

ASEAN SME Credit Analytics Consortium (SME-CAC) Concept Paper

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This Consortium is an initiative of the Asian Institute of Digital Finance (AIDF) to discharge in part its mandate – helping solidify Singapore’s leading position as a FinTech hub. The initiative is to build a new style financial infrastructure through leveraging digital financial technology. The Consortium is designed to smartly data-share SME credit data among financial institutions without compromising data privacy. The Consortium intends to comprise AIDF, conventional/digital banks, finance companies, lending platforms, and FinTech companies.

Pooling data from different sources can obviously improve the quality of a probability of default (**PD**) and/or debt recovery rate (**RR**) model. However, data residing in different financial institutions are governed by rules/policies to protect data privacy. This privacy-sharing conflict can be effectively addressed with modern digital technology under the banner of **federated learning**.

AIDF plans to develop advanced credit risk models (**PD** and **RR**) on SMEs through the Consortium. The member institutions can then utilize these more powerful models to make better informed lending decisions, to more effectively manage their credit portfolios’ exposure, and to benchmark their internal credit risk models.

The SME sector is vital to the long-run prosperity of the ASEAN member countries. Through this Consortium endeavour, we expect that the informational gap between borrowers and lenders can be narrowed which in turn serves the public interest of facilitating more efficient financing of SMEs.

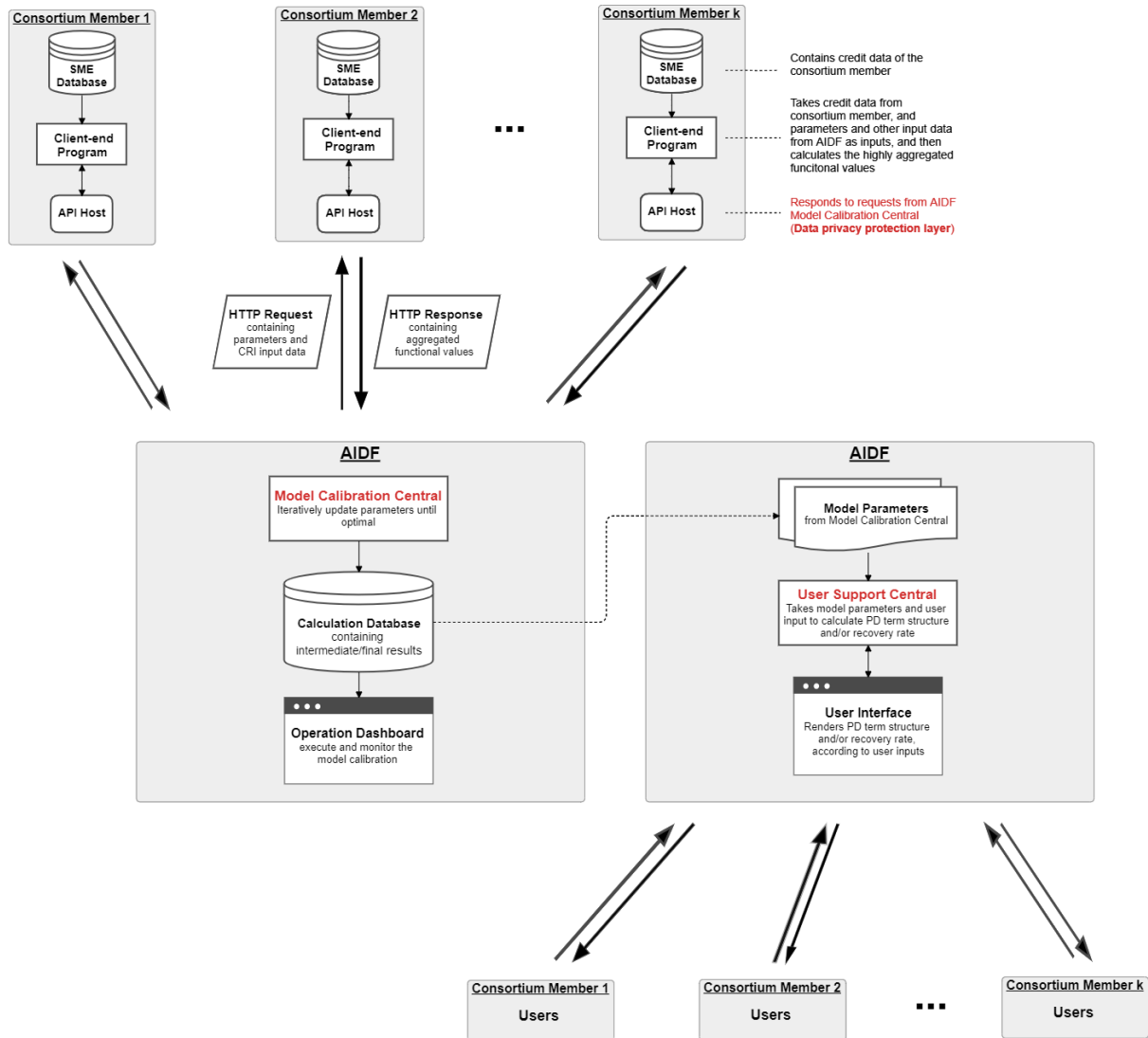
The technical design will utilize **edge and soft computing**. AIDF can train credit models over distributed multiple data sites belonging to and maintained by the members of the Consortium. Each data site serves as an edge storage and performs edge computing to generate and transmit back highly aggregated functional values with which inversion back to the values of input variables is impossible. The design ensures the preservation of total data privacy. The calibrated model is then shared as a **common good** among the Consortium members. (Please refer to the conceptual schema on page 3.)

AIDF in collaboration with CriAT, an NUS FinTech spin-off, has developed the beta-version of **iCASS** (intelligent Credit Analytics Sharing System) that performs distributed calibrations of large-scale credit risk models over multiple privacy-protected data sites. **iCASS** is robust to network latency and capable of tolerating localized data site failures during a calibration session. (Please refer to a screenshot of **iCASS** on page 4.)

Guiding principles

1. The founding members will form the **Governing Board** to set policies for the operation of the Consortium. AIDF serves as the secretariat of the Consortium and retains a seat at the **Governing Board**.
2. The Consortium members make an initial contribution of their credit data defined by the **Governing Board** and commit to, say, quarterly updating the data. Data fields and coverage will be determined by a working group appointed by the **Governing Board**. The working group shall take into account data availability and practicality. Only highly aggregated functional values critical to “federated learning” will be transmitted to the **Model Calibration Central** physically located in AIDF, but the protected data will never leave individual members’ data servers.
3. AIDF maintains a **User Support Central** to respond to queries of **PD** and/or **RR** accompanied by member-supplied obligor/instrument attributes after computing with the calibrated model. The **Governing Board** may decide on a fee schedule for such queries as a means of supporting the continual operation of the Consortium.
4. To address potential **free ridership**, the Consortium may adopt tiered memberships to reflect different levels of data/financial/technical contribution. The decision authority resides with the **Governing Board**. The Consortium members shall consent to a third-party audit to ensure integrity of the contributed data. (Examples of privileges granted to the highest-tiered members can be (1) the exclusive access to the model that is calibrated to the full dataset as opposed to the baseline model that only utilizes a random subset of the contributed data, and/or (2) a more favourable query fee schedule.)
5. AIDF and CriAT together grant the Consortium the usage right of their jointly developed **iCASS** as long as the Consortium remains not-for-profit. AIDF will leverage **iCASS** in its research efforts to advance the scientific methodology for assessing SME credit risks which can in turn benefit the Consortium members through their business applications.
6. AIDF contributes its NUS-CRI database to the Consortium’s modelling efforts. The database comprises, among other things, 30 years of comprehensive data on exchange-listed SMEs in the ASEAN region.
7. AIDF covers the first-year operating costs of the Consortium and absorbs the implementation expenses of **iCASS**. The **Governing Board** will determine the formulas for setting member fees and query fees to support the continual operation in future years.

The Schema of the ASEAN SME-CAC Federated Model Calibration Over Privacy-protected Distributed Data Sites



iCASS1.0 (intelligent Credit Analytics Sharing System) *



* **iCASS** is a joint effort of the Asian Institute of Digital Finance (AIDF) in the National University of Singapore (NUS) and CriAT, a Singapore-registered FinTech firm and an NUS spin-off. The development team is led by Prof Jin-Chuan DUAN (AIDF and CriAT) assisted by Shuping LI (AIDF), Yu-Hung CHIEN (AIDF), Xiaoxi WANG (CriAT), Kishore PRABHU (CriAT) and Shibo PENG (CriAT). (Note: Prof Duan is a co-founder and the non-executive chairman of CriAT.)

