



What is Performix?

Performix is a vendor-independent, intuitive, easy-to-use toolkit that lets you tune, manage, analyse, visualise, interrogate and report on information in any biometrics database, regardless of its size or level of complexity.

Most people use **Performix** to save time, effort and money – typically many hundreds of thousands of dollars per annum.

MIS Systems

In the past decade, Management Information Systems (MIS) have become a standard part of most information technology and communications systems.

Gone are the days when trouble-shooting involved trawling through tens of megabytes of logs, developing scripts to interpret them and putting them into a spreadsheet for reporting and graphing.

Today these systems watch all areas of vulnerability and store information into readily retrievable databases for analysis, charting and other forms of reporting.

But when conventional systems have an issue it is because of a specific event or series of events or overloads. Once the problem is found it is a matter of fact.

But when problems occur in a biometric system the issue is as a result of the “balance of probability”. This is a term that is foreign in the world of MIS systems.

Performix should be viewed as a MIS system for biometric data. It understands all about the “balance of probability”. More importantly, you don’t need to be an expert in statistics to use it.

Biometric systems can be used in a variety of ways. Common scenarios where they are used to improve services to customers include:

- Assisting to reduce identification fraud (e.g. drivers’ licenses or credit cards);
- Providing faster, simpler access to services in a call centre;
- Maintaining secure access to premises and facilities;
- Facilitating passenger flow in an airport;
- Allowing employees to more easily provide information about time and attendance in a fraud-free secure manner, etc.

People charged with managing and using biometric systems do not want to be concerned with the intricacies of the underlying statistics or the complexities of data analysis. However, they need to assure themselves and all other stakeholders that the system is working properly for the wide variety of customers that will be using it.

So it is necessary to have comprehensive, easy-to-use, management and reporting capabilities that can identify issues and problems before they start to impact those people that matter most to your organisation.

For example, simply adjusting parameters in order to reduce the incidence of malicious or accidental entry by impostors (i.e. reducing false accepts), is likely to create problems for valuable customers by having them denied legitimate access (i.e. increasing false rejects).

You also need to ensure that you minimise the risks of serious mishaps – especially a serious breach of security or denial of service to a very important group of customers or clients.

You need to have access to an easy-to-use management system that can help you to adjust complex parameters and let you know on an ongoing basis when you have achieved the optimal balance to suit your particular needs. And it needs to understand all about the “balance of probability”.

Performix can be used in four main ways through the lifetime of a biometric system:

- **Evaluation**

- Manage, run and compare various biometric systems against your particular group of enrollees to determine which vendor or type¹ of biometric is best suited to your application.
 - The wrong choice could cost a substantial amount of money and prestige.
- Analyse the quality of current enrolments and how particular vendors will handle this data.
 - A vendor may perform better on the existing data than another vendor and could save you millions of dollars through not having to re-enrol all of the users.

- **Assessment**

- Once you have installed a system, the selection and modification of parameters can be a time-consuming activity and the complex interaction of multiple parameters can't be reliably performed by a process of “trial and error”.
- When it comes time to install updates and additional parameters, you need to know the real impact of such changes beforehand. A costly upgrade that yields few tangible benefits, or even produces detrimental results, can be a very costly mistake.

- **Management**

- Biometric systems need to be managed throughout their life.
- Complex demographics and changes to these demographics need to be understood.
- False alarm rates need to be tracked.
- Fraud needs to be monitored.
- Wide-ranging sets of reports need to be prepared for upper management, to determine service level performance and for other operational activities, including risk assessment and management.

- **Investigation**

- You need to be able to determine the potential for fraud.
- Persons or events of interest should be tracked.
- Accidental or malicious impostors need to be identified and the reasons for their false identities determined.

These are just a few of the activities that make **Performix** an extremely valuable tool for any biometric system.

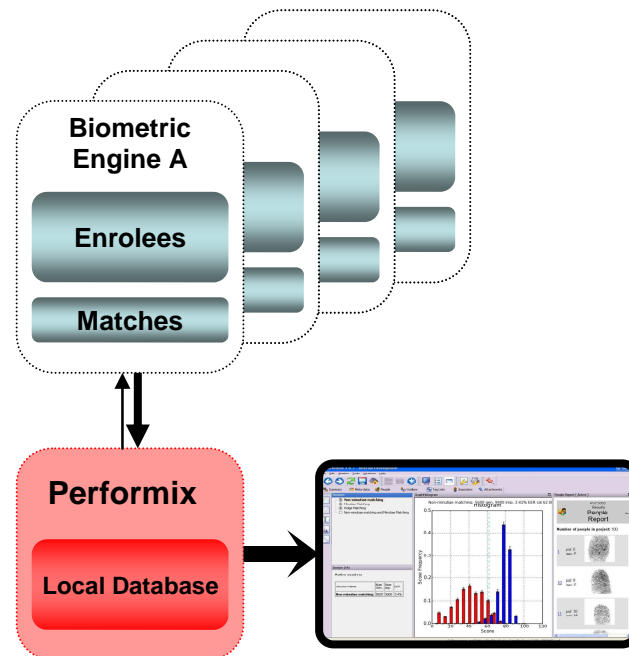
How does Performix work?

A biometric system uses one or more “matching engines” to compare information collected at an instant in time against details previously stored about a person (i.e. an enrolment).

Each matching engine has its own way of performing a match and determining the likelihood of it being a genuine match or an impostor – often referred to as a “match score”.

¹ Face, fingerprint, iris, palm, voice, etc., or multiple combinations of them.

Performix interfaces with the matching engine to obtain this match score. **Performix** does not attempt to perform any matching itself. It either has matches passed to it as the Biometric engine performs them as a part of its normal function, or, requests the Biometric engine to perform matches that are required for a particular analysis function.



There are two primary ways that **Performix** operates: Real-Time² mode and Off-Line mode.

In Real-Time mode (the normal mode for Enterprise-level installations), **Performix** captures this matching information as it happens so that it can provide a continuous reporting and monitoring environment.

In Off-Line mode, **Performix** requests batches of matches from the matching engine and stores these batches in its own database area for further processing. These matches may already exist or **Performix** can automatically request new matches be performed for particular types of analyses. These batches of matches can be used for Evaluation, Assessment, Management and Investigation as well as a wide range of additional ad-hoc analyses.

In addition, **Performix** can also extract data from archives in order to analyse and compare performance over time.

Where multiple matching engines are installed, **Performix** can extract batches of matching information for comparison purposes or for multi-modal analysis.

Multi-modal analysis allows the analysis and visualisation of the data where multiple biometrics are used, such as where (say) fingerprint and iris scanning are combined or where the same biometric data is used with multiple matching engines.

Performix can be used to compare many different batches of information. It may, for example, be used to compare the results of an upgrade with a previous version of the same matching engine, using your own

² Actually this mode is close to real-time, and does not need to be a true real-time operation. This saves considerably on computing and database resources and overheads.

enrolment data. It might also be used, say, to compare the performance of the system for various demographic groups.

What can I do with the data?

Once these matches have been obtained from the various matching engines³, **Performix** is able to analyse the data in a wide variety of ways. The results of these analyses are stored in a local **Performix** database, along with the enrolment information (with appropriate privacy security) for all persons included in the matches used in these analyses. These local **Performix** databases can be exported for display, reporting or further analysis by other **Performix** products.

Performix can use the whole database for its analyses. However, it is possible, in fact usually preferable, to conduct analysis on a sub-set of the data. Data can be filtered to provide, for instance:

- A subset of the database, such as those people matched over the past 48 hours;
- A random, representative sample of the database; or
- A filtered sample of a particular demographic group

The results of analyses such as FAR and FRR can produce quite different results for a particular group. For instance, a system may have a FAR of 0.01% (1 in 10,000) for all of the people enrolled. However, a particular group (e.g. Asian males with spectacles) may be more likely to be poorly-identified and might have a FAR of, say, 1%.

This difference would represent a significant vulnerability to a facility protected by a biometric system.

Examples of analyses that can be performed are:

- **False Accept Rate (FAR) and False Reject Rate (FRR)**
 - FAR is the frequency with which an impostor is accepted as a genuine user and hence granted access incorrectly.
 - FRR is the frequency with which a genuine user is not correctly recognised and hence denied access.
- **Fraud**
 - It is possible that a biometric database may have the same person enrolled under different names. This generally represents a fraudulent situation where an individual is seeking, say, multiple drivers' licenses
 - Picking this up in real-time, when someone applies for a license, requires a much more significant investment in the cost and complexity of the biometric system and may generate a system that is sometimes too slow for proper operation. However, performing these tasks as a part of background management of the system using **Performix** could represent a much more cost-effective solution for overcoming the very small amount of fraud that will be present in most biometric systems.
- **Evaluation/Comparison**
 - All biometric technologies and vendors have their strengths and weaknesses.
 - Prior to implementing a biometric system it is best to evaluate different types of biometrics
 - (E.g. fingerprint, palm print, iris, face, voice, etc.)
 - You may wish to evaluate different vendors of a particular type; or
 - You may want to see if a combination of types of biometric can provide better results.

³ There is a published application programming interface (API) which permits any matching engine to be interfaced to **Performix**.

Performix provides the ideal way of capturing information from pilot tests and comparing the results in a fully quantitative manner. Without **Performix**, you would need to rely on each particular vendor's own calculations – each of which may be based on different methodologies and criteria.

- **Pilot Analysis**

- If you have a biometric system being installed it is essential to understand how various environmental and demographic parameters will affect performance.
 - For instance, in a face recognition system, different lighting conditions during enrolment and/or operation may create different results for people with dark-coloured skin than those with light-coloured skin.
 - These types of issues will impact the overall capabilities of the system and certain changes to the architecture of the system may be needed.

- **Detection Rate**

- Where a biometric system is being used to identify specific individuals from a watch-list, it is essential to understand the potential detection rate that could be achieved compared with what is currently being achieved.
- This can significantly affect the cost and design of a biometric system.
 - Comparing every new enrolment against every other person in the database as a fraud check could significantly increase the cost of the system. But just using a check-list of known offenders dramatically increases the detection rate, without increasing the cost or complexity of the system.

- **Performance Trends**

- As biometric databases get larger and more diverse, or if operating parameters are changing, the performance of the system will change over time.
- Also, different enrolment locations may produce different results. A new camera in a face recognition system may produce different results and as, say, a driver's license system is rolled out to more and more locations, performance may change over time.
- **Performix** can chart these types of trends and provide performance snapshots over time.

- **Tagging and Investigation**

- The behaviour of a person or a group of persons may be worth tracking over time – especially as a part of a forensic examination.
- People and events can be tagged and the results monitored in both real-time and in retrospect.
- Multiple people and multiple teams can work with these results, adding intelligence to the data as it progresses through the examination.

- **Alerts**

- Certain scenarios can be programmed to produce alerts.
 - For instance, multiple persons from a watch list appearing at the same place at the same time.
- Also, certain issues associated with enrolment can also be used to create alerts.
 - For instance, changes that are not immediately obvious to a casual perusal by an operator (such as a slowly failing light bulb transformer or dust particles on a finger scanner) can be assessed and used to alert an operator.

- **Vulnerabilities**

- There are any number of factors that can lead to vulnerabilities in a biometric system.
- **Performix** can be used to identify, and provide solutions to, a vast range of vulnerabilities.

- **Reports**

- The production of automated reports can be one of the major cost-saving benefits of **Performix**.
 - Most systems need to report to regulators, clients and senior management on a wide variety of things, especially related to Service Level Achievement, on a regular and frequent basis.
 - Some customers have suggested that **Performix** is able to “keep vendors honest” by having a vendor-independent system performing these reporting functions.
- **Performix** also has very powerful ad-hoc reporting capabilities that include graphical as well as tabular reporting formats.
 - As all of the required information is captured in the **Performix** database, there is no need to trawl through voluminous logs to obtain information.

This is only a very small selection of the ways that **Performix** can be used. Please refer to the **Performix** Technical Datasheets, your local **Performix** sales representative or contact Biometix directly, for more information.

Plug-In Architecture

The basic architecture of **Performix** uses programming modules called “Plug-Ins”. Each Plug-In performs a specific function or set of functions. Plug-Ins can call other Plug-Ins and system functions.

Biometix publishes the way that Plug-Ins interface to the system and how Plug-Ins can be easily developed. This permits our partners, distributors, customers and our own developers, to add significant functionality and/or combine existing functionality, without the need to gain access to the source code.

This architecture permits the creation of tools that permit specific activities to be carried out, without the need to have a comprehensive understanding of **Performix**. These can be created by the **Performix** distributor, a third party consultant or the customers themselves.

As an example, an Investigation tool has been designed to help to identify likely cases of fraud. Investigators are taken through a number of steps that use language and concepts that are familiar to their normal way of operating. Dossiers can be built up on individuals or groups and they can be shared with other investigators who can further build on the dossier.

Other tools have been developed for specific customers' requirements, so ask the **Performix** representative about having some of these tools tailored to meet you specific needs.

Unlike other forms of customisation, the use of Plug-Ins does not change the source code of your version of the product and can continue to be used in future versions of **Performix**.

Performix Products

Performix is structured as a suite of products so that our customers can gain access to appropriate features of the product regardless of the size of their system. The products are:

- **Performix PxEN**
 - This is the enterprise-level version of the product and has been designed to operate from around 200,000 enrolees to in excess of 10 million. It integrates into Enterprise environments, using processing, middleware and database infrastructure that already exists.
 - Multiple workstations can run **Performix PxEN**.
 - It operates in the Real-Time mode to provide a sophisticated continuous monitoring and reporting regime that also permits project-based analysis to be performed.
 - It can also operate in the Off-Line mode.
- **Performix PxPC**
 - This is a stand-alone PC-based version that operates in the Off-Line mode for up to 250,000 enrolees, (i.e. a smaller system or a subset sampled from a larger database).
 - It provides most of the tools from **Performix PxEN** for use in project-based analysis and reporting.
 - There is a special version of **Performix PxPC** for use by research and teaching institutions.
- **Performix PxOEM**
 - This contains almost all of the features of **Performix PxPC** and is bundled with various matching engines and other biometric and security products.
 - It contains special components provided by the 3rd party vendor including an import tool for a specific matching engine.
 - It permits analysis of projects for up to 100,000 enrolees, typically sampled from larger databases.
 - It cannot be enhanced, upgraded or used with other matching engines.
 - Special discounts apply for upgrade to **Performix PxPC** or **PxEN**.
- **Performix PxRead**
 - Any local **Performix** database, with privacy components suppressed, can be viewed interactively (including drill-down) by **Performix PxRead**.
 - **Performix PxRead** provides most of the display and reporting capabilities of **Performix PxPC**, but it isn't able to do further analysis on the read-only database.
 - This is an ideal way for management of an organisation, support teams, researchers and committees to share the results of analysis without the need to produce vast and comprehensive reports.
 - **Performix PxRead** is available, free-of-charge, as a download from www.biometix.com/PxRead.
 - It comes with a tutorial database and is an ideal way to become familiar with the extensive set of visualisation, drill-down and reporting facilities provided by **Performix**.

Local **Performix** databases are completely portable and can be transferred between different Px products.

For more information, contact Biometix. Details are on the first page of this Technical Note.

Or, browse our web site at www.biometix.com

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