G-Cloud 13

Lot 2 Cloud Software

Service Definition

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1 INTRODUCTION

1.1 COMPANY OVERVIEW

Trilateral Research a UK and IE-based enterprise founded in 2004, is a leading ethical AI company. Trilateral Research brings the rigour of interdisciplinary research to solve complex societal problems. Our teams are at the forefront of all things 'data' in our complex world: from understanding the problem and what data is needed, collection, processing, interpreting, analysis and modelling to the consideration of emerging policy and regulations in AI innovation.

Our solutions make it possible for public sector professionals to make the best use of their data. We focus our efforts on areas where the application of our software and services can make a difference in supporting decision making to enhance societal wellbeing.

We provide a combination of solutions to tackle complex social problems that combine our Sociotech for Good software products and consulting services:

- *Cloud-based data analytics platforms and problem-specific applications powered by the latest AWS Services ensuring security by design and scalability*
- *State of the art explainable machine learning modules specialising in natural language processing, network analysis, pattern recognition and risk assessment*
- *Subject matter experts specialised in problem definition, data acquisition, analysis and synthesis*
- *Data sharing enablement via our in-house data protection services provider – voted Europe's Top 10 GDPR provider in 2021*

We are a trusted supplier, with over 18 years' experience of providing consulting services and software to tackle social problems.

We have a wide range of clients including Greater Manchester Combined Authority, Avon and Somerset Police, Guys and St Thomas's Charity Trust, the Information Commissioner's Office, University of Cambridge, Victoria & Albert Museum, United Nations High Commissioner for Refugees (UNHCR), UK-Ministry of Defence (MOD), Defence and Science Technology Laboratory (DSTL), Cardiff County Council, International Committee of the Red Cross (ICRC) among others. We operate throughout the UK, Ireland and beyond.

Trilateral is a **Cyber Essential Plus** certified organisation and is a signatory to the **UN Global Compact** corporate responsibility initiative and its principles. Further we are committed to honour the **Armed Forces Covenant** and support the Armed Forces Community.

1.2 YOUR PROBLEM, OUR CESIUM SOLUTION

The Problem: restricted ability to share data among multi-agency partners

The United Kingdom's Safeguarding Children Partnerships are responsible for multi-agency collaboration to ensure that children and young people are safeguarded and supported to improve their lives. The 2021 Wood Review identified a particular challenge with the current multi-agency safeguarding arrangements:

> *How can we help hard pressed, stressed professionals to feel empowered to ask for and share information and to inculcate an attitude of sharing and openness in those who control the data and information?*

The present multi-agency arrangements comprise statutory safeguarding partnerships between local government, the police and health services. In addition to these statutory partners there are local schools and charities who identify and refer at-risk children. In many cases, the partners work well together; nonetheless, the 2020 Child Safeguarding practice review identified a need, "to move beyond the legislative and procedural, to the technological and the behavioural, and forensically explore how we can develop our multi-agency and multi-disciplinary practice…which strengthens information sharing, risk- assessment and decision making". Key to this, is the recognition that **the better the sharing and analysis of data, the more safeguarding professionals can focus on improving the lives of children**.

The Solution: CESIUM - Child Exploitation, Assessment, and Identification Using Machine Learning

In response to these identified challenges for safeguarding partnerships, CESIUM empowers safeguarding professionals with a secure platform for the ethical sharing and analysis of multi-agency data. The sharing of data is enabled by a secure cloud-based environment to integrate the various databases used by safeguarding partners. Multiple records about the same case from different partnership databases are fused into a single view.

From this secure platform, CESIUM augments the Multi-Agency Child Exploitation (MACE) decision making process with ethically designed risk assessment tools. These risk assessment tools have been co-designed and developed with safeguarding professionals and draw upon cutting edge data analytics and machine learning technologies. By automating many routine tasks, CESIUM reduces the time safeguarding professionals spend on administering data, and more time on supporting at-risk children through the MACE process. Of note, CESIUM's machine learning has been designed to identify children within a partnership's databases who may have otherwise been missed.

In addition to the technical challenges, the multi-agency sharing of data has considerable ethical considerations. In response, CESIUM is supported by Trilateral Research's leading data ethics practice with bespoke data sharing agreements and ethical impact assessments. In accordance with our ethical principles, Trilateral Research provides comprehensive digital literacy training to ensure users understand how to correctly interpret and critique CESIUM's machine learning outputs.

Benefits to the user

CESIUM has two core benefits:

1. Identify and assess at-risk children who are known to the safeguarding partnership but may have otherwise been missed
2. Support an increase in operational efficiency for tackling child exploitation

Presently a child is referred to a safeguarding partnership by a partner agency such as a school or charity. CESIUM's algorithm augments this referral processes by using past cases to identify children who are known to the partnership and are subject to exploitation but have not been referred by a partner agency. As such, CESIUM seeks to identify as-risk children who may not have otherwise received support.

In many cases, the current MACE process is enabled using word processors and spreadsheets. While these tools are effective, they are not necessarily efficient, and they enable only limited data analysis. Ultimately, CESIUM seeks to remove the need for word processor documents and spreadsheets with an integrated software platform. Many of the routine tasks are then automated to give analysts more time to manage and support at-risk children.

Core features and functionality

The core features and functionality are about augmenting the analytical experience for assured decision making.

- Identify and prioritise cases in partnership databases who may require MACE referral
- Ethically designed machine learning algorithms in accordance with the values of Explainable AI
- Match instances of the same case from across multiple databases
- Search across multiple databases for different records of same person
- Single view of the same person recorded in multiple databases
- Explore page to generate focussed queries of CESIUM's database
- Timeline analysis to show all recorded events about a case
- Associates diagram to visualise and analyse a case's known connections
- Data engineering service to integrate a safeguarding partnership's databases
- Data sharing agreements which incorporate ethical impact assessment
- Digital literacy training to understand, interpret and critique machine learning

Within Trilateral Research, we take a responsible approach to data-driven decision making. We are a **Cyber Essentials Plus** certified company. These tools have been designed and built using the following principles:

- **Privacy and ethics by design** - ensuring that privacy and ethical considerations are embedded in the design and development of the platform, modules and applications. Further, during the development process we have engaged with our data protection, privacy and ethics experts in Trilateral Research to run data protection, privacy and ethical impact assessments with the developers and end users of the solution(s), ensuring that risks are jointly mitigated and that appropriate measures are included for algorithmic transparency.
- **Security by design** - ensuring that cyber security concerns are embedded in the design and testing of the system. Among others, the security by design has been based on the following principles: National Cyber Security Centre's 14 Principles, Amazon Web Services Security Best Practices Whitepaper 2016, OWASP Top 10 -2017 - The Ten Most Critical Web Application Security Risks.
- **Research** to ensure socially relevant insights – the multidisciplinary combination of social and technical methods to develop machine learning and natural language processing tools *(among others)* and pull-out relevant information.
- **Co-design methods** to support the agile development cycle, system design, user evaluation and testing.

1.3 SOCIOTECH INSIGHTS GROUP – ASSOCIATE SERVICES

To help you make the most of CESIUM, Trilateral's Sociotech Insights Group offer a range of associate services. For details on pricing see our SFIA rate card and pricing strategy.

Premium technical support

→ Priority troubleshooting
→ Remote technical training
→ Cloud data migration support

Implementation support

→ Implementation of solution(s)
→ Integration support as required

Interdisciplinary analytical support, data & AI services

→ Problem definition.

→ Co-design methods to enhance implementation of features and extend algorithm development leveraging subject matter expertise.
→ Data requirements and identification.
→ Data curation and management.
→ Data collection, creation and preparation for tailored insights.
→ Interdisciplinary support to analyse data to gather insights.
→ Data science services.
→ Algorithmic transparency and validation services to assess algorithms.

Data protection, data ethics and cyber security services

→ Data protection impact assessment for deployment and system integration.
→ Cyber-security risk assessment.
→ Data protection compliance support – data flow mapping, standard operating procedures, and policy definition, effective anonymisation and pseudonymisation, retention period definition.
→ Data sharing agreements, incl. Controller to Process agreements and join controller agreements.
→ Ethical impact assessment and solutions incl. transparency, explainability, accountability, sustainability, consequences, potential dual use.
→ Ethics consulting for future use and upscaling – how to operationalise ethical values and principles for technical innovation.
→ Advising on AI regulation and ethics standards (UK and EU) incl. gap analysis and recommendations

Training

→ Face-to-face and/or virtual training support.
→ Training on the use of our cloud-based data analytics platforms
→ Domain-specific training to enhance analytical insights.
→ Ethics training on ethical values and ethical AI guidance documents that are relevant to the details and context of the product, to facilitate and enhance end user understanding, ensure compliance with AI regulations and promote best practise.

2 DATA PROTECTION

2.1 INFORMATION ASSURANCE

At Trilateral Research we have comprehensive Information Security policies in place. Regular risk assessments are conducted in conjunction with the Business Continuity policy. The Information Security policies form part of the company's Policy and Procedure documents, which are mandatory for all personnel. The Information Security Management Board governs the security approach of the company and products, and this is implemented via the Software Engineering Manager and the Information Security Officer, with the support of IT helpdesk. The Senior Data Protection Advisor and Senior Data Protection Technical Advisor provide regular guidance on policy and procedures. All technical teams have relevant qualifications and experience in data and computer science and engineering and utilise best practice in their work. All cyber security systems are tested internally by the technical team on a regular basis and annually by independent penetration tests and the company is Cyber Essentials Plus accredited. Our staff have experience in applying Risk Management Frameworks such as ISO:27005 which incorporates applying information security management standards such as ISO:27001 and experience applying the NIST Risk Management Framework (NIST 800-37) and associated NIST Security Control frameworks such as NIST 800-53.

2.2 DATA BACK-UP AND RESTORATION

All data stored in the cloud is backed up across multiple availability zones (geographical data centres). London based cloud data centres from Amazon Web Services are used to store data. Backups are periodically and automatically created, encrypted, and securely stored. In the event of a server failure, the service will automatically be restored by other servers in different availability zones. This is regularly tested. The client's specific requirements can be discussed prior to an order being placed.

2.3 BUSINESS CONTINUITY STATEMENT/PLAN

At Trilateral Research we periodically evaluate and plan for potential risks to business continuity, updating our Business Continuity Plan (BCP) on an annual basis. This process engages all key stakeholders within the organisation and is updated as the business model evolves, and as new risks emerge. The BCP is tested on a regular basis and activated in response to an incident causing significant disruption to normal service delivery/business, particularly the delivery of key/critical activities. Examples of circumstances triggering activation of this plan include: loss of key staff or skills e.g. above normal levels of absenteeism due to illness or public incident; loss of critical systems e.g. ICT failure; denial of access, or damage to, facilities e.g. loss of a building through fire; loss of a key resource e.g. a major

supplier vital to the delivery of a key service; pandemic, viral infection causing major disruption on a societal level.

Trilateral Research's working environment is designed to be highly resilient, with staffing redundancies for critical service, support and development functions, secure fully virtual working environments, including use of VPN for secure access and communications from remote working locations, and systems delivered in cloud infrastructures that innately provide technical resilience and redundancies by design.

A detailed plan can be provided to the buyer upon request.

2.4 PRIVACY BY DESIGN

At Trilateral Research we have extensive experience in privacy, data protection and ethics by design and default and all our technical development processes and practices integrate these considerations from end-to-end. Specifically, our solutions have included privacy, data protection and technology ethics expertise in the requirements definition, development, and testing processes to meet these requirements. Within the toolset itself, our algorithmic development process has also included a consideration of end user's privacy and the principles of data ethics. As part of this work, we have developed an algorithmic transparency mechanism that supports compliance with Data Protection legislation both for Trilateral Research as a developer and for our end users as customers. We have documented this and other considerations, features, and functionalities within the Data Protection Impact Assessment we have undertaken throughout the development process, updating the document regularly as the solution has matured.

Further, Trilateral Research's extensive expertise in data ethics means that our algorithms have been developed using algorithmic transparency techniques including to ensure the user understands how the algorithms operate, their accuracy and precision. Doing so is essential to building trust in our products and our allegiance to technology for social good with an emphasis on responsible research and innovation.

3 USING THE SERVICE

3.1 ORDERING AND INVOICING

To express interest in purchasing CESIUM, please contact us to discuss your requirements. Please provide us with information about:

- ❑ *Your requirement*
- ❑ *Expected levels of usage and types of users*
- ❑ *A suitable time to call for a preliminary conversation (and contact details)*

Following an initial conversation, we will provide you with an assessment which will clearly highlight any changes or additions to the standard service offering what may be required. We will then work with you to complete an order form to agree contractual milestones and invoicing procedures based on the specific details of your service. To initiate contact please e-mail: sociotech@trilateralresearch.com

3.2 PRICING OVERVIEW

Beyond the pricing of our applications, all pricing is per our SFIA rate card - engagements range from £300 to £1300 per day.

3.3 AVAILABILITY OF FEASIBILITY STUDY

As part of the decision to purchase CESIUM, we offer a feasibility study. Due to the necessary database integration, a trial is not always possible. The feasibility study, therefore, seeks to map out your current ways of working and identify the efficiencies CESIUM offers to your MACE decision making process. As part of the feasibility study, we also offer access to a demo version of CESIUM, which uses synthetic data. Should you progress to a licence agreement, we will deduct the cost of the feasibility study. Should you like to know more, please do e-mail: sociotech@trilateralresearch.com

3.4 ON-BOARDING, OFF-BOARDING

3.4.1 On-boarding

Once we have received an order from you through G-Cloud, Trilateral Research will work with you to ensure the service fits your requirements. To do so, we take the following steps:

Planning

- ❑ *Meeting to scope requirements (e.g., data requirements, associate services needed with our dedicated Product Manager and Engineering Manager)*
- ❑ *Develop, review and agree with you a tailored implementation plan*

Implementation

- ❑ *Data base integration in accordance with an agreed workplan*
- ❑ *Development of data sharing agreement and ethical impact assessment*
- ❑ *Implementation according to the implementation plan (see below) via remote set-up and on-site or virtual meetings*
- ❑ *The number of meetings and duration of the implementation period will be discussed and agreed at the planning stage. Five days of implementation are included in our standard license agreement.*

Support

- ❑ *We will support you throughout the duration of the contract and alert you to any maintenance windows.*

3.4.2 Off-boarding

Upon conclusion of the service:

- ❑ *Termination notice as agreed in the contract (where the number of days will be agreed and specified).*
- ❑ *Arrangements and any associate services required to ensure exporting of latest versions of data in CSV and/or JSON format.*
- ❑ *Additional bespoke migration services available on request and at additional cost.*
- ❑ *Deletion of user accounts and data as appropriate and specified by the customer.*

3.5 TRAINING

To ensure you gain value from the use of CESIUM, we offer a basic combination of supported training (8 hours) as part of your license. These include:

- ❑ *Technical guides available as PDF and online [HTML]*
- ❑ *Video tutorials*
- ❑ *Face-to-face and virtual training support*

Please note that training can be provided remotely (i.e., virtual) or on-site, but the latter will incur travel and where necessary accommodation expenses. Wider training is available upon request.

3.6 INTEGRATION PLAN

CESIUM relies on a bulk data extract from partnership databases into a secure environment. Any licence agreement, therefore, requires a database integration. The integration plan will include, but is not limited to:

- ❑ Database schema design
- ❑ Development of workplan
- ❑ Development of data sharing agreement
- ❑ Role based access implementation
- ❑ Bulk data extract implementation

3.7 IMPLEMENTATION PLAN

Our licenses include a standard 5 days for implementation. A baseline implementation plan will be determined with the buyer. Any implementation services required beyond the basic implementation specified in the pricing document will be charged on a daily rate (SFIA rate card).

3.8 SERVICE MANAGEMENT

The Software Engineering Manager is responsible for security policy. The Senior Data Protection Advisor and Data Protection Technical Advisor provide regular guidance on procedures. The team have qualifications in computer science, experience in IT and stay informed of best practice. Cyber security systems are tested internally by the technical team on a regular basis and annually by independent penetration tests.

We are Cyber Essentials Plus accredited. Our staff have experience in applying Risk Management Frameworks such as ISO:27005 which incorporates applying information security management standards such as ISO:27001, NIST Risk Management Framework (NIST 800-37) and associated NIST Security Control frameworks - NIST 800-37.

3.9 SERVICE CONSTRAINTS

Service availability is at least 99% as standard. Our solutions are highly customizable as standard but additional applications can be purpose built as required and following discussions with the client.

Phone and email support for the service is available on a standard basis 9.00 - 17.00 Monday to Friday. Weekend and bank holiday support is available as part of our Premium Customer Support.

3.10 SERVICE LEVELS

Service availability is at least 99% as standard. Our solutions are highly customizable as standard but additional applications can be purpose built as required and following discussions with the client. Phone and email support for the service is available 9.00 - 17.00 Monday to Friday. Weekend and bank holiday support is available as part of our Premium Customer Support.

3.11 OUTAGE AND MAINTENANCE MANAGEMENT

All data stored in the cloud is backed up across multiple availability zones (geographical data centres). London based cloud data centres from Amazon Web Services are used to store data. Backups are automatically produced. In the event of a server running computational or database services, the service will automatically be restored by other servers in different availability zones. This is regularly tested.

3.12 FINANCIAL RECOMPENSE MODEL FOR NOT MEETING SERVICE LEVELS

Not applicable.

4 PROVISION OF THE SERVICE

4.1 CUSTOMER RESPONSIBILITIES

The implementation timeline will be agreed at the time of contract, and based upon this timeline, the customer is responsible to provide reasonable and timely access to personnel required to provide inputs to the system design. In addition, the customer will be responsible to provide timely feedback and input to any collaboration or data-sharing agreements or similar documents that may be required to enable Trilateral to effectively implement and deploy the system on the Customer's behalf.

4.2 TECHNICAL REQUIREMENTS AND CLIENT-SIDE REQUIREMENTS

CESIUM is a cloud-based web-based application and thus only require an internet connected browser and an industry-standard browser. The following browsers are supported:

- ❑ *Google chrome*
- ❑ *Firefox*
- ❑ *Internet Explorer (8+)*
- ❑ *Edge*
- ❑ *Safari (6+)*
- ❑ *Opera (12+)*

4.3 DEVELOPMENT LIFE CYCLE OF THE SOLUTION

Within Trilateral Research we rely on co-design, agile product development and continuous integration and deployment methodologies.

- Development: Agile co-design methods reliant on user requirements gathering, development sprints, daily scrums, and testing with the end user.
- Deployment: Code is merged daily, tested instantly and deployed continuously.
- Maintenance: Client feedback is continuous; bug fixes are rolled out immediately and new features are continuously developed.

4.4 AFTER-SALES ACCOUNT MANAGEMENT

Within Trilateral Research we rely on building relationships with clients throughout the contracting and delivery process to ensure a transparent approach to service provision and maintaining relationships. This includes, but is not limited to:

Pre-contract

Appointing a dedicated Contract Manager that can establish and build a mutual understanding of user requirements and provision of solutions and service levels that is subsequently designed into the implementation plan and the provision of any additional Associate Services.

Throughout the contract

The continued use from the contract stage of the dedicated Contract Manager to ensure the client has a single point of contact for any queries, complaints and to provide their feedback regarding the delivery of service, contracting and billing matters. This will be facilitated through routine client meetings/check-in via email/telephone/face-to-face (based on customer preference) to ensure customer satisfaction and feedback on the solution(s) and associate services. Clients will have direct contact with our technical team for technical support. Our dedicated Product Manager will ensure transparency in client requests and how we are able to engage with them immediately vs. where the Product Manager will prioritise them within the future product roadmap based on their interaction with the users.

Post-contract

Our post-contract processes include an evaluation of service provision and professional contract conclusion. Lastly, it will involve completing the termination process involving the termination of the contract will be agreed during the service contract discussion and will be based on the Call-Off Contract Terms and Conditions.

5 OUR EXPERIENCE

5.1 CASE STUDIES

The following case studies provide an illustration of our experience in providing cloud-based software and associate services to the public and third sector.

PUBLIC SECTOR LOCAL COUNCIL	**Honeycomb: Understanding Modern Slavery**
Trilateral Research are leveraging the STRIAD® platform and our in-house sociotechnical expertise in modern slavery & human trafficking and data science to develop insights that provide Greater Manchester Combined Authority with a better understanding of the prevalence and drivers of modern slavery in Manchester as well as an oversight of trends. In addition, we are also developing new data where there are gaps. ***Outcome: Fit-for-purpose solution for better understanding modern slavery in Greater Manchester.***	

PUBLIC SECTOR LOCAL COUNCIL	**Air Pollution Monitoring & Forecasting**
Trilateral Research are leveraging the STRIAD® platform and our in-house sociotechnical expertise in the environment and data science to leverage multi-format data (sensor, weather, structure, socio-economic) to develop an air quality index and forecasting tools for Meath County Council. ***Outcome: Air Quality Index and Forecasting tools for Meath County Council to better understand air pollution impacts.***	

PUBLIC SECTOR MINISTRY OF DEFENCE	**HUMAN-CENTRIC ANALYSIS FOR CONFLICT & CRISIS**
Trilateral Research gained innovation funding through the Defence and Security Accelerator to work with representatives from the UK-MOD to develop and test the STRIAD® platform tailored to enable and support human security considerations within the military planning process. ***Outcome: Fit-for-purpose solution for human security analysis.***	

PUBLIC SECTOR UK LAW ENFORCEMENT	**INNOVATION IN CHILD SAFEGUARDING**
Trilateral Research gained innovation funding through Innovate UK to work with representatives from the UK Law Enforcement and the NWG Network to develop and test the CESIUM application tailored to enable multi-agency working in the identification of children vulnerable to exploitation. ***Outcome: Fit-for-purpose solution for child safeguarding with emphasis on privacy, ethics and security by design and algorithmic transparency.***	

PUBLIC SECTOR LAW ENFORCEMENT	**SUICIDE PREVENTION**
Trilateral Research supported UK law enforcement in supporting their understanding of risk of suicide through the development of predictive models and visualisations. This involved the use of various modelling techniques including Logistic Regression, a Random Forest Classifier and a Decision Tree. ***Outcome: Spatial-temporal model of Suicide at middle super output area (MSOA) in England and Wales.***	

PUBLIC SECTOR LOCAL COUNCIL	**DATA INSIGHTS ON YOUTH OFFENDERS**
Trilateral Research supported a local authority in understanding suspected risk of Child Sexual Exploitation (CSE), Serious Youth Violence (SYV), Possession with Intent to Supply (PWITS), Missing Persons (MISPERS). This involved the use of various modelling techniques including Logistic Regression, a Random Forest Classifier and a Decision Tree. ***Outcome: Youth offending risk algorithms, geospatial crime visualisations, and criminal network analysis and visualisation tools.***	

CHARITY SECTOR	**CRIME & ADOLESCENT MENTAL HEALTH**
Leveraging cloud-infrastructure and tools, Trilateral Research developed a cloud-based solution for a UK charity to build predictive tools to analyse crime and its relation to socio-economic indicators, and adolescent mental health issues. ***Outcome: Cloud-based data visualisations and crime maps and the cloud-based deployment of a scenario exploring fully deployed interactive predictive solution.***	

5.2 CLIENTS

An illustrative sample of clients for Trilateral Research software and our Sociotech Insights Group associate services include:

5.3 CONTACT DETAILS

For any queries relating to our service, please contact Dr Hayley Watson sociotech@trilateralresearch.com or call 020 70528285.