

ECONOMICS, SECURITY MANAGEMENT AND THE FUTURE INTERNET

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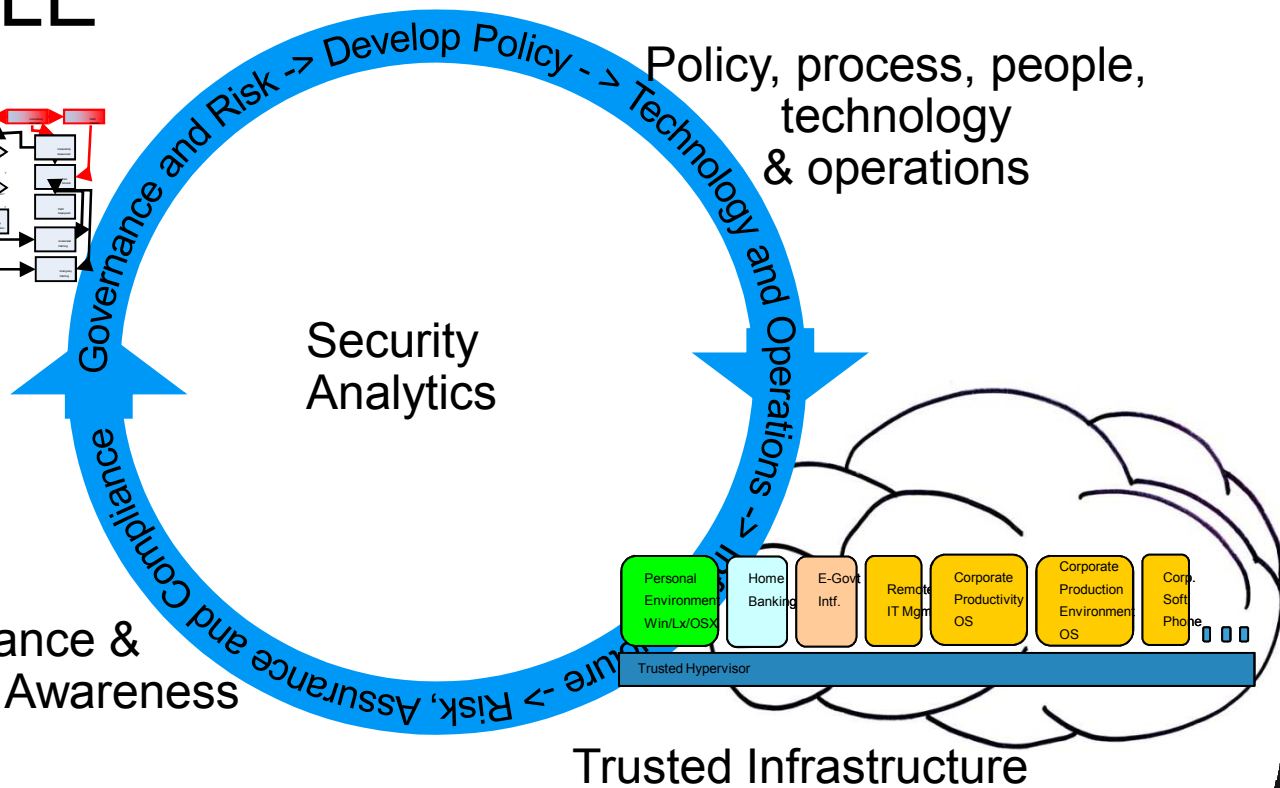
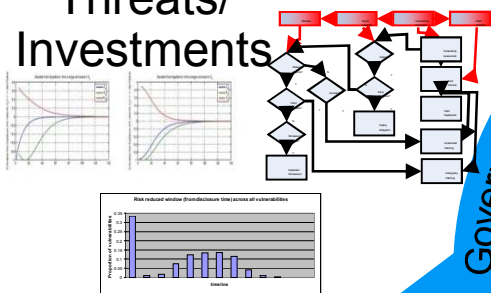
SYNOPSIS OF THIS TALK

- The Application of Economic Methods to Enterprise Security Management
- Early work on the Application of Economic Methods to Cloud Information Stewardship
- Some personal thoughts on the relevance of Economic Methods to Security Management in the future internet



TODAYS SECURITY MANAGEMENT LIFECYCLE

Economics/
Threats/
Investments



Assurance & Situational Awareness

Trusted Infrastructure



PROBLEMS WITH SECURITY INVESTMENTS

- Security Investments affect multiple outcomes: budget, confidentiality, integrity, availability, ...
- In most situations these outcomes can only be predicted with high degrees of uncertainty
- Often the outcomes are inter-related (trade-off) and the link to investments is poorly understood
- Classical business justification/due diligence (Return on Security Investment, cost benefit analysis) encourages these points to be glossed over



ECONOMIC FRAMING: AN ANALOGY

- The ‘Central Bank’ problem
 - How to set the *interest rate* to achieve satisfactory levels of *inflation* (f) and *unemployment* (e).
- ‘Satisfactory’ is defined by a utility (or loss) function, such as:

$$U(e, f) = F(e - e^*) + G(f - f^*) + \dots$$

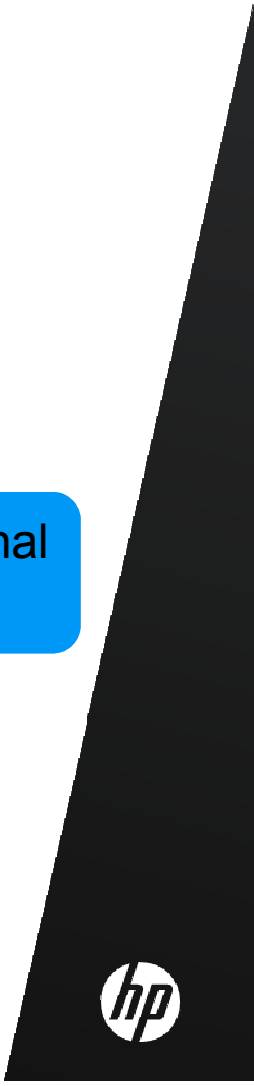
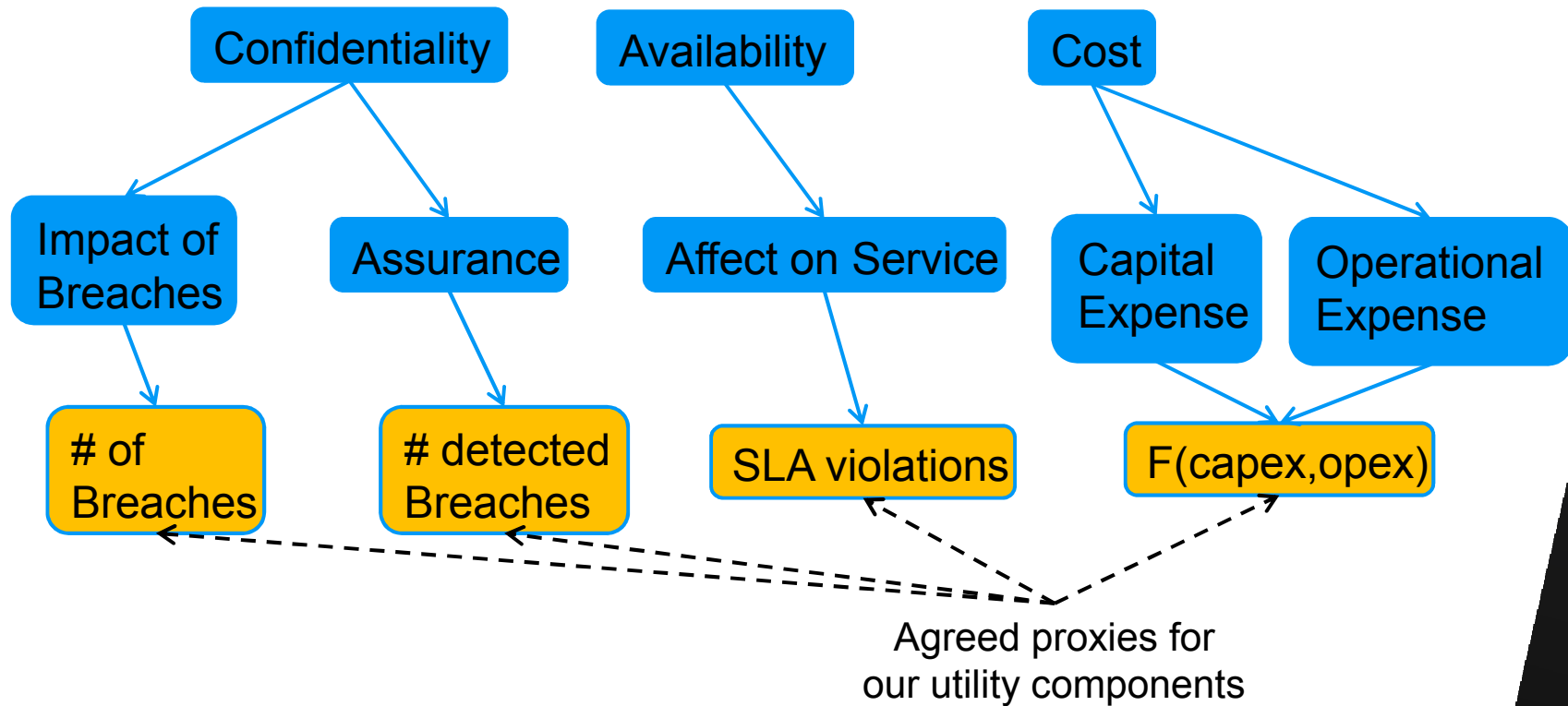
- The ‘Security Management’ problem
 - How to invest in security to achieve satisfactory levels of confidentiality (C) and availability (A)
- And then there is the limited budget.

$$U(C, A, K) = \omega_1 (C - \bar{C})^2 + \omega_2 (A - \bar{A})^2 + \omega_3 \text{Linex}(K - \bar{K})$$

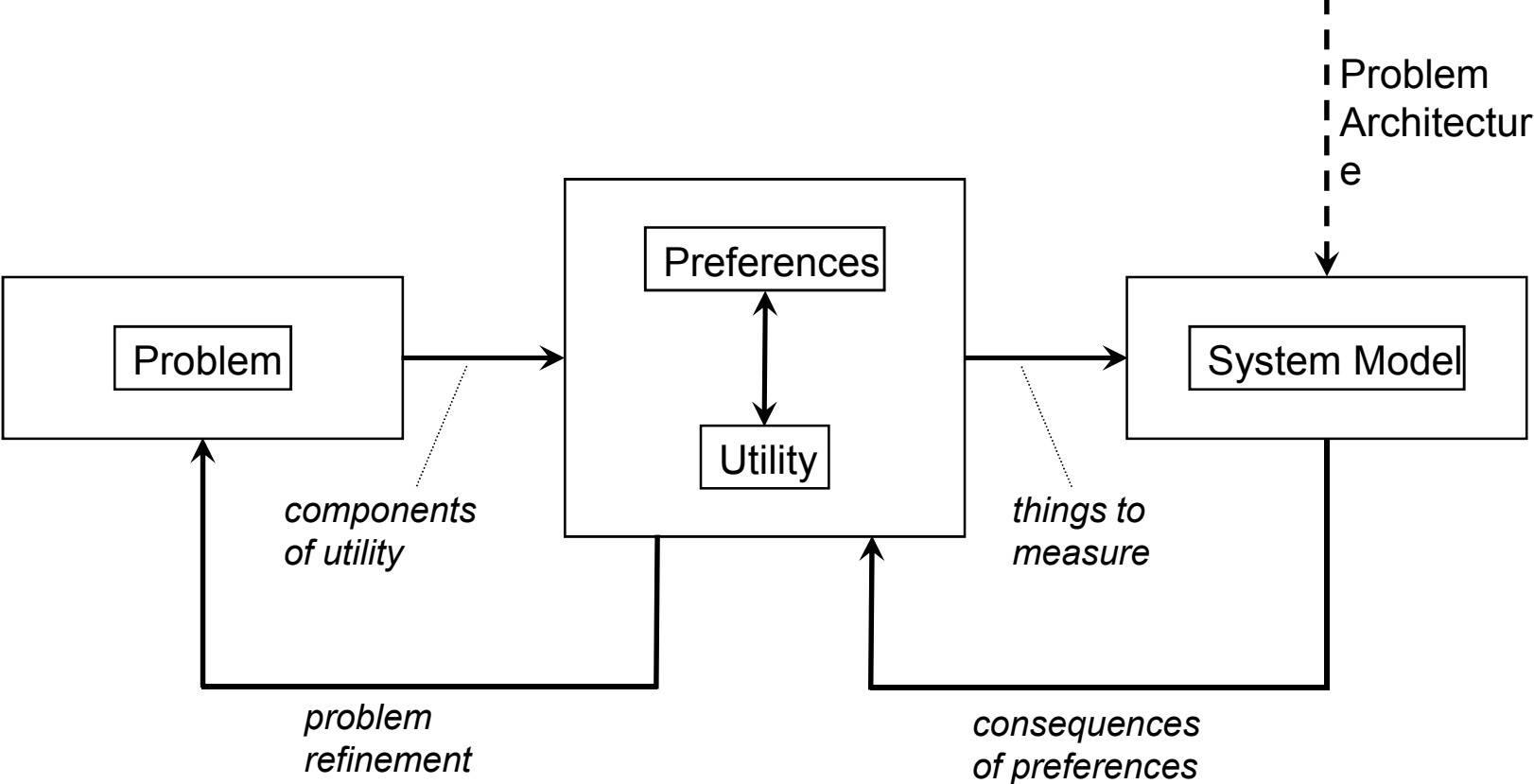


PREFERENCE ELICITATION

(Structured Discussion (framed by initially provided components))



OUR METHODOLOGY



UK GOVERNMENT FUNDED COLLABORATIVE RESEARCH

– Trust Economics:

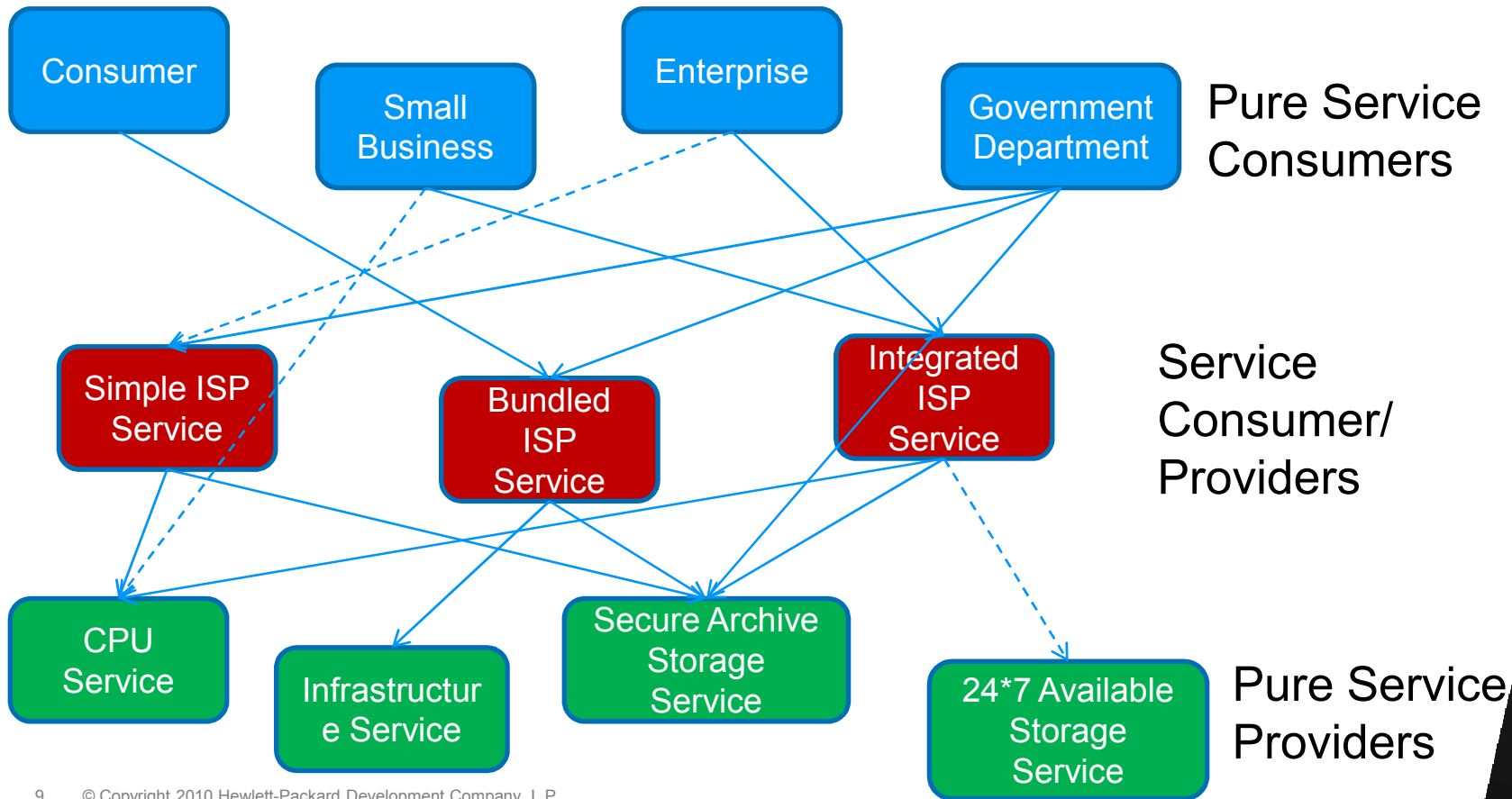
- economics, maths foundations, cognitive science & human factors -> Today's CISO/Enterprise
- UCL, Newcastle University, Bath University, (*Merrill Lynch in transition*)

– Cloud Stewardship Economics:

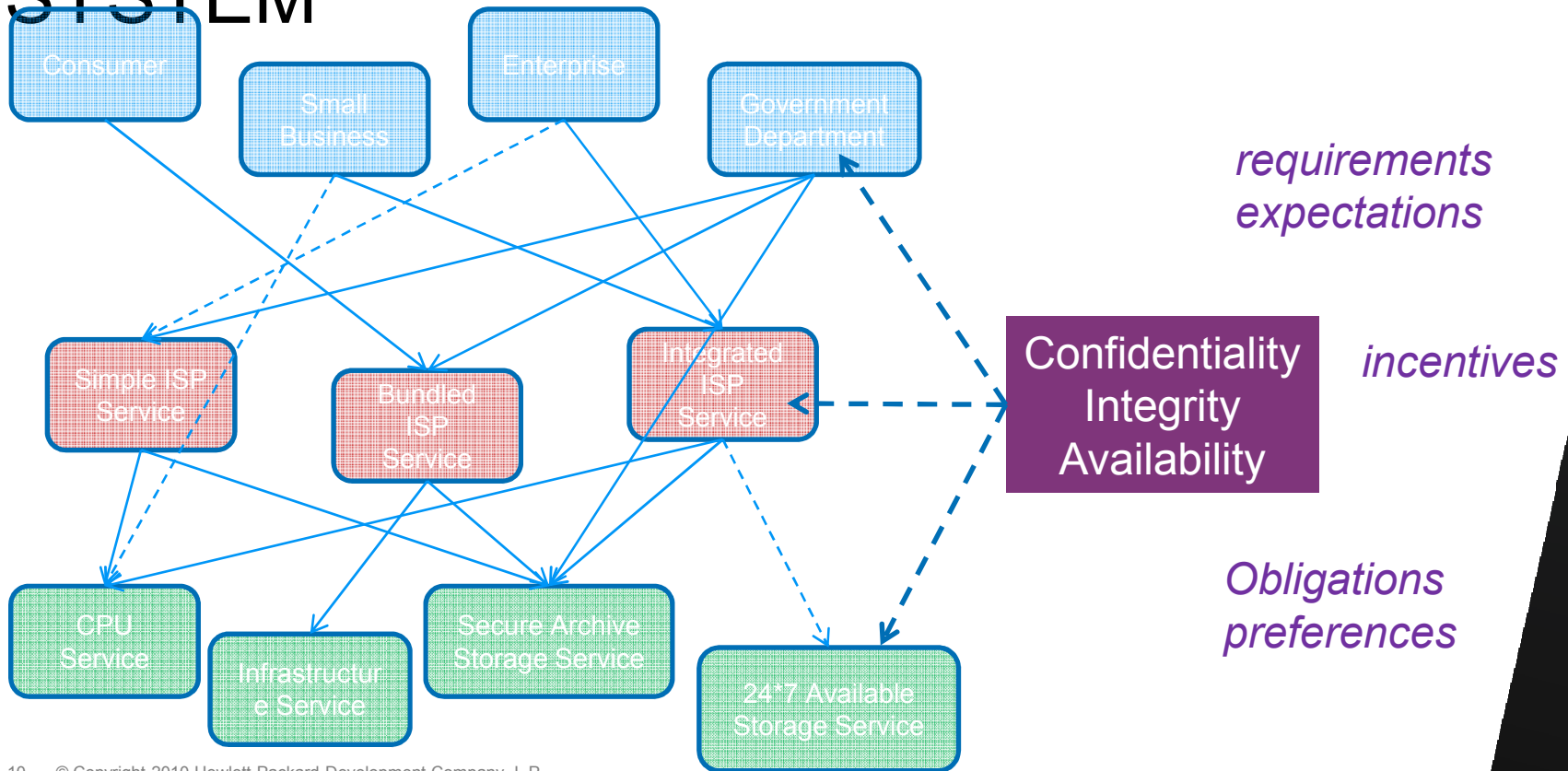
- Economics & System Modelling -> Cloud Eco-Systems
- Aberdeen University, Bath University, IISP, Lloyds of London, 3 SMB's



THE CLOUD ECO-SYSTEM



STEWARDSHIP IN THE CLOUD ECO-SYSTEM



CLOUD STEWARDSHIP ECONOMICS

Key ideas that are guiding our empirical work

- Information Asymmetry
 - As the service provider I know more about the costs and risks of handling your data than you or any regulator
- Externalities; Public/Club Goods
 - Being secure costs me more than I gain, even though others in the community gain too.
- Heterogeneity of services & users
 - How do we value bundled security characteristics & develop associated product and pricing strategies
- ... As well as applying preference, utility, system modelling to this context

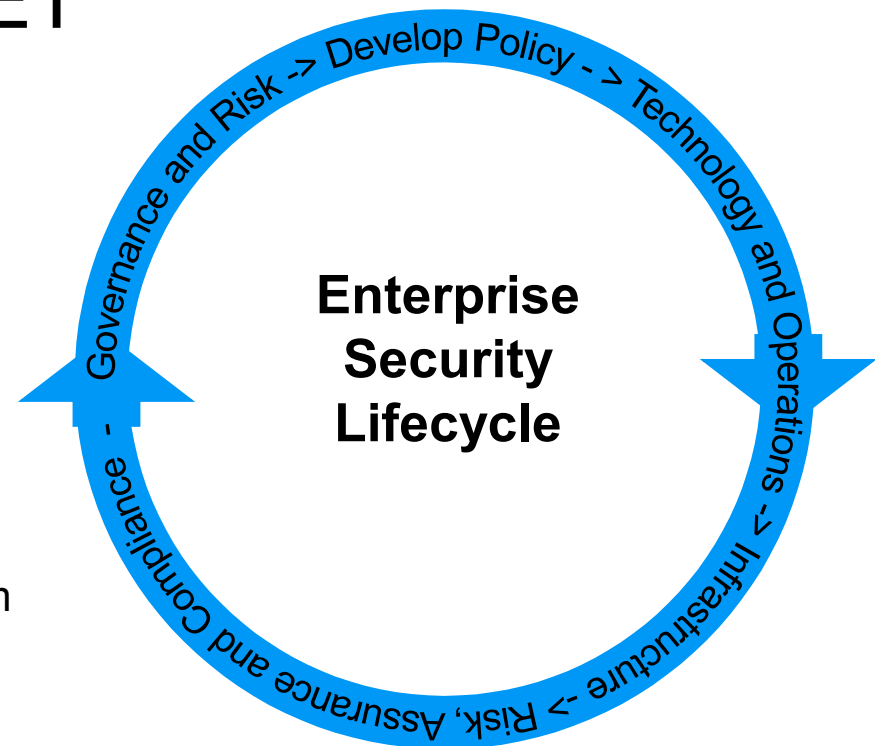


FOUNDATIONS OF TRUST IN THE FUTURE INTERNET

My Current Views

- Left unchecked the (IT) services market will prioritize low cost and flexibility – with bad ‘security externality effects’
- To counter this we need organisations to become much more explicit about their (current and future) information security lifecycle and needs
- Sharing security information is already hard – it will be harder in the services eco-system

- We should think more about how adjusting incentives can improve this situation



Q&A

