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Usability and Incentives for Threat Information Sharing Technology

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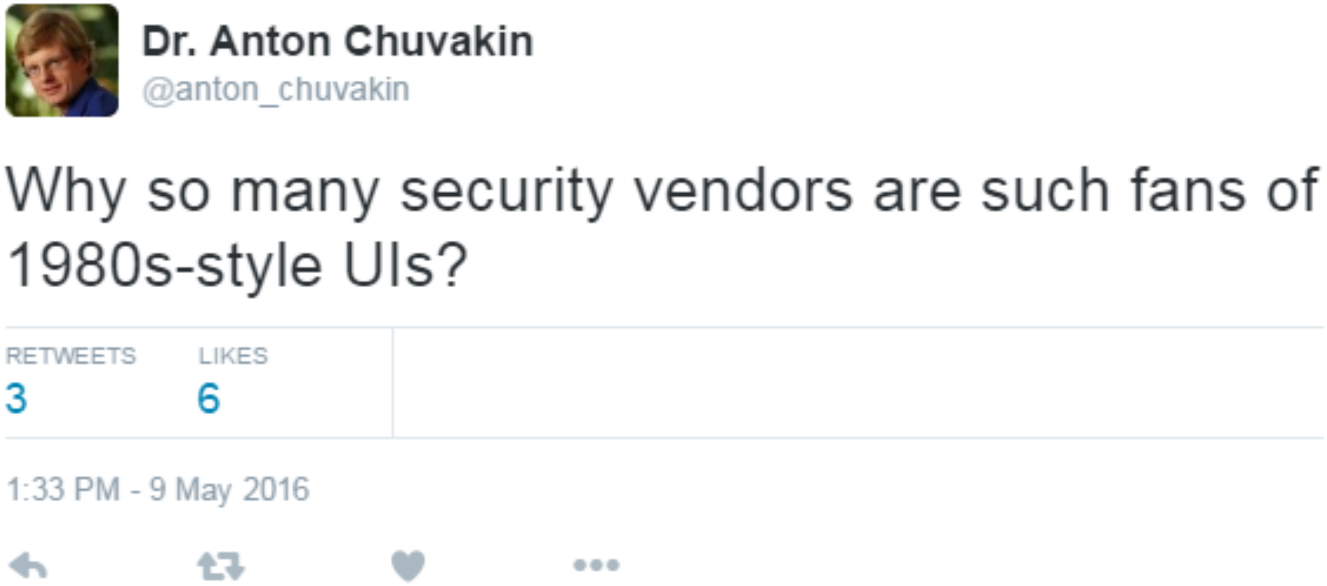
Seoul, Korea
June 14, 2016

Starting point



Dr. Anton Chuvakin
@anton_chuvakin

Why so many security vendors are such fans of 1980s-style UIs?

RETWEETS	LIKES
3	6

1:33 PM - 9 May 2016

Human interaction is critically important at all stages of the threat intelligence lifecycle.

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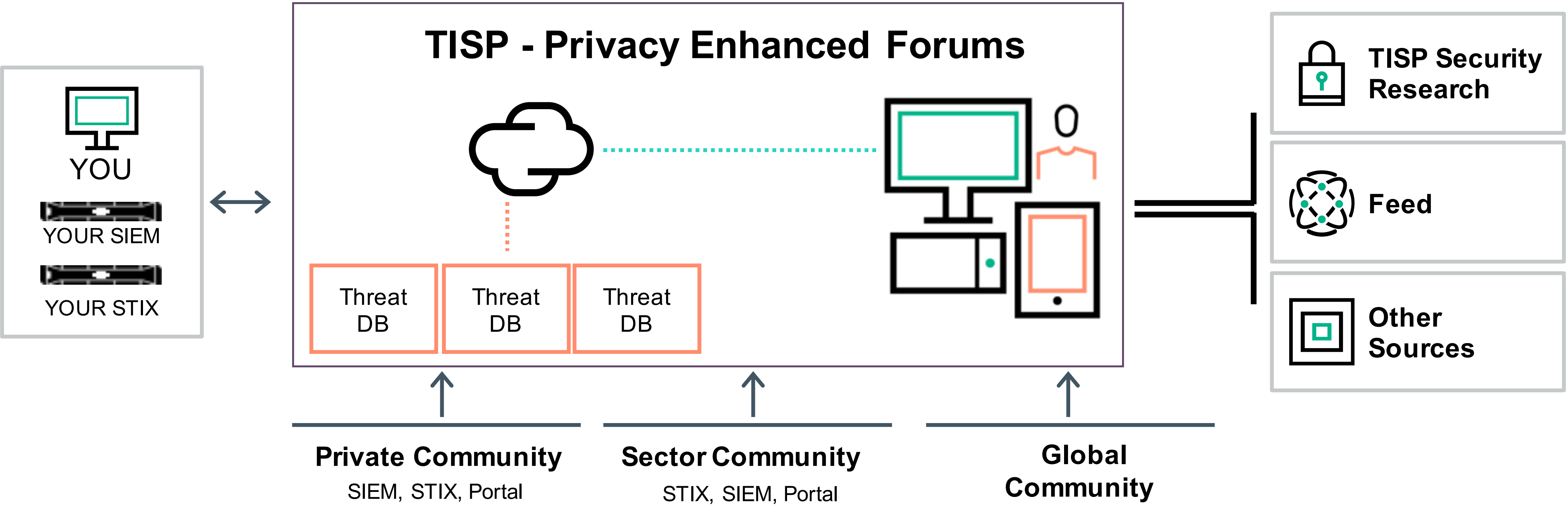
Threat Information Sharing Platform (TISP)



Overview
Encouraging users to contribute quality content

Who are TISP users?

What data can/do they contribute?

What motivates them to contribute?

What are the obstacles to sharing (and how do we remove them)?

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TISP UX research

UX

Puts users and human behavior at the forefront of any design activities

Vastly underutilized in enterprise software, including security platforms

HCI and UX methods can

Provide insight into the issues with TISPs for Analysts

Validate potential solutions, directing development strategy

Our research

Initiate the systematic study of (some) UX and HCI aspects of TISPs

T. Sander and J. Hailpern. *UX Aspects of Threat Information Sharing Platforms: An Examination & Lessons Learned Using Personas*.

In Proceedings of the 2nd ACM Workshop on Information Sharing and Collaborative Security (WISCS '15)

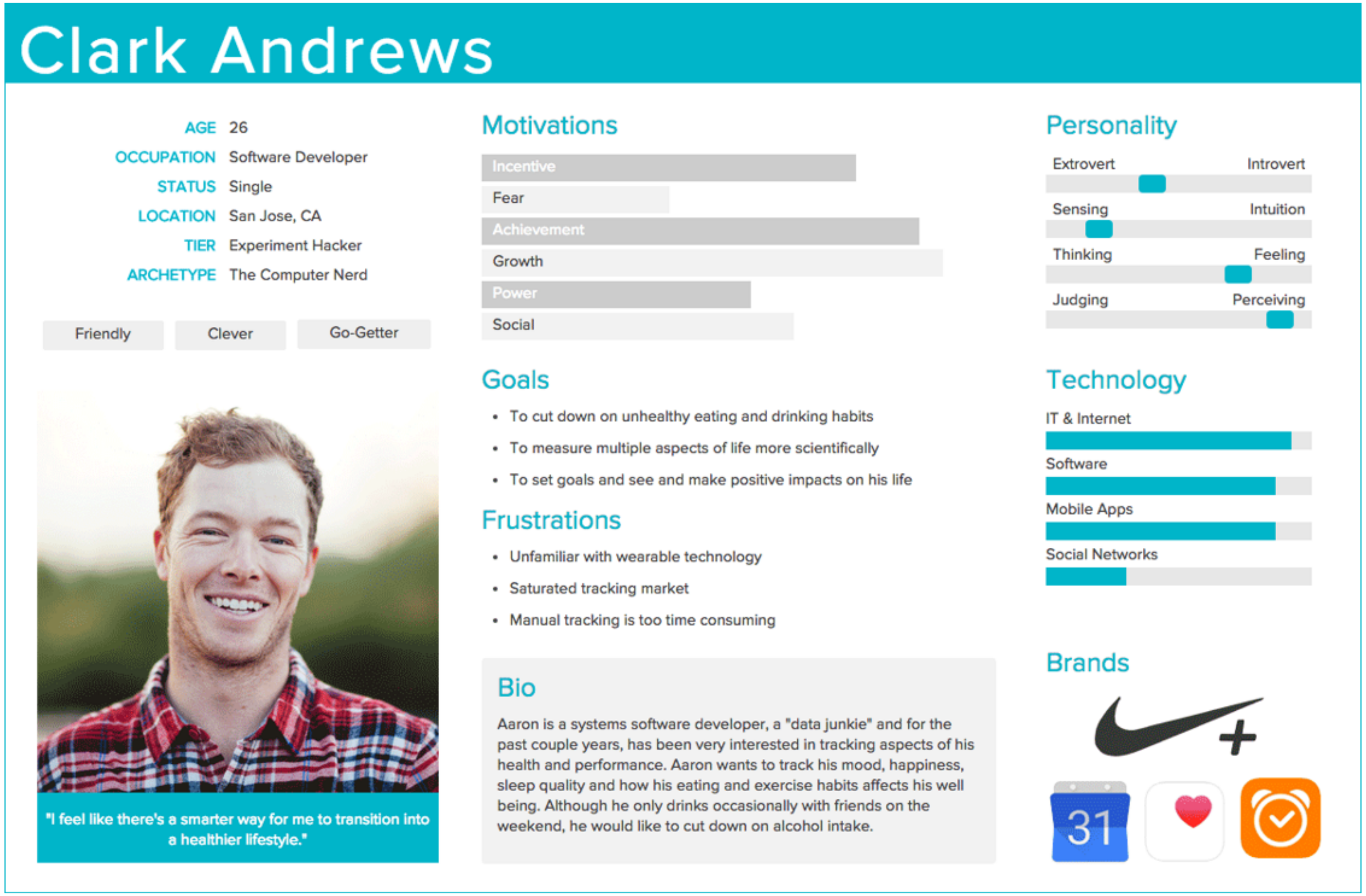
Understanding TISP users

Our approach: Personas

Fictionalized representation of users

Create relatable characters

Help prioritize and guide features



Clark Andrews

AGE 26
OCCUPATION Software Developer
STATUS Single
LOCATION San Jose, CA
TIER Experiment Hacker
ARCHETYPE The Computer Nerd

Friendly | Clever | Go-Getter

"I feel like there's a smarter way for me to transition into a healthier lifestyle."

Motivations

Incentive
Fear
Achievement
Growth
Power
Social

Goals

- To cut down on unhealthy eating and drinking habits
- To measure multiple aspects of life more scientifically
- To set goals and see and make positive impacts on his life

Frustrations

- Unfamiliar with wearable technology
- Saturated tracking market
- Manual tracking is too time consuming

Bio

Aaron is a systems software developer, a "data junkie" and for the past couple years, has been very interested in tracking aspects of his health and performance. Aaron wants to track his mood, happiness, sleep quality and how his eating and exercise habits affects his well being. Although he only drinks occasionally with friends on the weekend, he would like to cut down on alcohol intake.

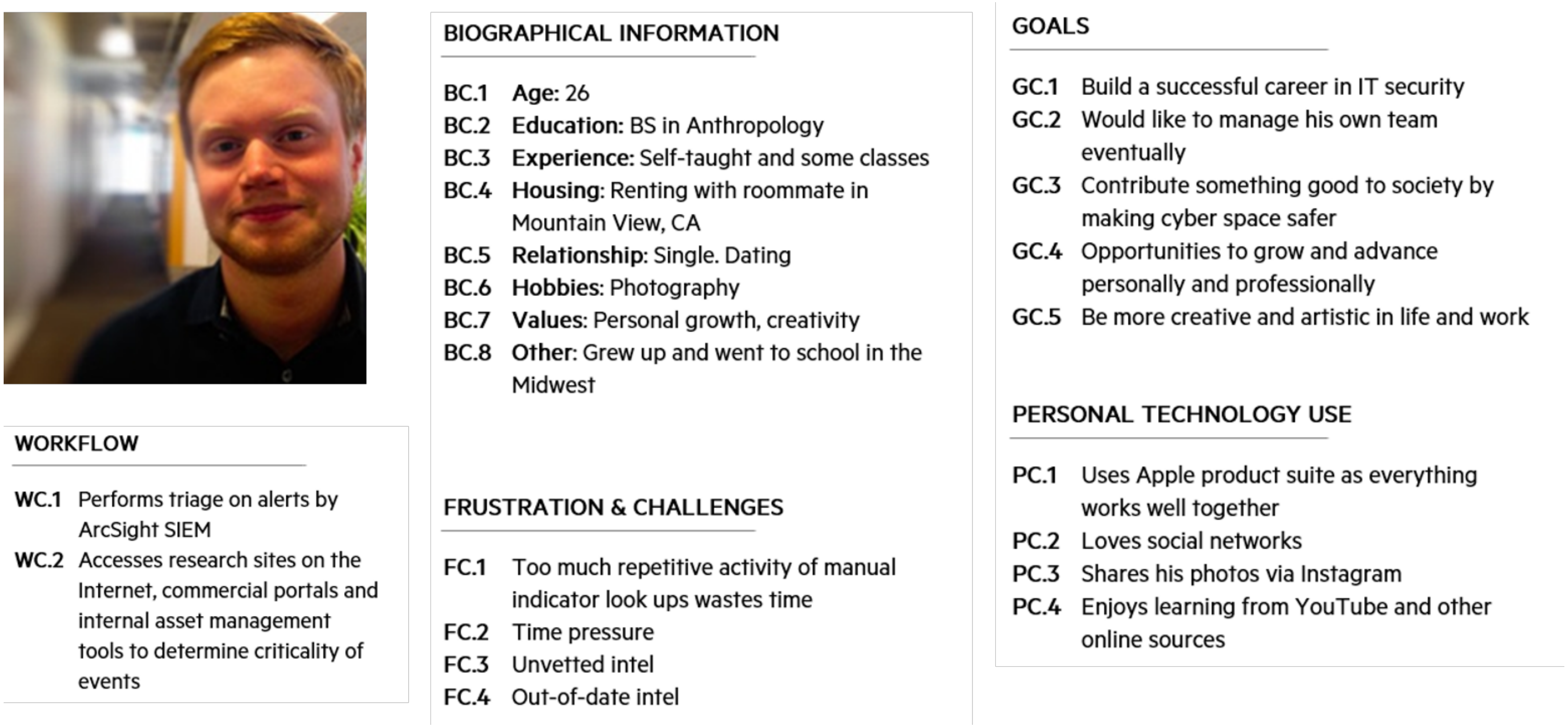
Personality

Technology

Brands

Source: Fake Crow

Persona: Chris Meyer - SOC analyst



WORKFLOW

WC.1 Performs triage on alerts by ArcSight SIEM

WC.2 Accesses research sites on the Internet, commercial portals and internal asset management tools to determine criticality of events

BIOGRAPHICAL INFORMATION

BC.1 **Age**: 26

BC.2 **Education:** BS in Anthropology

BC.3 **Experience:** Self-taught and some classes

BC.4 **Housing**: Renting with roommate in Mountain View, CA

BC.5 **Relationship**: Single. Dating

BC.6 **Hobbies:** Photography

BC.7 **Values**: Personal growth, creativity

BC.8 **Other**: Grew up and went to school in the Midwest

FRUSTRATION & CHALLENGES

FC.1 Too much repetitive activity of manual indicator look ups wastes time

FC.2 Time pressure

FC.3 Unvetted intel

FC.4 Out-of-date intel

GOALS

GC.1 Build a successful career in IT security

GC.2 Would like to manage his own team eventually

GC.3 Contribute something good to society by making cyber space safer

GC.4 Opportunities to grow and advance personally and professionally

GC.5 Be more creative and artistic in life and work

PERSONAL TECHNOLOGY USE

PC.1 Uses Apple product suite as everything works well together

PC.2 Loves social networks

PC.3 Shares his photos via Instagram

PC.4 Enjoys learning from YouTube and other online sources

Table 1: Chris Meyer | SOC Analyst

“Security tools are inconvenient to use compared to most consumer technology”

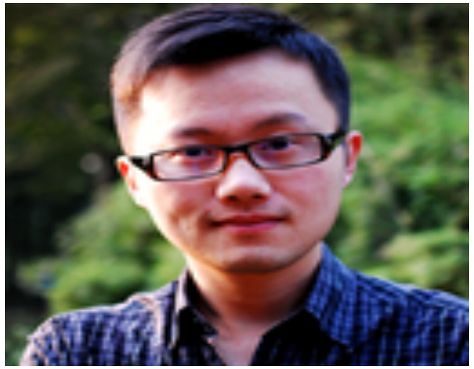
Persona groups

CISO/Managers

CTI Analysts

SOC Analysts

Incident Responders



Power users

Power users

Fuse intel from various sources

Create or enrich cases

Import third party reports

Create detailed profiles

Data contribution by users

TISP user contributions

SOC Analyst

- Feedback on indicators he does triage on.
- Annotations

Benefits:

- Lower FP rate
- Enhanced context for basic indicators

Incident Responders

- New IOCs, cases, malware samples
- In depth analysis results from IR with deep knowledge in malware analysis, log analysis or forensics
- Tools and methods relevant to an investigation
- Contributions to cases from others

Benefits:

- Live IOCs
- Can add more context during attack investigation

CTI Analyst

- Gatekeeper for in and outgoing intel
- Enriches data with context
- Links between intel pieces
- Detailed feedback on intel and sources

Benefits:

- Evaluates quality and relevance of intel and how to improve it
- Has trusted personal relationships necessary for sensitive data sharing

TISP user contributions

Power Users

- Original threat research
- External research reports
- Detailed analysis results for customer cases and queries
- Research derived from a number of sources and tools

Benefits:

- Contribute large amounts of high quality content

CISO/Managers

- Decision makers when sharing highly sensitive data, e.g. APT related.
- Set overall sharing policy and culture for sharing in organization

Benefits:

- His/her buy-in critical for more than occasional analyst driven sharing to take place

TISP user needs

SOC Analyst

- Minimal indicator context
- Vetted intel, low false positive rates
- Automatic data enrichment to reduce repetitive work
- Good integration with SIEM tools

Incident Responders

- Detailed IOCs, TTPs etc
- Detailed context and enrichment
- Tailored responses that support their workflow

CTI Analyst

- One-stop TI management capability
- Unified relationship management
- Strategic threat intelligence
- Non-attribution for (most) data contributed to platform
- Development of mutually trusted peer-relationships to ensure access to important information

TISP user needs

Power Users

- API support for importing data streams into tools of their choice
- Ability to customize UI to support their particular workflows, e.g. showing far greater level of detail than to average analyst
- Automated, intelligent support for bulk upload of IOCs.

CISO/Managers

- Overview of top threats and (changing) threat landscape relevant to their organization
- Successful investigations and metrics showing ROI for intel investments
- Metrics and evidence showing ROI of outward sharing
- Assurance that outward sharing does not create risks for company

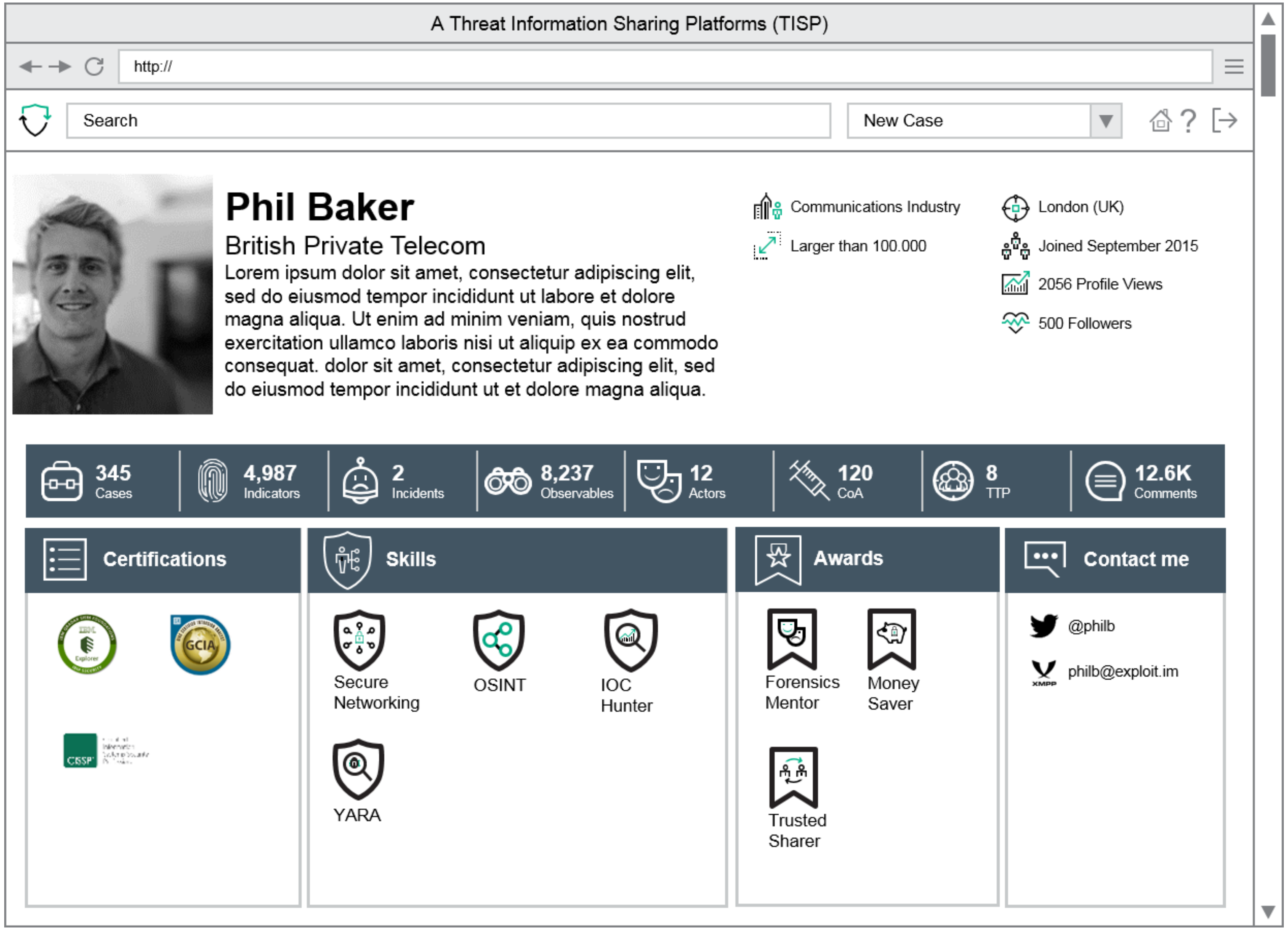
Motivation and gamification

General findings

Threat information sharing, as a concept, is universally considered beneficial. Analysts would like to actively participate so the platform needs to support this and remove barriers

Opinion on gamification and badges was mixed. Half of younger and earlier career respondents were positive to enthusiastic. The rest of the younger respondents had at least some reservations, while older and more advanced respondents were less interested in badges overall.

Design Idea: Full User Profile



A Threat Information Sharing Platforms (TISP)

http://

Search

New Case

Phil Baker

British Private Telecom

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Communications Industry

Larger than 100.000

London (UK)

Joined September 2015

2056 Profile Views

500 Followers

345 Cases | 4,987 Indicators | 2 Incidents | 8,237 Observables | 12 Actors | 120 CoA | 8 TTP | 12.6K Comments

Certifications

GCIA

CISSP

Skills

Secure Networking

OSINT

IOC Hunter

YARA

Awards

Forensics Mentor

Money Saver

Trusted Sharer

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XMPP philb@exploit.im

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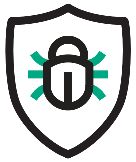
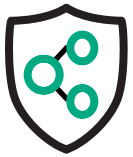
TISP common badge types

Skill based Badges

Recognize demonstrated skills


Malware Analyst

Secure Networking

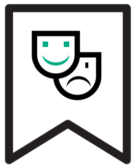

OSINT

IOC Hunter

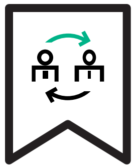
YARA

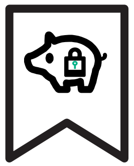
Award Badges

Recognize community contributions


Hacktivism

Forensics Mentor


Trusted Sharer


Money Saver

Certification Badges

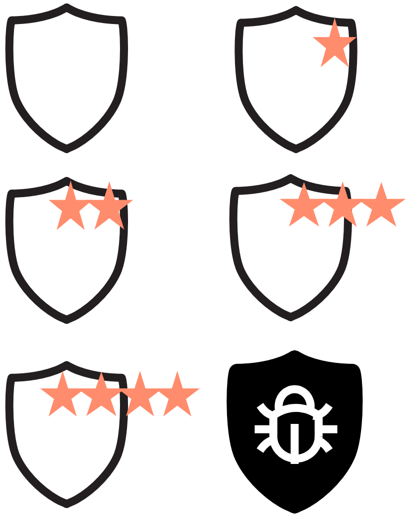
Recognize completion of trainings & exams

Points, badges, leaderboards (PBL)

Points

Level	Required Points
Beginner	50
Intermediate	100
Advanced	250
Master	800
UBER	1500

Badges



Leaderboards

– Recognize top contributors

– Personalized for peer comparison

Badges – Findings

- Skill based badges most favored by younger/early career analysts
- Mission badges also appealed to advanced professionals
- Badges should measure quality, not just quantity.
- Being a good collaborator should be rewarded; one-upmanship is a concern
- Analysts less favorable about extending badges to everyday SOC work
- Some users liked badges linked to real world rewards
- SOC teams can pool badges for use in self–marketing/recruitment

Mission Badges

NROL-39
NOTHING IS BEYOND OUR REACH

23D SPACE OPERATIONS SQ
SEMPER VIGILANS

Gamification beyond PBL

Can leverage social incentives: introducing users, who made good contributions or gained certain badges.

Early career and advanced users interested in TISP helping them achieve social goals.

Younger users

- like features such as commenting and up-voting of posts which makes for more lively interaction

Advanced users

- expanding their professional network
- building more mutually trusted peer-relationships
- it provides better access to information

Badges useful for evaluating credibility of contributions

Contributors can tag their anonymous messages to allow recipients to judge credibility without knowing the source.

Badges suitable for establishing credibility of information

- Most of the previous badges.
- Recognized team, role and length of service
- Company badges (size, vertical etc.)

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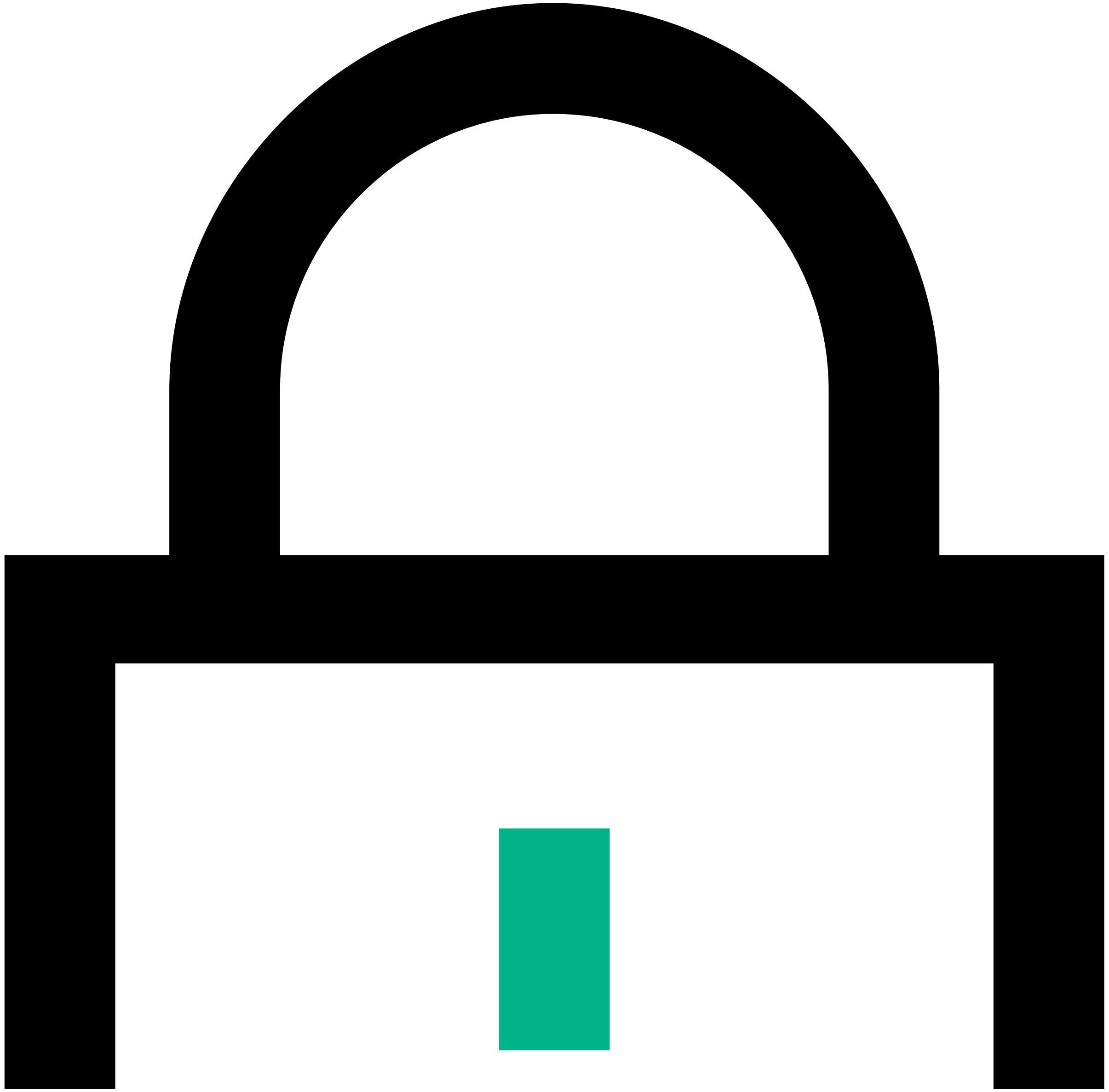
Profile privacy

Disclosing full profile *within* organization OK, but not without

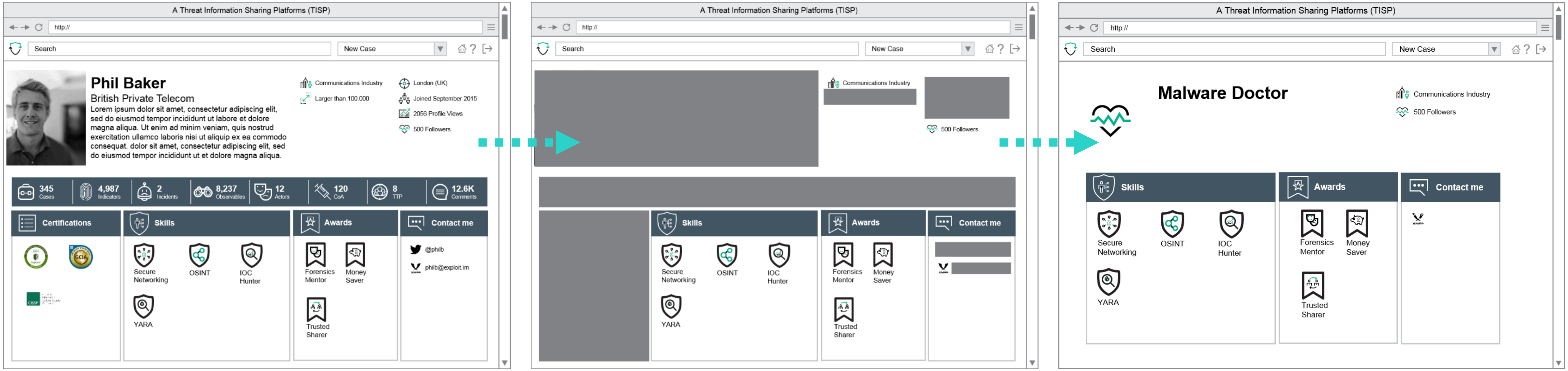
Contributor organization specifics should not be shared

Organization’s vital statistics are OK

Opening full profile to selected collaborators is a valuable trust-building tool



Sanitized User Profile



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British Private Telecom

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Search | New Case

Malware Doctor

Communications Industry

500 Followers

Skills: Secure Networking, OSINT, IOC Hunter, YARA

Awards: Forensics Mentor, Money Saver, Trusted Sharer

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Removing obstacles

Sharing policies, processes and workflow

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Key findings

Processes and policies do not support sharing as well as they could!

Senior-level interviewees perceived lack of adequate sharing policies as THE major obstacle for effective sharing

Perceived risks

- Inappropriate sharing may result in exposure for organization
- Less experienced analysts may not always fully understand what they are sharing
- Not everyone in IR/SOC has complete information about sensitive cases

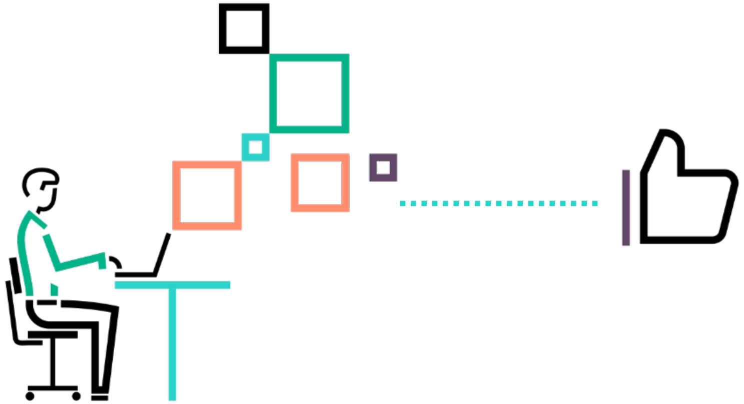
Information sharing policies

Organizational sharing policies need to govern (partial list)

- – Who can share?
- – Provide practical criteria to distinguish between sharable and non-sharable information
- – With whom data can be shared
- – Under which conditions
- – If/when approvals are required and by whom

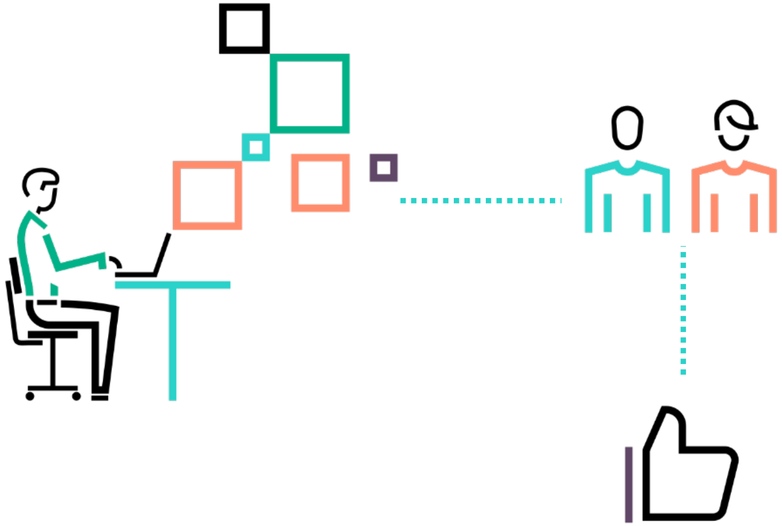
Interviewees saw value for the community creating policy templates that organizations can adapt to their needs

Approval workflows



Level 1 Analysts cannot share

Level 2, IR, and CTI are automatically trusted to share



Level 1 Analysts and IR submit request to share

Senior Analysts, Power users and Managers approve

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Conclusions

UX perspective provides novel insights

TISP users differ significantly

Profile/gamification approach shows promise

Integrating sharing into SOC/IR processes helpful to increase sharing

Next steps

Refine personas

Build and test new designs for specific personas (power users)

Explore cross-organizational aspects of badges/profiles

Share suitable sharing policy templates and guidance

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Thank you

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