (PKI) provides multi-user multi-terminal support
  - Nymi Band provides hardware-based security; the biometric template is stored only on the Nymi Band, which makes it resistant to any central server-based attacks
  - Operator solution confidence – the operator remains in possession of their own biometric
- **Compliance**
  - Non-repudiation of user activity (data integrity)

- Reduced audit findings or “exceptions”
- Increased business confidence in accuracy of the data (eliminate user errors)
- Intuitive use and simple enough that operators do not “look for a way around it”
- Complies with 21 CFR Part 11 guidelines

- **Implementation**
  - Complementary to and integrates with existing security controls and IT systems
  - Protection of existing investments e.g. reduces friction in use of MES solutions
- **Usability**
  - Overall improved productivity as operators are not interrupted in their work activities to stop and log-in / e-sign
  - Useable without needing to remove gloves, garments – significant increase in ease of use
  - General operator satisfaction (“I have never seen a project with so much demand from the business”)
- **Supporting Corporate Initiatives**
  - Move to digitisation (Pharma 4.0)
  - Increasing efficiency at the shop-floor

Benefits Summary



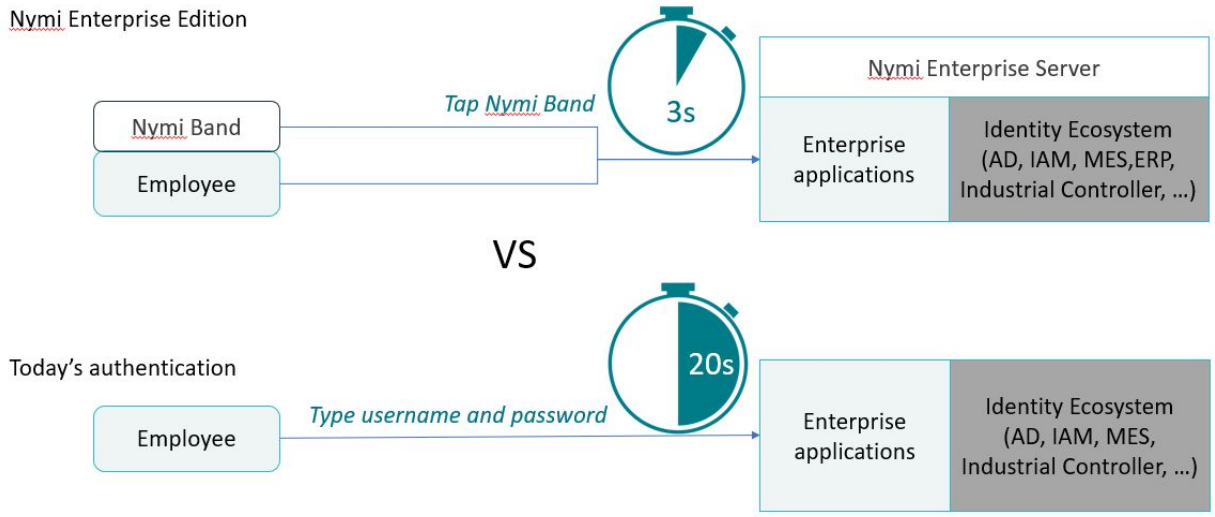
Quantifiable Benefits of Nymi

Benefits predicted and realised will vary dependent upon the industry sector, use case and geographic location. These and other environmental elements will have considerable impact on business benefits an organisation can realise from the implementation of Nymi.

This section focuses on general areas of known savings from across a range of real-world customer examples:

Productivity improvements:

These typically come from the time an operator has to spend inputting username and password in a highly procedural process, where operator signatures are necessary on a frequent basis throughout the day:



It is not uncommon for certain processes to require upwards of 100 operator signatures per day, in an organisation that has already deployed some form of process management system this will typically be provided by entering the user name and password.

Factors that may effect the time saving include password complexity, gloved or ungloved environment, keyboard vs no keyboard, etc.

On average the typical time taken is 20 seconds per e-signature – at a rate of 100 per day that is 33 minutes per day per operator.

When compared to the use of Nymi, the typical time saving per operator per day would be 28 minutes.

Labor rates vary around the world, but the fully loaded cost for a highly trained operator may be $40 per hour or higher. At this rate the saving per day per operator would be $19. Over the course of a year, per operator this may equate to savings of $3,800.

Data integrity and audit

The quantifiable savings from data integrity will also vary significantly dependent upon industry sector, compliance requirements and audit requirements.

In addition to the value of the data itself and the reliance by the business of the accuracy of this data to make fundamental operations and business decisions on a daily basis, many organisations also have substantial compliance and audit requirements.

Where a process today may involve many steps to be completed and signed by users, with traditional forms of authentication there is an increased risk of human error. The Nymi solution not only reduces the potential for human error in signing transactions, but is also allows an operator to maintain the flow of their work. This can lead to a reduction in incorrect entries and process flow.

Some customers report that for every incorrect entry and investigation needs to be undertaken by the quality or audit department – a simple incorrect entry may cost the organisation $50,000 per investigation. If a major deviation from an establish standard operating procedure the investigation cost will rise to $150,000. If in the unfortunate event that the data inaccuracy or deviation is sufficient to warrant a batch recall this may rise to $7,000,000 or more in all associated costs.

Password resets

The amount or need for password resets will vary dependent upon an individual company's password policy. The mechanisms for achieving that password reset will also vary by organisaition. What is certain in highly regulated industries and in processes that require entry of passwords many many times, the associated frequency and cost of providing password resets will dramatically increase.

The quantifiable aspect of password resets may come from the lose in productivity, impact on the whole production line or batch especially if time sensitive as well as administration or IT resource to reset the passwords. Without taking into account any loss in productivity or production impact, the average cost per employee across all industries in managing password resets is $420 per employee per year.

Improved throughput and productivity

This are will again be highly dependent upon the industry, process, and output of the organisation and associated processes. The productivity savings above focused on the reduction in operator time spend entering traditional username and password authentication. This section focuses on the increase productivity that a production line or plant may be able to produce by using that saved time to produce more product.

The simple equation would be to look at the value of product produced from the production line over the course of the year. Divide this by the number of operators required to produce the output. From the productivity savings identified above, a theoretical value of potential additional value from reapplying that saved time to increased production can be calculated.

Comparison between Nymi and with other forms of authentication

Nymi comparison

Category	Feature	Nymi	Smart Card	Username/Password	Other Bio-metric
Security	Secure authenticator including hardware security	✓	✓	✗	?
	Multi-factor authentication	✓	✓	✗	✓
	Bio-metric authentication	✓	✗	✗	✓
	Secure communications (prevents replay)	✓	✓	✓	✓
	Unique, company specific certificate burn on during manufactu	✓	✓	✗	?
	Determines presence of user	✓	✗	✗	✗
Resistant to collusion	On-body detection (Capacitance/light/motion sensing)	✓	✗	✗	✗
	ECG measurement to determine Human and liveness	✓	✗	✗	✗
	Authentication to device only if human, alive & worn	✓	✗	✗	✗
	One band to one user	✓	N/A	N/A	✓
Usage	Intuitive, easy to use	✓	?	✓	?
	Does not interrupt operator work flow	✓	✗	✗	✗
	Can be used under gloves, with gowns, eyewear	✓	✓	✓	✗
	Biometric remains with biometric owner	✓	N/A	N/A	✗
	Always-on authentication	✓	✗	✗	✗
	Removes user data entry error	✓	✗	✗	✓
	Average authentication time	2-3	5-20	20-30	5-10
Platform	Integration work underway by major MES vendors	✓	?	N/A	?
	Future proof platform design (additional use cases/capabilities	✓	✗	N/A	?
	Operates with existing security infrastructure	✓	?	✓	?

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