Buy Now Pay Later

DeepCredit Proposal

Scoping eTR+ Rebuild project

May 26, 2025

deepcredit

Introduction

CTOS has engaged **DeepCredit** to support the **scoping** of the project to **rebuild the eTR+ platform** in response to urgent regulatory, operational, and strategic drivers:

- The **Consumer Credit Act (CCA)** coming into force in **December 2025 mandates BNPL reporting to a licensed CRA**, triggering significant growth in contributor numbers and record volumes.

- CTOS had already identified that the **current infrastructure had reached its limits,** and that the related data processes would benefit from **further automation** and increased **data quality controls** prior to **scaling.**

- DeepCredit drafted a **proposal for the rebuild of the eTR+ platform**, based on the discussions held with the CTOS team and the material shared in the past few weeks. This presentation summarizes the key points from this process

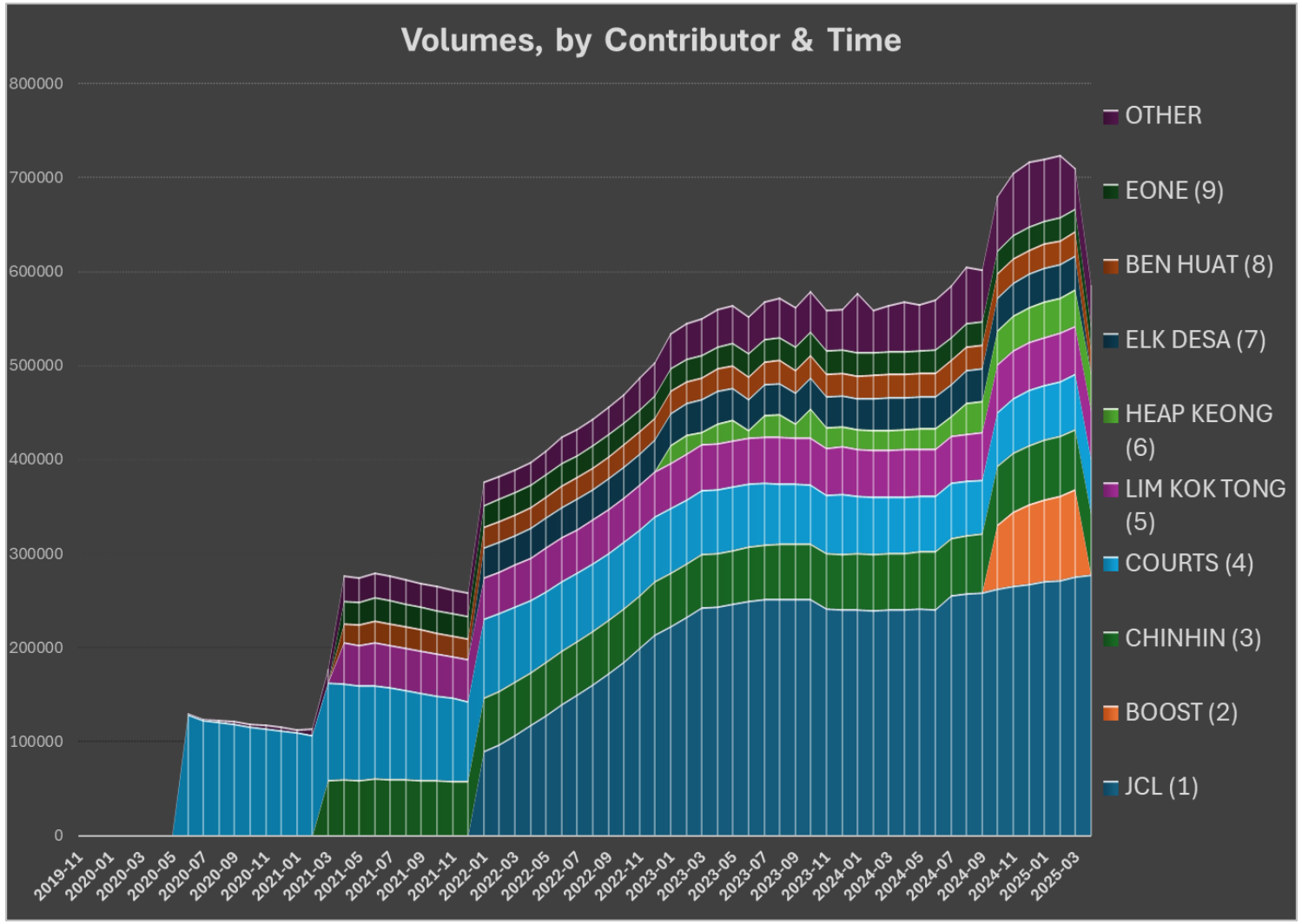
Contributors (as of 2025-05)

Size Group	Contributors (Short Name)	Contributors (Count)	Records (Latest)	Records (Latest %)	History (Num of Months)	Recency Lag (Num of Months)
>10K Monthly	**JCL, BOOST, CHINHIN, COURTS, LIM KOK TONG**, HEAP KEONG, ELK DESA, BEN HUAT, EONE	**9**	**658,142**	**90.85%**	**41.0**	**1.2**
1K to 10K Monthly	DIRECT LENDING, FOHCHONG, 365 CAPITAL, NEW CHEN, FS, CHONG, FUNDAZTIC, ACOM, SURIA JERAI, SOUTHERN, KEAT SENG, MBSM, BIGPAY, KOWAJA	14	62,429	8.62%	35.9	1.6
<1K Monthly	SEP, MYEG ISLAMIC, MYEG FINANCE, MEE HUA, EBEST, KBB, CHP, MUTIARA, QUICKASH, CML, MLC	11	3,834	0.53%	28.8	1.7
Total		**34**	**724,405**	**100.00%**	**35.0**	**1.6**

Contributors

- 91% of records coming from Top-9 contributors
- The group of top contributors has better recency / lower lag (1.2 vs 1.6)
- JCL is the biggest one, contributing 38% of records, followed by Boost contributing 12%

Contributors: Volumes Overview



Contributors

- Among the top contributors, Boost is the most recent addition (2024.10) and Courts the oldest one (2020.05)
- Volumes have been increasing gradually, with visible jumps ion 2021, 2022, 2024 (Boost)

Contributors: Business Mix

Short Name	Company	Website	Description	Category (*assumption)	Records (%)
JCL	JCL Credit Leasing Sdn Bhd	jcl.my	Offers *Product Financing* for electrical appliances, furniture, and more; also provides personal loans and i-Fund (Shariah-compliant).	Retail Installment Financing	37.60%
BOOST	Boost Credit	myboost.co	Offers both *Capital by Boost* for MSMEs (Shariah-compliant business loans) and *Personal Financing* for consumers via digital onboarding.	Digital Lender – Consumer & SME	12.40%
CHINHIN	Chin Hin (Jitra) Sdn Bhd	chinhin.com	Motorcycle distributor since 1971 (Kedah), offering shop-based vehicle hire-purchase and installment loans.	Vehicle / Motor Hire-Purchase	8.82%
COURTS	Courts (Malaysia) Sdn Bhd	courts.com.my	Retailer of electronics, furniture, and appliances with in-house flexible installment payment plans (FlexiPlans, FlexiHome).	Retail Installment Financing	7.97%
LIM KOK TONG	Lim Kok Tong Motors Sdn Bhd	limkoktongmotors.com	Kedah-Perlis based Yamaha motorcycle dealer offering zero-interest or low-interest installment and hire-purchase packages.	Vehicle / Motor Hire-Purchase	7.08%
HEAP KEONG	Heap Keong Motor	hkmotor.com.my	Yamaha motorcycle dealership with a long-standing presence; offers hire-purchase options to customers.	Vehicle / Motor Hire-Purchase	5.17%
ELK DESA	ELK Desa Capital Sdn Bhd	elk-desa.com.my	Listed subsidiary of ELK-Desa Resources; provides vehicle hire-purchase financing and some consumer-focused services.	Vehicle / Motor Hire-Purchase	4.89%
BEN HUAT	Ben Huat Motors (K) Sdn Bhd	ben-huat-link	Likely a regional motorcycle or small vehicle dealer; inferred to offer hire-purchase financing based on trade name and registration.	Vehicle / Motor Hire-Purchase	3.55%
EONE	Eone Credit Sdn Bhd	eone-link	Licensed money lender or hire-purchase provider; trade directories list them under motorcycle/vehicle credit activities.	Vehicle / Motor Hire-Purchase	3.36%

Contributors

- Among the top contributors, the most prominent business case seems to be related to **motor financing** (this is expected to change)
- 32% of total records seem to be coming from businesses that primarily/only do **motor financing**
- Likely several records from JCL and Boost could also be related to that category

Observations & Requirements

	Observations	Impact	Proposed improvements
General	**CCA 2025 comes in effect Dec 2025**, with a 6-month grace period to start reporting	CTOS wants to be able to present a best practice solution, and swiftly and effectively onboard new BNPL business into the eTR+	1. Create a **best practice eTR+ solution in AWS** responding to (a) the **CCA 2025** regulatory change opportunity and (b) Cloud adoption requirement. 2. Promote automation for **operations efficiency, scalability** 3. Improve **data quality** in a demonstrable manner, with a data quality framework (KPIs, dashboards, management reports). 4. Create data quality and operations dashboards to reduce the need for analysts working on ad-hoc reports, and inter-departmental deliberations **(operational efficiency, data quality)** 5. Make the new platform capable to more easily add features, starting from the calculated variables feature **(New Product Development, Monetization)**
	CTOS has decided to move into AWS	Re-platforming of the eTR+ to AWS is given, due to the Cloud strategy of the business	
	Currently there are **35 contributors** (1 with varying layout not loaded) and approximately **700K** records ingested monthly. The expectations is for **contributors to double (x2)**, and **records ingested monthly to quadruple (x4 – x5)** as big contributors expected to be onboarded	The **current infrastructure is already at it's limits** based on the team feedback. Action is required to be able to handle the **expected increased volumes** **Varying layout currently not loaded**	
	Both the data ops team and the analytics team have separate data quality reports in place The team's feedback is that **the level of data quality achieved is not the desirable one**	Enhancements to the **data quality** controls and framework are required **Duplication of analyst efforts**	
	The current infrastructure does not support calculated variables, one of the opportunities identified for further **data monetisation**	It would be **difficult to add calculated features in the existing process**, limiting **new product development** capabilities	

Observations & Requirements

	Observations	Impact	Proposed improvements
Existing Submission Process	Existing raw data layout covering fixed payments is **loosely defined and enforced** There is a **feedback loop** requesting **corrections** by contributors, with significant **manual interventions**	The ingestion process has multiple variants of ingesting the raw file (one for each contributor) There is significant operational complexity, increasing operational risk	6. The raw data layout and instructions to contributors require update & enforcement **(data quality, operational efficiency)** 7. The process should be further automated using AWS and open-source capabilities **(operational efficiency, scalability)**
	Enhancements to the existing raw data layout have been identified by the team: 1. Customer & product limit fields to be added 2. Varying payments layout is not being loaded currently	Updates to the existing raw data layout are required even without rebuilt, development efforts to ingest varying payments (cases identified include certain BNPL products and utilities)	
	The walk through of the process indicates a **large degree of complex manual steps** required by the operator. **High dependency on specialised resource.**	Large degree of manual steps increases operational risk, hinders operational efficiency required to scale	8. The pipelines need to be restructured in a robust way, that makes steps easy to be repeated even by a non-expert employee **(data quality, operational efficiency, operational risk reduction, scalability)**
	The on-premise server currently service the process **struggles with the current volumes** The team is using a memory-intensive process (pandas)	The team recognised that the current hardware + programming approach is already at it's limits with current volumes; difficult to support higher ones	6. While flexible, the current process is too complex given the simple layout (just 40 fields and 35 contributors) 7. The infrastructure and programming approach has reached its limits, an upgrade is necessary **(scalability)**
	The provided ERD diagram had 143 tables, only 4 out of which are the final tables. Schema indicates **no separation between production and UAT databases.**	Without cleanup and separation of production and UAT databases, there is increased operational risk.	8. UAT and production need to be clearly and firmly separated **(operational risk)**

Conclusions

Challenges to be addressed	Scope of work required
Challenges with the current process and on-premise infrastructure, need to improve to handle x5 volumes and intensified competion: ❖ **Operational Efficiency** (and reduce **Operational Risk**) ❖ **Scalability** ❖ **Data Quality** & **Monitoring** ❖ **Ease of new product development** & **Monetisation**	Rebuild eTR+ processes into pipelines and upgrade infrastructure in AWS **1) Redesign** the **data loading** process, **KPIs**, **and Data Quality** frameworks. Revise the Raw Data Layout and instructions. **2) Implement the new** end-to-end loading process/**data pipelines** 3) Build **monitoring reports and dashboards for data quality & operations** 4) Develop requested **new feature layer**

Project Phases

Phases	Sprints (Months)	Milestones
Phase I, Design & Setup	**1-2**	**Project Kick Off** ❑ High Level Plan Review ❑ Access provisioning and initial technical setup ❑ Review of existing controls and infrastructure ❑ KPIs and priorities
Phase II, Development	**2-6***	**Development Starts** ❑ Development of data ingestion and transformation pipelines ❑ Implementation of data quality checks and metrics ❑ Buildout of dashboards and automated reports ❑ Development and integration of feature layer ❑ **Sprint-based demos and feedback (Strive to expedite completion)**
Phase III, Stabilisation & Handover	**7*-9**	**Parallel Run Starts** • System testing, fine-tuning and performance validation • Load testing to confirm scalability and reliability under production volumes • Parallel validation with current platform • Completion of documentation and training **Full handover to CTOS team**

deepcredit

Project Team & Work

Team	Responsibilities
DeepCredit Team	**Team Lead Consultant, Data Scientist, Data Engineer** ❑ Agile project management; prioritisation & reporting ❑ Coordinate with CTOS IT on AWS implementation ❑ Coordinate with CTOS team on business requirements, sprints' feedback ❑ Coordinate with/Guide CTOS team on UAT ❑ Develop and implement automated data pipelines ❑ Data quality dashboards and reports ❑ Create derived features for reporting and analysis ❑ Training, handover, post implementation support
CTOS IT	❑ Provide and manage secure access to development team (AWS, Confluence, JIRA) ❑ Coordinate with DeepCredit team on AWS implementation ❑ Switch of the reporting engine to the new source
CTOS Data Ops Specialist & Business Stakeholders	❑ Current platform operations until parallel run complete ❑ Provide input for business requirements and sprints' feedback ❑ Perform User Acceptance Test and provide sign-off

Disciplined Agile approach

- Work in **Sprints**, towards **Milestones**
- Monthly iterations, with **demos to internal stakeholders**
- **Start UAT early**, to minimise risk
- **Management visibility** and feedback with monthly progress review meetings

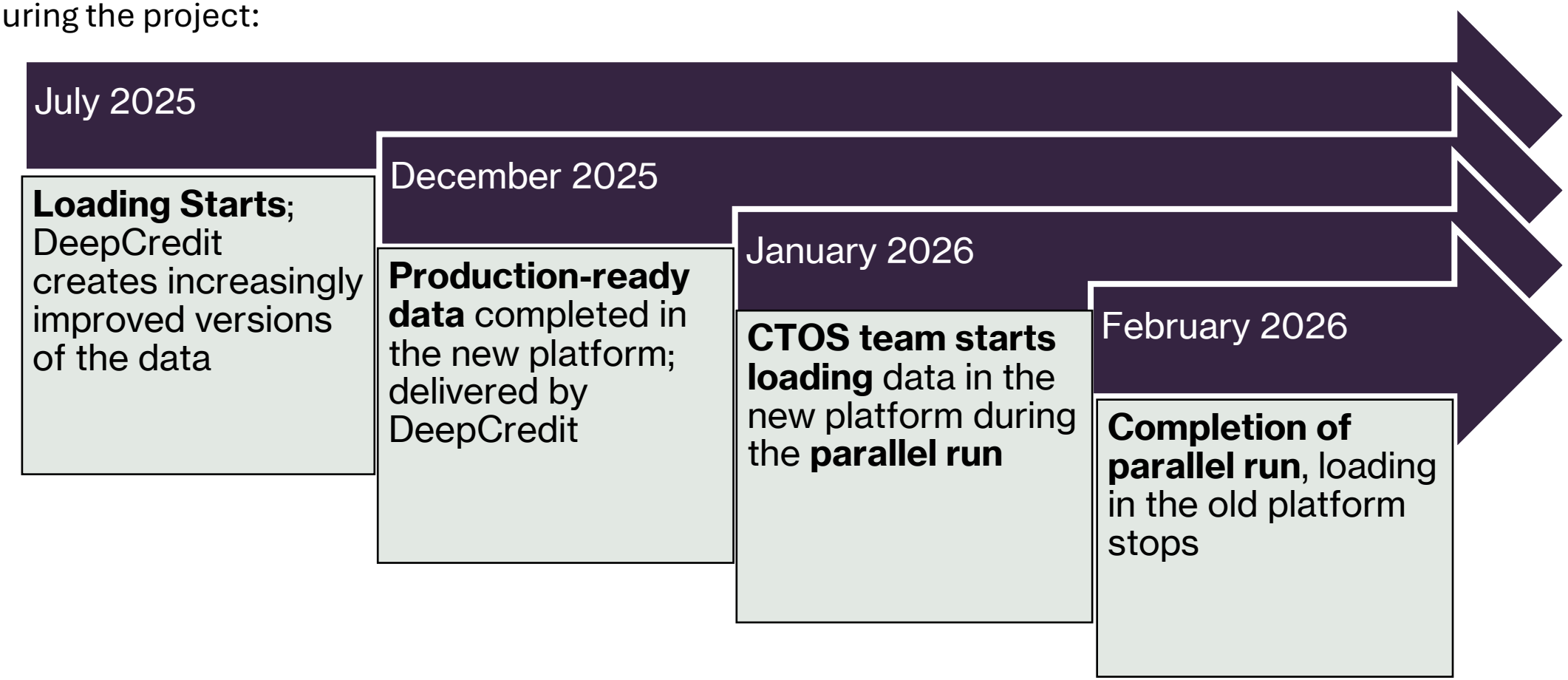
deepcredit

Project Timeline

Project duration	Development : 6 Months Parallel run & Testing: 3 Months **Total: 9 Months** Agile implementation; dependencies to CTOS can change total duration
Timeline	Assuming **contract commencement on June 1st**: **Parallel run (i.e. production loading) to start Dec-2025**, full roll out by Feb-2025. Agile implementation; dependencies to CTOS can change total duration
DeepCredit team	Lead Consultant/PM, Data Scientist, Data Engineer Coordinating, developing and loading data during development; Coordinating, finetuning, troubleshouting and training during parallel run

Project Timeline : Loading

Assuming **a commencement date of June 1st, 2025,** and **depending on CTOS timely actions agreed** during the project:



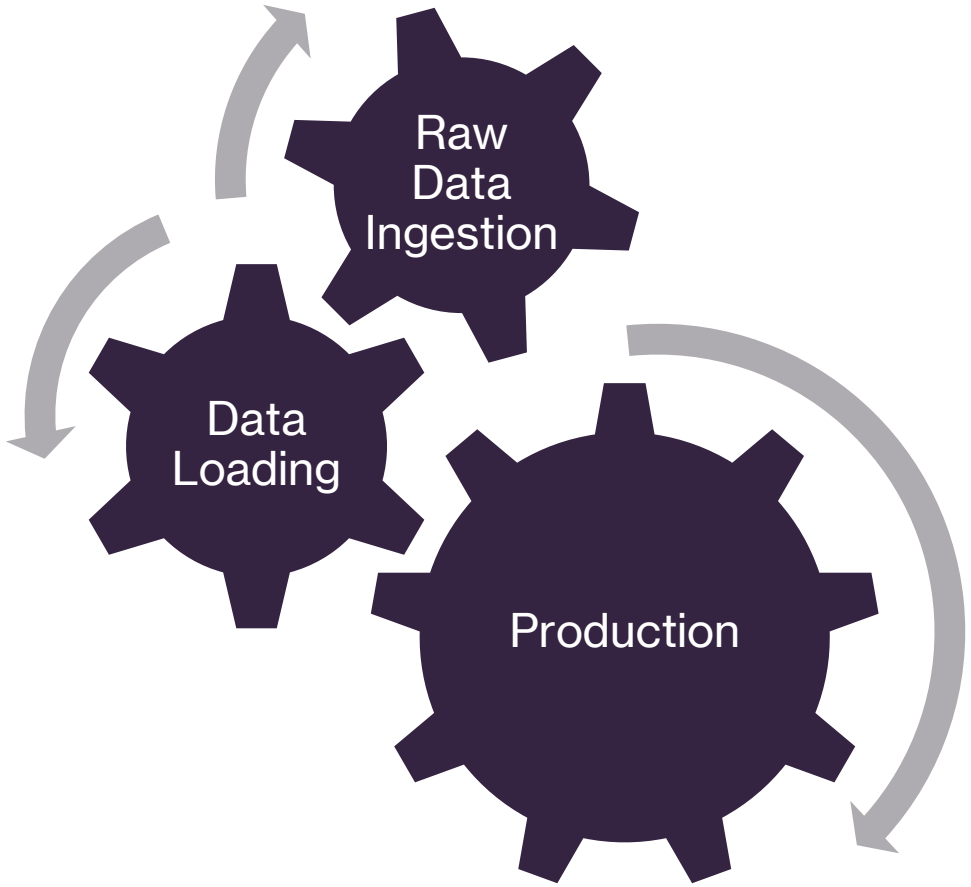
Development risk and current unknowns exist; DeepCredit will identify and alert early, proposing actions to ensure timely completing Milestones set during the project.

Annex

Dashboards & Reports Preview

Monitoring Dashboards

Illustrative Examples



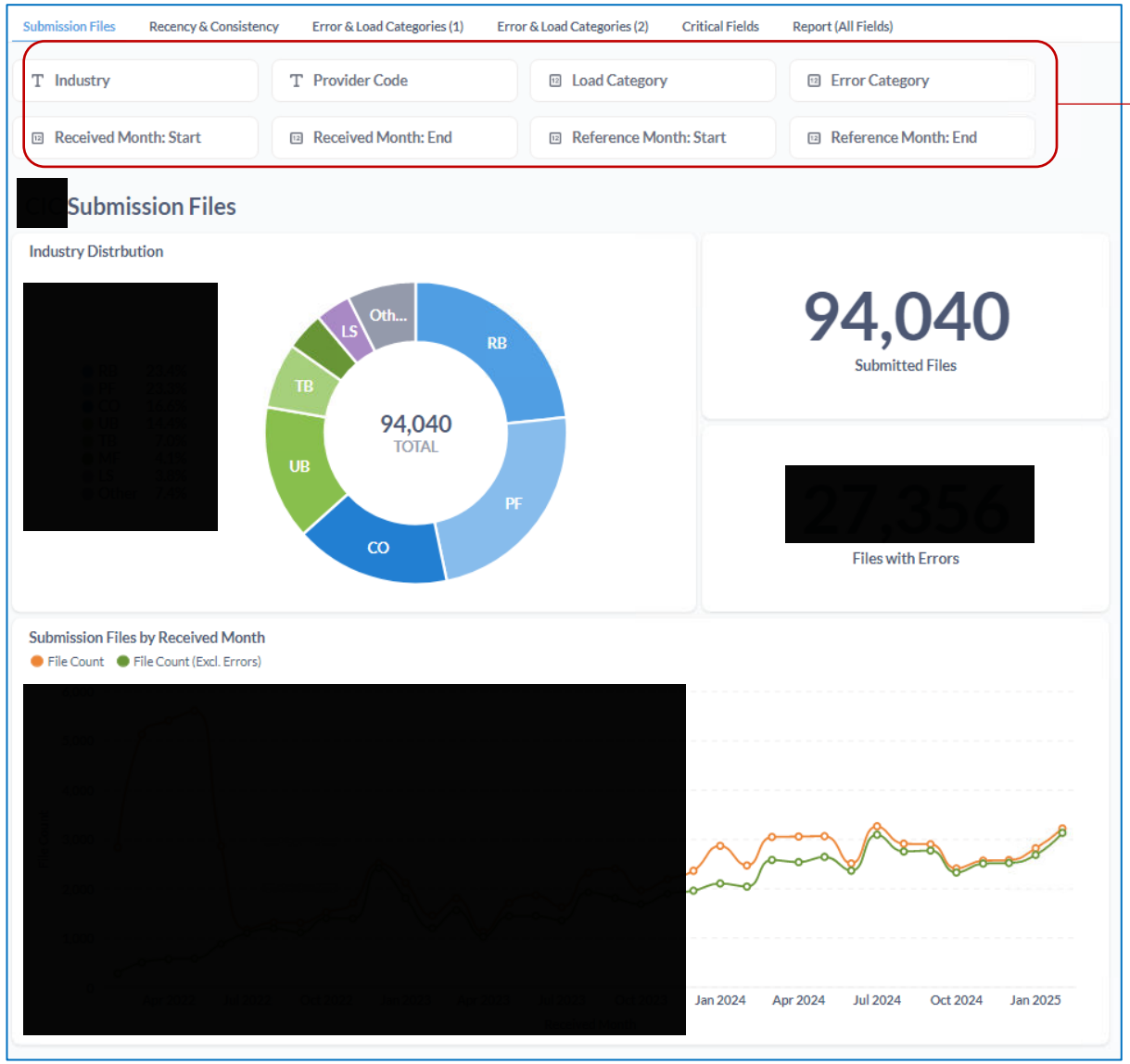
- ✓ Dashboards by processing stage, aligned to the redesigned data flow

- ✓ Raw Data Ingestion
  - ❑ File-level
  - ❑ Record-level
  - ❑ Submitting Entity Level

- ✓ Data Loading
  - ❑ Across time periods
  - ❑ Advanced controls
  - ❑ Operations Efficiency

- ✓ Production
  - ❑ Enquiries
  - ❑ By provider
  - ❑ By Enquiry Type

Raw data quality (1)



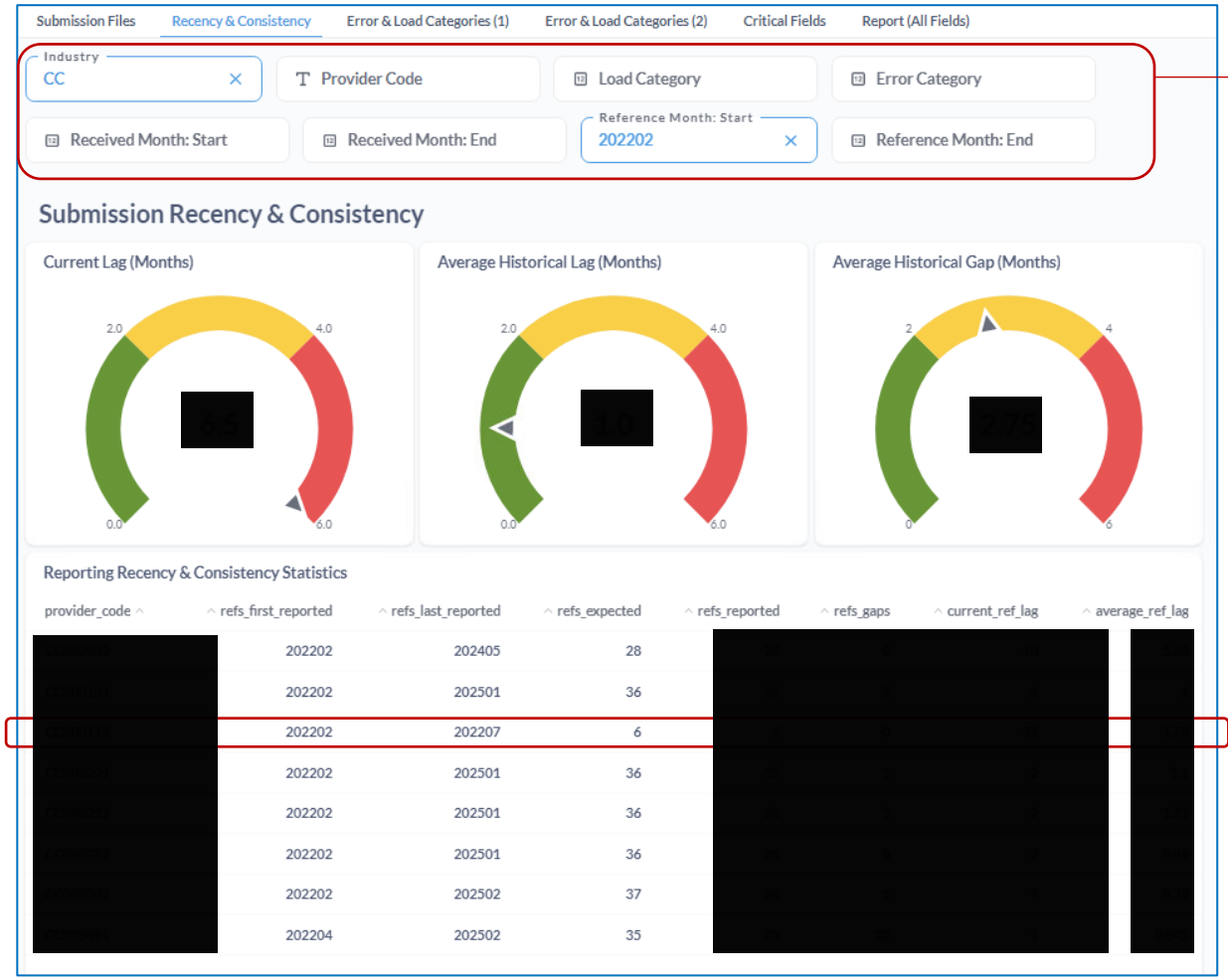
Allowed Filters

View: Submission files

- ✓ All files received
- ✓ Submissions with significant file-level errors
- ✓ By month received
- ❖ Number of error files

deepcredit

Raw data quality (2)



Example: Limit to CC companies, Ref>=2022-02

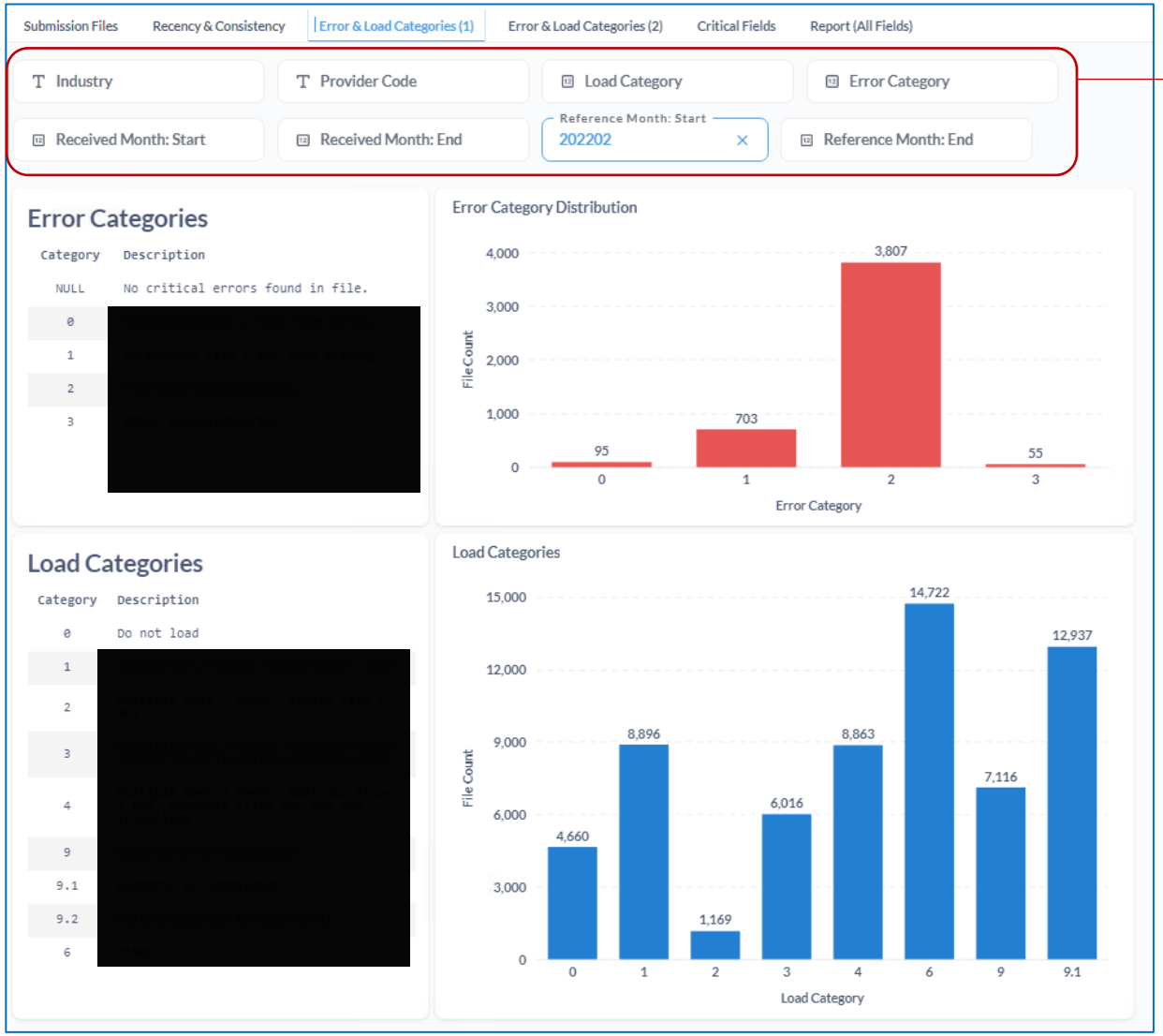
Example: Identified Problematic Submitting Entity!

View: Subscriber Recency & Consistency

- ✓ **Recency**: Lag in Months
- ✓ **Consistency**: Gaps in Months

deepcredit

Raw data quality (3)



Example: Limit to Ref>=2022-02

View: File-level Error Categories

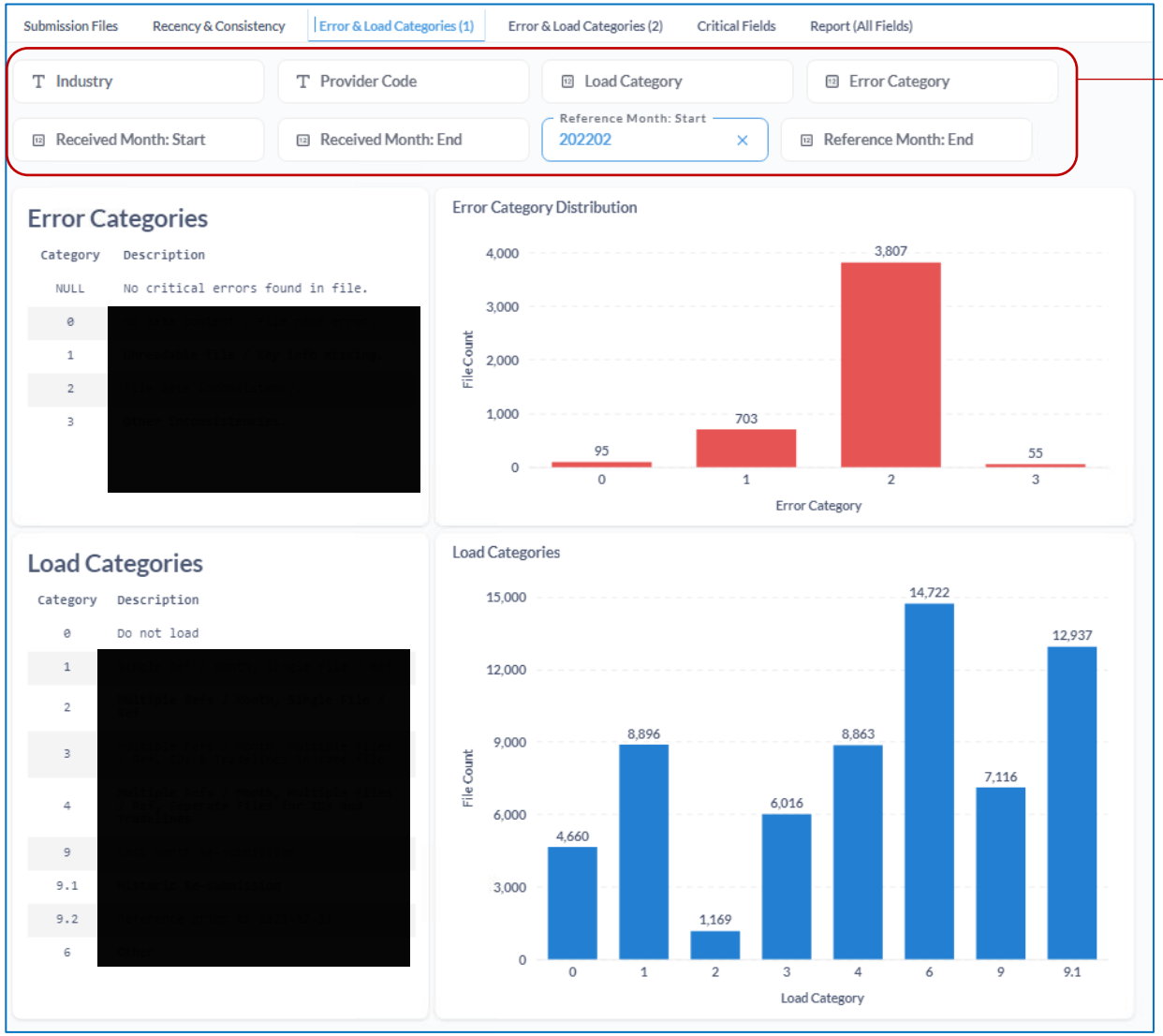
- File-level error categories, leading to rejection of the file entirely

View: Load Categories

- Load Categories are automatically calculated
- They separate submissions by complexity and into normal vs. re-sumbissions

deepcredit

Raw data quality (4)



Example: Limit to Ref>=2022-02

View: File-level Error Categories

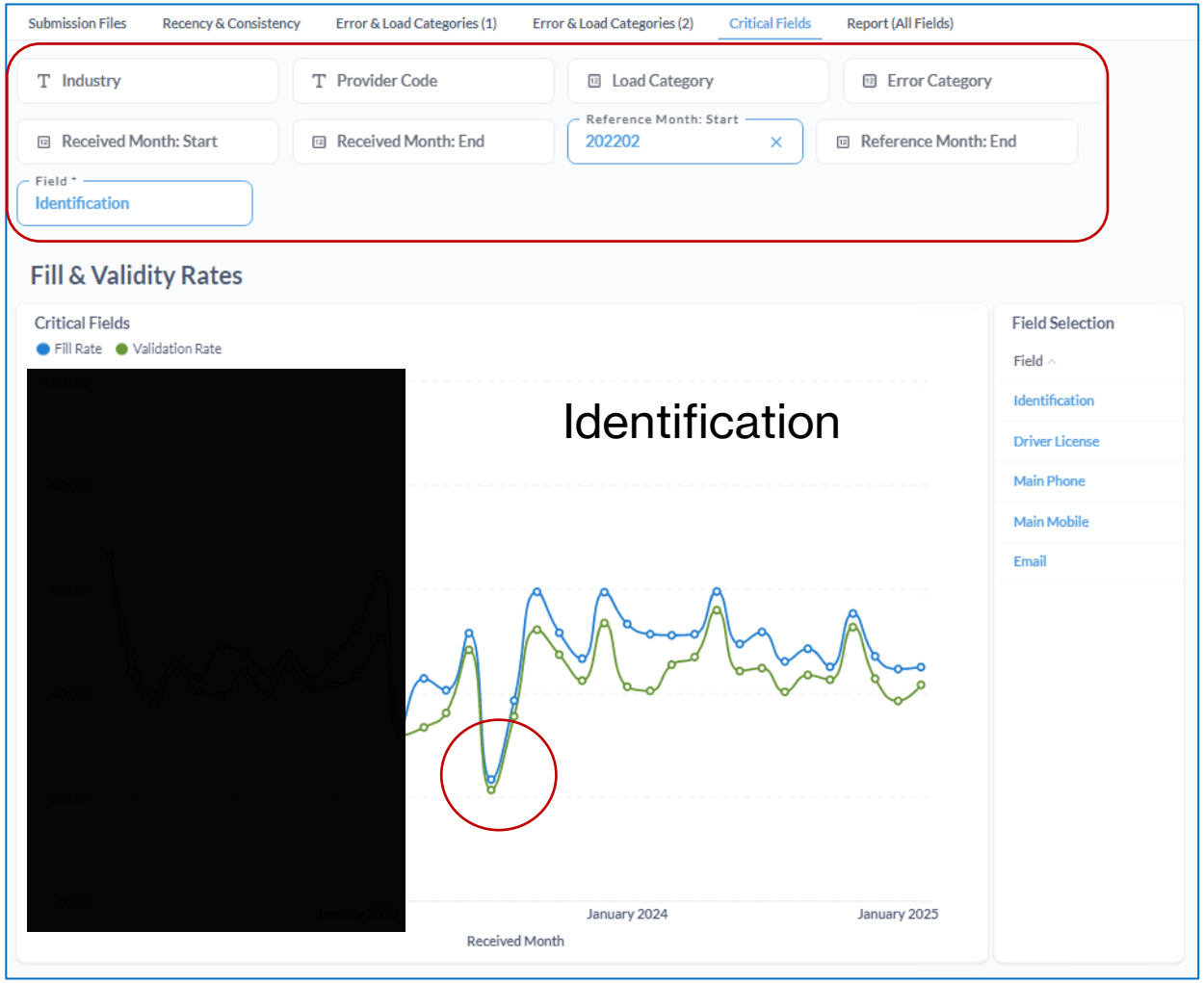
- File-level error categories, leading to rejection of the file entirely

View: Load Categories

- Load Categories are automatically calculated
- They separate submissions by complexity and into normal vs. re-sumbissions

deepcredit

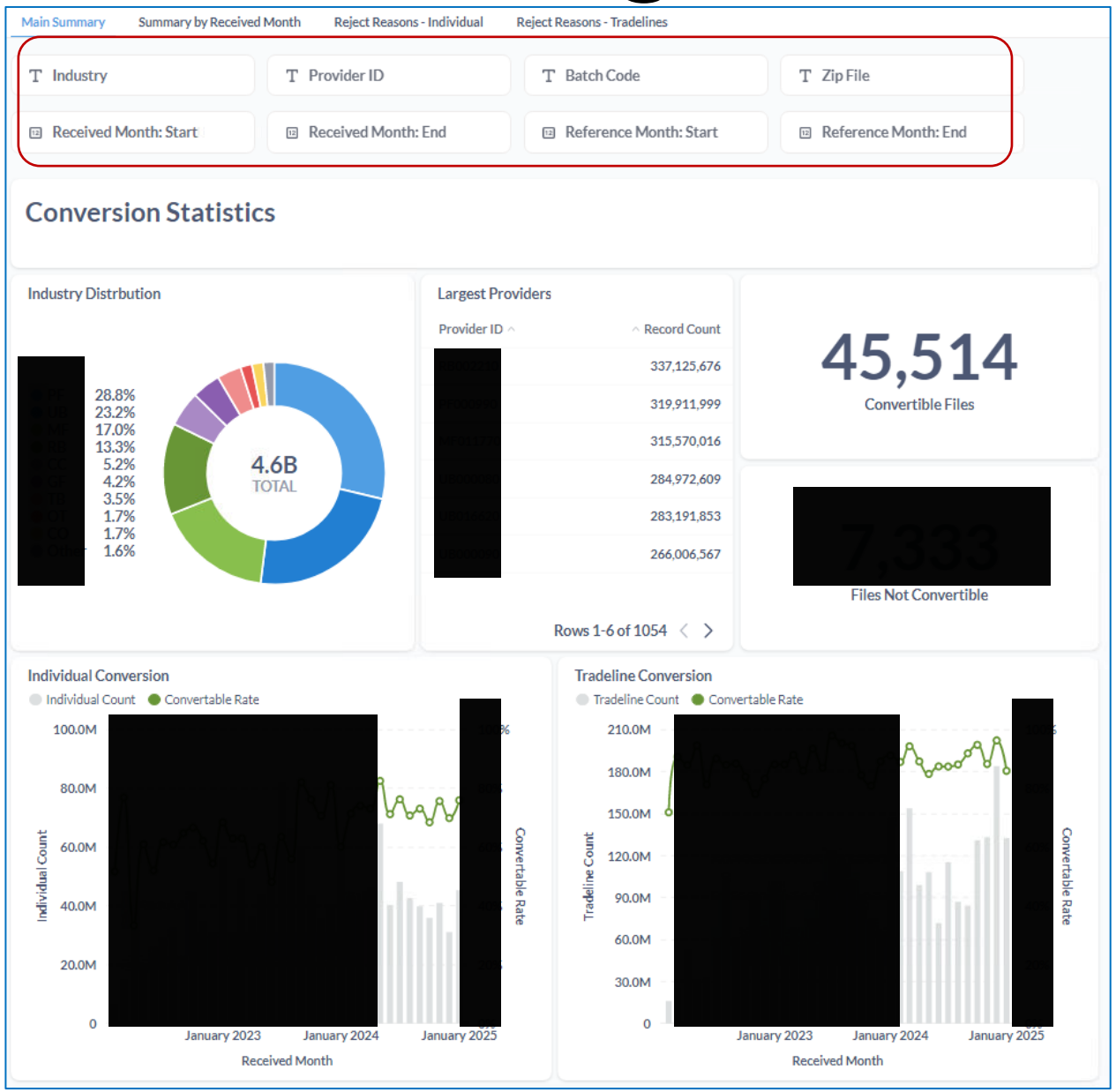
Raw data quality (5)



View: Critical Fields

- ✓ Fill & Validity Rates for Key Fields
- ✓ Anomaly detection
- ➢ Can be expanded to all fields

Data Loading (1)



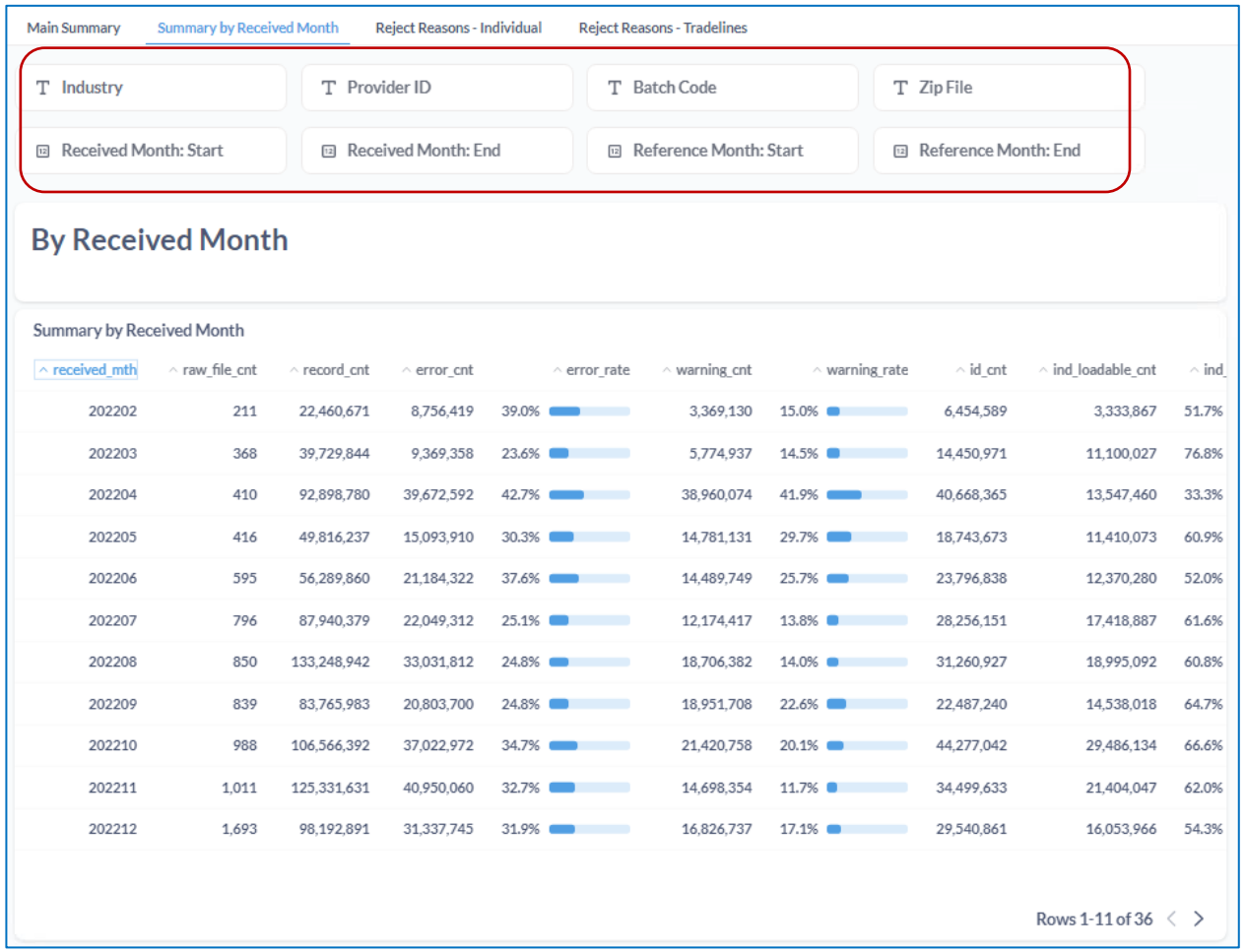
View: Conversion Statistics

- Files for which loading to GDS was attempted
- ❖ Files Non-Convertible means 0 records passed record-level quality controls

- Conversion Rate for Individuals, Tradelines by Received Month

deepcredit

Data Loading (2)

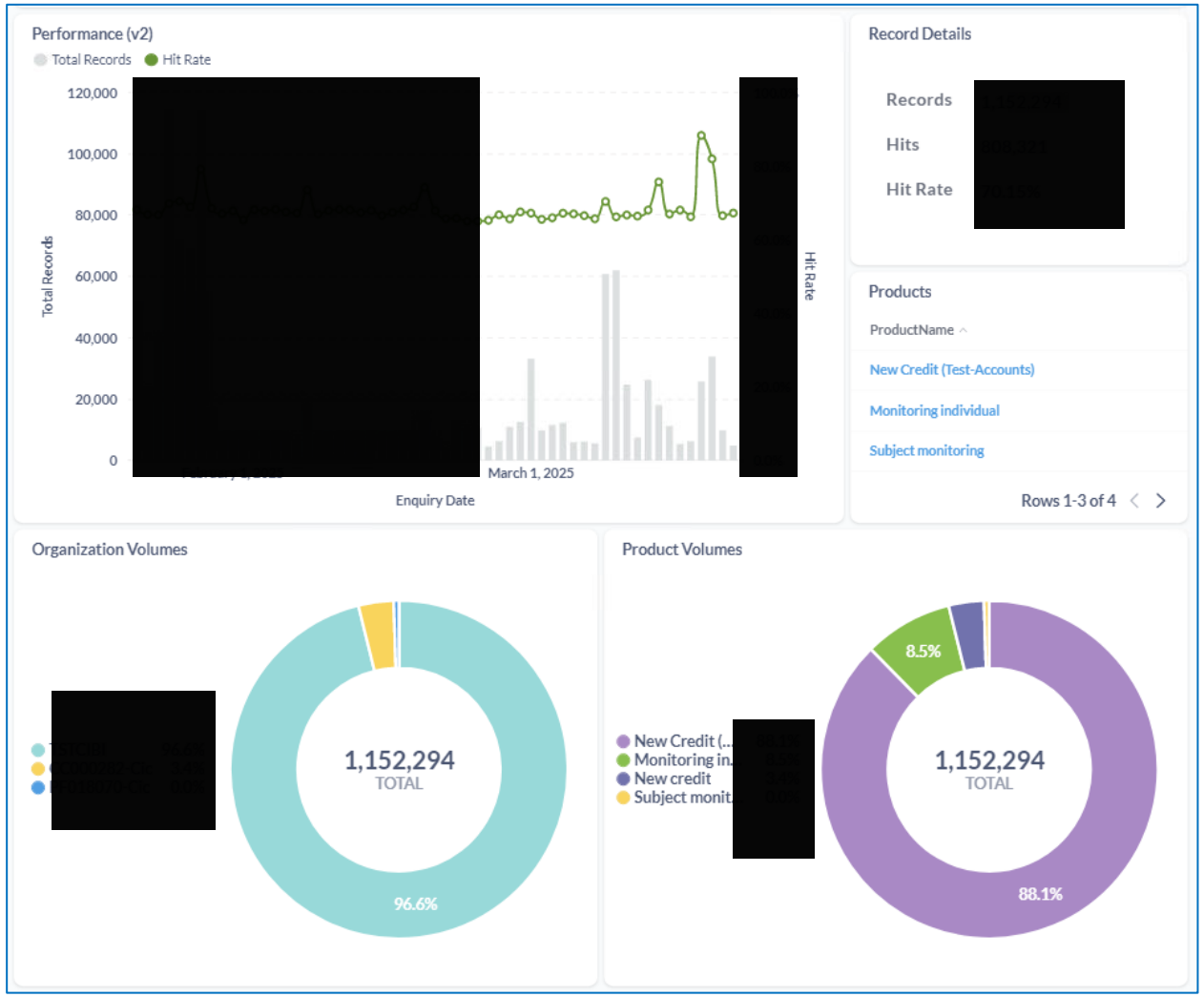


received_mth	raw_file_cnt	record_cnt	error_cnt	error_rate	warning_cnt	warning_rate	id_cnt	ind_loadable_cnt	ind_
202202	211	22,460,671	8,756,419	39.0%	3,369,130	15.0%	6,454,589	3,333,867	51.7%
202203	368	39,729,844	9,369,358	23.6%	5,774,937	14.5%	14,450,971	11,100,027	76.8%
202204	410	92,898,780	39,672,592	42.7%	38,960,074	41.9%	40,668,365	13,547,460	33.3%
202205	416	49,816,237	15,093,910	30.3%	14,781,131	29.7%	18,743,673	11,410,073	60.9%
202206	595	56,289,860	21,184,322	37.6%	14,489,749	25.7%	23,796,838	12,370,280	52.0%
202207	796	87,940,379	22,049,312	25.1%	12,174,417	13.8%	28,256,151	17,418,887	61.6%
202208	850	133,248,942	33,031,812	24.8%	18,706,382	14.0%	31,260,927	18,995,092	60.8%
202209	839	83,765,983	20,803,700	24.8%	18,951,708	22.6%	22,487,240	14,538,018	64.7%
202210	988	106,566,392	37,022,972	34.7%	21,420,758	20.1%	44,277,042	29,486,134	66.6%
202211	1,011	125,331,631	40,950,060	32.7%	14,698,354	11.7%	34,499,633	21,404,047	62.0%
202212	1,693	98,192,891	31,337,745	31.9%	16,826,737	17.1%	29,540,861	16,053,966	54.3%

View: Conversion Statistics

- Summary by Received Month

Production (Enquiries & hit rate)



View: All Enquiries

- Includes all types of enquiries


Thank you!
deepcredit

Q&A

eTR+ Rebuilt : Solution Overview

deepcredit

CTOS eTR+ Rebuild: Solution Overview

eTR+ Modules

Explore the architectural modules and components of the eTR+ enhanced system

Technology Stack

Comprehensive overview of technologies, frameworks, and tools used in the project

Project Phases

Timeline and roadmap showing development phases and milestones

Draft DataFlow

Data processing pipeline architecture and flow diagrams