



Leveraging Privacy Enhancing Technology to Accelerate Secure Data Collaborations

<p>Status Quo No Longer Works</p>	<p>Clinical data has never been more sought after nor at higher risk of attack. Validation, deployment, and ongoing monitoring of promising artificial intelligence (AI) and machine learning (ML) algorithms require access to real world, personally identifiable and protected health information.</p> <p>Current methods for making this data available typically require de-identification (if possible), which can mask real-world aspects of the data and require significant time, effort, and expertise to deidentify with a remaining risk of re-identification. The approvals process can take 9-18 months to complete all the while consuming limited resources.</p>								
<p>A Paradigm Changing Solution</p> <p><i>BeeKeeperAI enables sightless computing on PII/PHI within a data steward's secure cloud environment – Neither the data nor the model intellectual property is ever seen</i></p>	<p><u>EscrowAI™</u> is a patent protected privacy enhancing collaboration platform that protects intellectual property, data sovereignty, and individual privacy while enabling AI/ML development and deployment on personally identifiable and protected health information (PII/PHI). Here's how:</p> <table border="1" data-bbox="360 999 1474 1684"> <thead> <tr> <th data-bbox="360 999 919 1035">Data Steward (DS)</th> <th data-bbox="919 999 1474 1035">Algorithm Owner (AO)</th> </tr> </thead> <tbody> <tr> <td data-bbox="360 1035 919 1241"> DS receives a request from an AO with a model's data specification. If the DS decides to participate in the project, they curate the data to the specification, encrypt the data, and placed it in blob or S3 bucket. <i>The data is never seen nor shared.</i> </td> <td data-bbox="919 1035 1474 1241"> The AO encrypts their model and places it in EscrowAI where it is containerized and sent to the DS secure environment. <i>The algorithm intellectual property is never seen nor shared.</i> </td> </tr> <tr> <td data-bbox="360 1241 919 1446"> The encrypted data set and encrypted algorithm are placed into a Trusted Execution Environment (TEE), operating in the DS's cloud environment, where they unencrypt and compute in the encrypted TEE. <i>The data and model cannot be seen.</i> </td> <td data-bbox="919 1241 1474 1446"> A mutually (DS/AO) approved report is published from the TEE and is delivered to the AO who then may have the option to tune and rerun their model. <i>Unless pre-agreed with the DS, only the AO receives the performance report.</i> </td> </tr> <tr> <td data-bbox="360 1446 919 1684"> Advantages include: <ul style="list-style-type: none"> • Protects data sovereignty (doesn't move) • Protects patient privacy (never seen) • Enables licensing of data for research • 1-Time SaaS Implementation in hours • No IT Burden: Maintained by BeeKeeperAI • Streamlines approvals 60-70% </td> <td data-bbox="919 1446 1474 1684"> Advantages include: <ul style="list-style-type: none"> • Protects intellectual property • Accelerates time to market by 60-70% • Enables computing on protected PII/PHI • Curates an immutable record • AO workflow user interface • Accessible in minutes: SaaS-based </td> </tr> </tbody> </table>	Data Steward (DS)	Algorithm Owner (AO)	DS receives a request from an AO with a model's data specification. If the DS decides to participate in the project, they curate the data to the specification, encrypt the data, and placed it in blob or S3 bucket. <i>The data is never seen nor shared.</i>	The AO encrypts their model and places it in EscrowAI where it is containerized and sent to the DS secure environment. <i>The algorithm intellectual property is never seen nor shared.</i>	The encrypted data set and encrypted algorithm are placed into a Trusted Execution Environment (TEE), operating in the DS's cloud environment, where they unencrypt and compute in the encrypted TEE. <i>The data and model cannot be seen.</i>	A mutually (DS/AO) approved report is published from the TEE and is delivered to the AO who then may have the option to tune and rerun their model. <i>Unless pre-agreed with the DS, only the AO receives the performance report.</i>	Advantages include: <ul style="list-style-type: none"> • Protects data sovereignty (doesn't move) • Protects patient privacy (never seen) • Enables licensing of data for research • 1-Time SaaS Implementation in hours • No IT Burden: Maintained by BeeKeeperAI • Streamlines approvals 60-70% 	Advantages include: <ul style="list-style-type: none"> • Protects intellectual property • Accelerates time to market by 60-70% • Enables computing on protected PII/PHI • Curates an immutable record • AO workflow user interface • Accessible in minutes: SaaS-based
Data Steward (DS)	Algorithm Owner (AO)								
DS receives a request from an AO with a model's data specification. If the DS decides to participate in the project, they curate the data to the specification, encrypt the data, and placed it in blob or S3 bucket. <i>The data is never seen nor shared.</i>	The AO encrypts their model and places it in EscrowAI where it is containerized and sent to the DS secure environment. <i>The algorithm intellectual property is never seen nor shared.</i>								
The encrypted data set and encrypted algorithm are placed into a Trusted Execution Environment (TEE), operating in the DS's cloud environment, where they unencrypt and compute in the encrypted TEE. <i>The data and model cannot be seen.</i>	A mutually (DS/AO) approved report is published from the TEE and is delivered to the AO who then may have the option to tune and rerun their model. <i>Unless pre-agreed with the DS, only the AO receives the performance report.</i>								
Advantages include: <ul style="list-style-type: none"> • Protects data sovereignty (doesn't move) • Protects patient privacy (never seen) • Enables licensing of data for research • 1-Time SaaS Implementation in hours • No IT Burden: Maintained by BeeKeeperAI • Streamlines approvals 60-70% 	Advantages include: <ul style="list-style-type: none"> • Protects intellectual property • Accelerates time to market by 60-70% • Enables computing on protected PII/PHI • Curates an immutable record • AO workflow user interface • Accessible in minutes: SaaS-based 								
<p>For More Information</p>	<p><u>BeeKeeperAI</u> is a spin-out of the University of California, San Francisco's Center for Digital Health Innovation where the founding team learned first-hand the challenges facing data stewards seeking to advance innovation while optimizing data security while working with industry partners who were seeking to get AI solutions to the bedside more quickly. learnmore@beekeeperai.com</p>								