



ENJOY SAFER TECHNOLOGY™

Sizing Cybercrime: incidents and accidents, hints and allegations



Stephen Cobb, CISSP
Senior Security Researcher



**Stop wasting money on
measuring cybercrime
Spend it on the police
instead.**

Ross Anderson, 2013



Sizing cybercrime?

How much is there?

TOO MUCH!

What does it cost us?

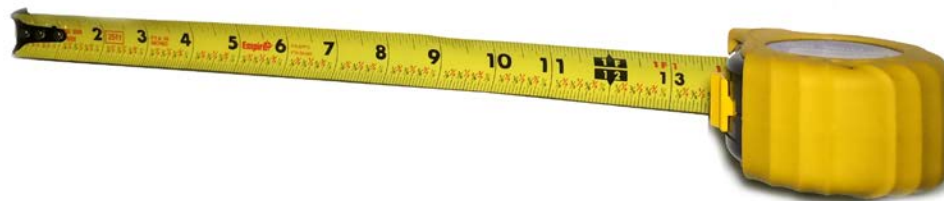
The total cost of cybercrime?





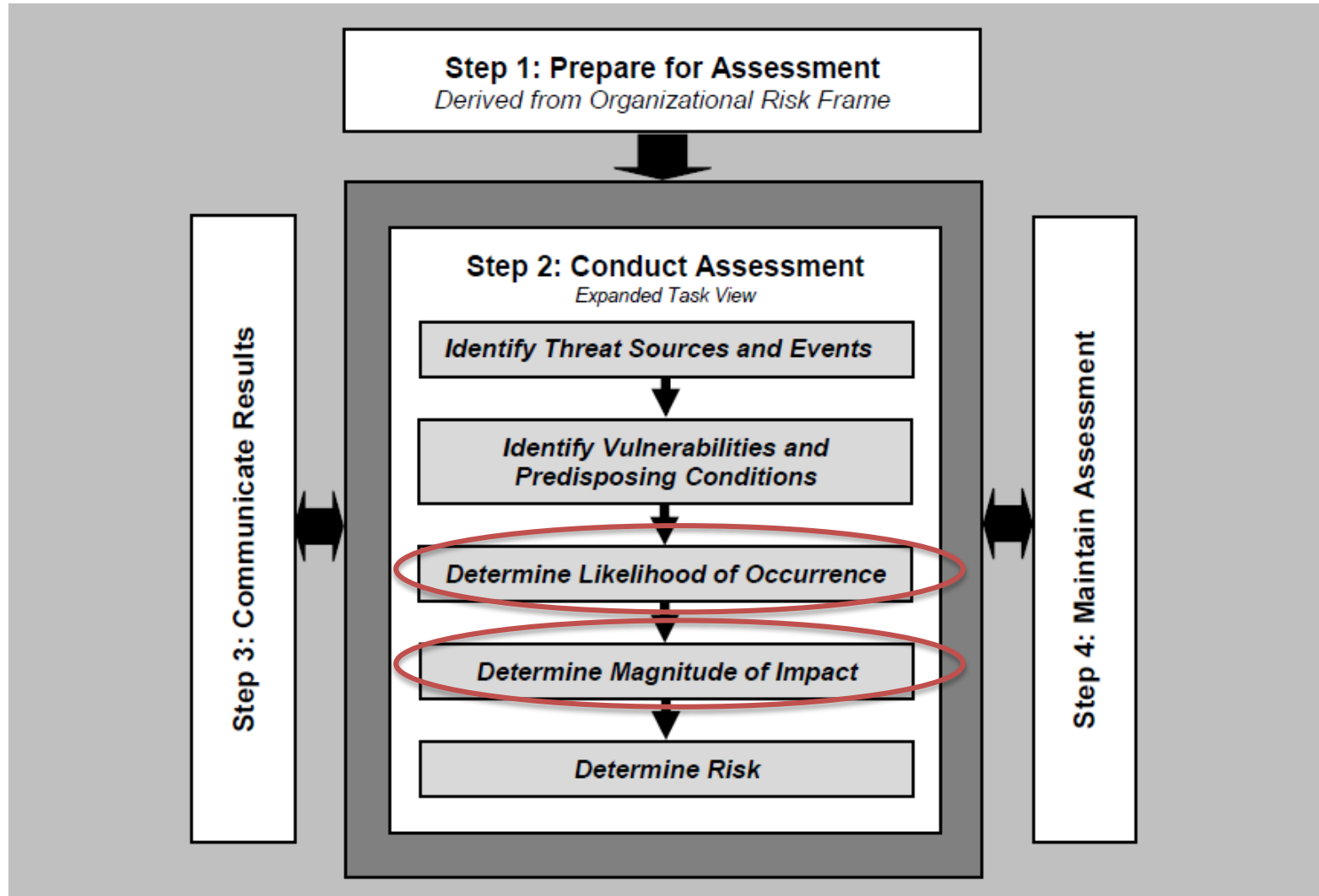
Why measure crime?

1. Inform crime reduction initiatives
2. Enhance local and national responses to crime
3. Identify gaps in response to crime
4. Provide intelligence and **risk assessment**
5. Identify preventative measures
6. Educate and inform the public



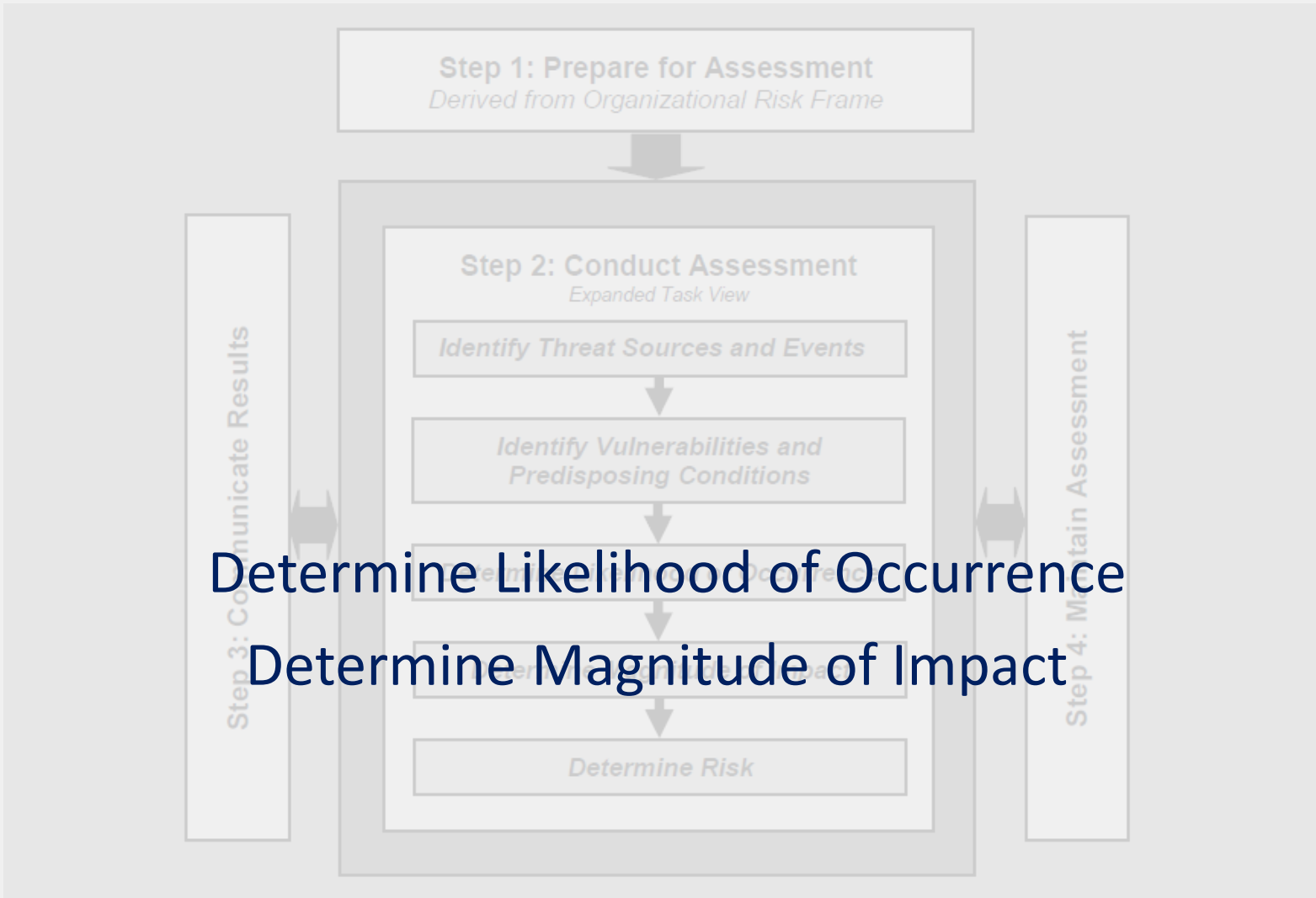


Risk managers need to know





R



Determine Likelihood of Occurrence
 Determine Magnitude of Impact



MARKETS

Law Makers

Law Enforcers

Judiciary

Policy Makers

Victims - Persons

Victims - Groups

Public and Press

Security Managers

Solution Providers

MOTIVES

Strategy

Resources

Performance

METRICS

Type of crime

Impact

Prevalence

Type of deterrence

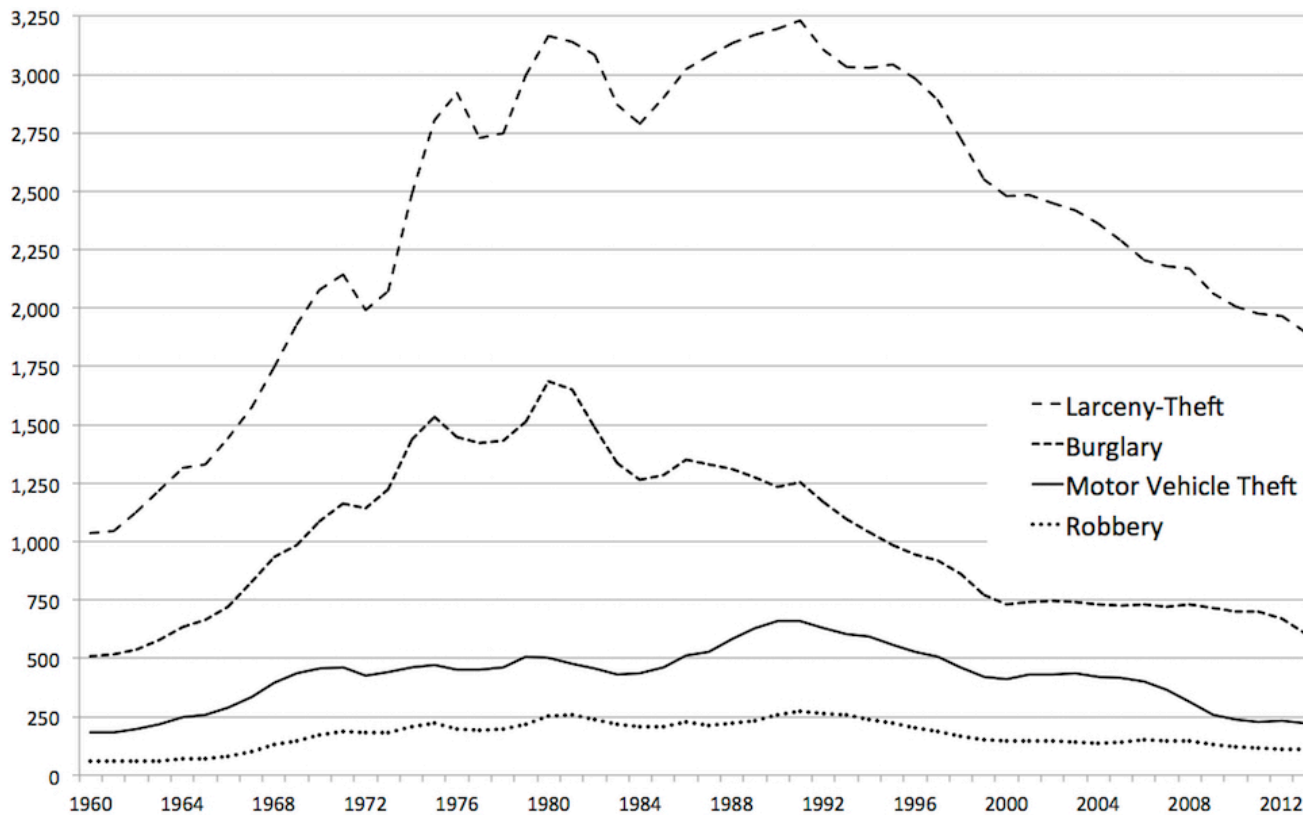
Cost

Effectiveness



And there could be good news

Rate of Property Crimes in United States, per 100,000 People, 1960-2013*



Based on FBI Uniform Crime Reporting (UCR) Data



When did we start measuring crime?

- André-Michel Guerry
 - *On moral statistics of France* – 1832
- Correlated statistics from all districts
 - Number of persons receiving education
 - Reports of property crime
- Shocker! Areas with highest rates of property crime matched areas of higher education
- The world's first crime maps and infographics



STATISTIQUE COMPARÉE

DE L'ÉTAT DE L'INSTRUCTION ET DU NOMBRE DES CRIMES

dans les divers Arrondissements des Académies et des Cours R^{es} de France

PAR A. BALBI & A. M. GUERRY, Auteurs.

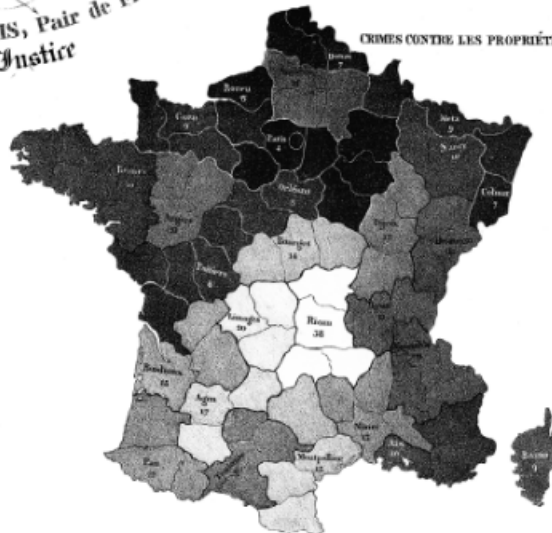


A Son Ex^{te} le Comte DE PORTALIS, Pair de France,
Ministre de la Justice

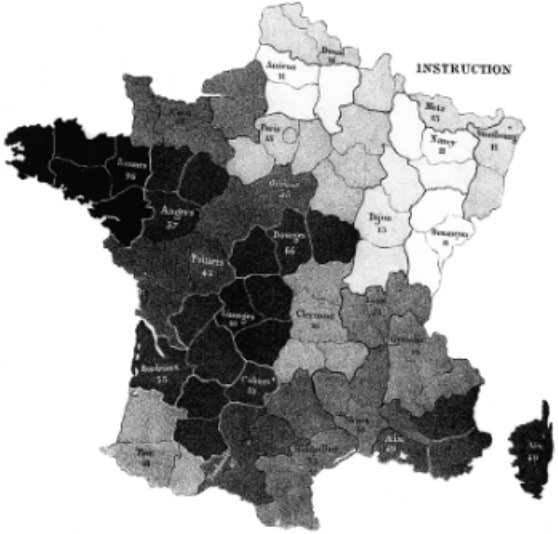
CRIMES CONTRE LES PERSONNES



CRIMES CONTRE LES PROPRIÉTÉS



CRIMES		INSTRUCTION	
Contre les personnes		Contre les personnes et la propriété	
Arrondissement	Nombre	Arrondissement	Nombre
Beaune	1 207	Beaune	1 207
Besançon	1 157	Besançon	1 157
Bordeaux	1 107	Bordeaux	1 107
Bourges	1 057	Bourges	1 057
Caen	1 007	Caen	1 007
Colmar	957	Colmar	957
Créteil	907	Créteil	907
Genève	857	Genève	857
Limoges	807	Limoges	807
Metz	757	Metz	757
Nancy	707	Nancy	707
Orléans	657	Orléans	657
Paris	607	Paris	607
Reims	557	Reims	557
Rouen	507	Rouen	507
Toulouse	457	Toulouse	457
Valenciennes	407	Valenciennes	407
Yverdon	357	Yverdon	357
Angoulême	307	Angoulême	307
Bayonne	257	Bayonne	257
Béziers	207	Béziers	207
Bordeaux	157	Bordeaux	157
Brest	107	Brest	107
Caen	57	Caen	57
Colmar	7	Colmar	7
Créteil	17	Créteil	17
Genève	27	Genève	27
Limoges	37	Limoges	37
Metz	47	Metz	47
Nancy	57	Nancy	57
Orléans	67	Orléans	67
Paris	77	Paris	77
Reims	87	Reims	87
Rouen	97	Rouen	97
Toulouse	107	Toulouse	107
Valenciennes	117	Valenciennes	117
Yverdon	127	Yverdon	127
Angoulême	137	Angoulême	137
Bayonne	147	Bayonne	147
Béziers	157	Béziers	157
Bordeaux	167	Bordeaux	167
Brest	177	Brest	177
Caen	187	Caen	187
Colmar	197	Colmar	197
Créteil	207	Créteil	207
Genève	217	Genève	217
Limoges	227	Limoges	227
Metz	237	Metz	237
Nancy	247	Nancy	247
Orléans	257	Orléans	257
Paris	267	Paris	267
Reims	277	Reims	277
Rouen	287	Rouen	287
Toulouse	297	Toulouse	297
Valenciennes	307	Valenciennes	307
Yverdon	317	Yverdon	317
Angoulême	327	Angoulême	327
Bayonne	337	Bayonne	337
Béziers	347	Béziers	347
Bordeaux	357	Bordeaux	357
Brest	367	Brest	367
Caen	377	Caen	377
Colmar	387	Colmar	387
Créteil	397	Créteil	397
Genève	407	Genève	407
Limoges	417	Limoges	417
Metz	427	Metz	427
Nancy	437	Nancy	437
Orléans	447	Orléans	447
Paris	457	Paris	457
Reims	467	Reims	467
Rouen	477	Rouen	477
Toulouse	487	Toulouse	487
Valenciennes	497	Valenciennes	497
Yverdon	507	Yverdon	507
Angoulême	517	Angoulême	517
Bayonne	527	Bayonne	527
Béziers	537	Béziers	537
Bordeaux	547	Bordeaux	547
Brest	557	Brest	557
Caen	567	Caen	567
Colmar	577	Colmar	577
Créteil	587	Créteil	587
Genève	597	Genève	597
Limoges	607	Limoges	607
Metz	617	Metz	617
Nancy	627	Nancy	627
Orléans	637	Orléans	637
Paris	647	Paris	647
Reims	657	Reims	657
Rouen	667	Rouen	667
Toulouse	677	Toulouse	677
Valenciennes	687	Valenciennes	687
Yverdon	697	Yverdon	697
Angoulême	707	Angoulême	707
Bayonne	717	Bayonne	717
Béziers	727	Béziers	727
Bordeaux	737	Bordeaux	737
Brest	747	Brest	747
Caen	757	Caen	757
Colmar	767	Colmar	767
Créteil	777	Créteil	777
Genève	787	Genève	787
Limoges	797	Limoges	797
Metz	807	Metz	807
Nancy	817	Nancy	817
Orléans	827	Orléans	827
Paris	837	Paris	837
Reims	847	Reims	847
Rouen	857	Rouen	857
Toulouse	867	Toulouse	867
Valenciennes	877	Valenciennes	877
Yverdon	887	Yverdon	887
Angoulême	897	Angoulême	897
Bayonne	907	Bayonne	907
Béziers	917	Béziers	917
Bordeaux	927	Bordeaux	927
Brest	937	Brest	937
Caen	947	Caen	947
Colmar	957	Colmar	957
Créteil	967	Créteil	967
Genève	977	Genève	977
Limoges	987	Limoges	987
Metz	997	Metz	997
Nancy	1 007	Nancy	1 007



Les deux premières cartes présentent d'après le Cens de 1826 le nombre des habitants de l'Empire en 1826 et d'après le Service des Contributions, le rapport moyen de nombre des contribuables à la population dans les départements qui forment l'arrondissement de chaque Cour Royale. Les diverses dénominations des cartes correspondent au nombre des arrondissements, mais en abrégé par lettres et sans répétition que dans la même carte. Les chiffres indiquent sur combien de mille habitants se trouvent en moyenne dans chaque Cour Royale. Les divers départements de la Cour royale de Paris comptent sur 200,000 de la Cour royale de Orléans sur 75,000.

La troisième carte, divisée par arrondissements et les arrondissements sont les mêmes que ceux des Cour royales (à l'exception de la Cour qui renferme le territoire d'Alsace) offre d'après les derniers états officiels dressés au Ministère de l'Instruction publique et qui remontent à 1826, le rapport du nombre des étudiants à la population de chaque Cour royale. Les chiffres indiquent sur quel nombre d'habitants il y a un étudiant. On voit que dans l'arrondissement de Valenciennes de France, il n'y a qu'un étudiant sur 100 et dans les arrondissements de Bayonne d'Alsace et de Metz.

Prix 5 francs.

Paris, chez Jules Renouard, Libraire, rue de Turcoy, 17.



Many challenges in counting crime

- What counts?
 - Crimes reported to authorities
 - Crimes investigated
 - Crimes proven in a court of law
- US and UK track crimes reported
- But they also survey households
- The “dark figure” of crime will persist

a certain unknown number of crimes of all kinds are undetected

Dr. Michel Kabay



Measuring computer crime

- Began with SRI collecting cases of “abuse”
- Donn Parker’s *Crime by Computer* book: 1976
- First Survey of Computer Crime Studies: 1980
 - John Taber identified several issues
 - Crimes and abuses were confused
 - Crime stories persist even if erroneous
 - Taber advised skepticism
 - Multiple parties may benefit from construing computer crime as problematic



Computer surveys past

- UK Audit Commission 1981
- CSI Computer Crime & Security Survey 1996
- Internet Crime Complaint Center (IC3) 2000
- CERT-CSO-USSS (Microsoft Deloitte PWC) 2004
- U.S. National Computer Security Survey 2005
 - Cybercrime Against Businesses





NCSS 2005 was largest ever

- Response rate 23% with 8,000+ firms
- CSI/CERT/PwC averaged 15% and 500
- Despite size: “not sufficient to support national or industry-level estimates”
- 22 million security incidents reported
 - But 20 million were defined as “other”
 - “spyware, adware, phishing, and spoofing”
- NCSS was never repeated
 - DoJ now refers you to CERT-CSO-USSS-PwC



Use and abuse: 2003

- Ryan & Jefferson: *The Use, Misuse, and Abuse of Statistics in Information Security Research*
- Analyzed 14 different surveys
 - 12 compounded erroneous extrapolations of data by failing to limit responses to one per company
 - Cost figures problematic
 - If 497 of 500 report less than \$100K lost to security incidents but 3 report \$200 million lost the what is the average loss for the population?
 - If those 3 are from the same firm



Sex, lies, and cybercrime surveys

- 2012 Florêncio & Herley
- Rip into methodology
- Outliers and exaggeration
 - The lifetime sex partner problem
- Solution?
 - Large stratified random samples are necessary if you want to generalize results
 - But even 8,000 may not be enough

Can any faith
whatever be
placed in the
surveys we have?
No, it appears not.

Florêncio
and Herley



Any upside to surveys?

- Asking people what they think about crime is a safer bet, and can be useful
 - For example: the EU Barometer, Blackhat survey
- Reports about things that actually happened
 - Can be instructive if used appropriately
 - For example: Verizon DBIR
- But we're still in trouble if there's a 250X discrepancy in cost per record breached
 - Ponemon says \$145 but Verizon says \$0.58



A sad story

US cybersecurity: Progress stalled

Key findings from the 2015
US State of Cybercrime Survey

July 2015





A code of conduct?

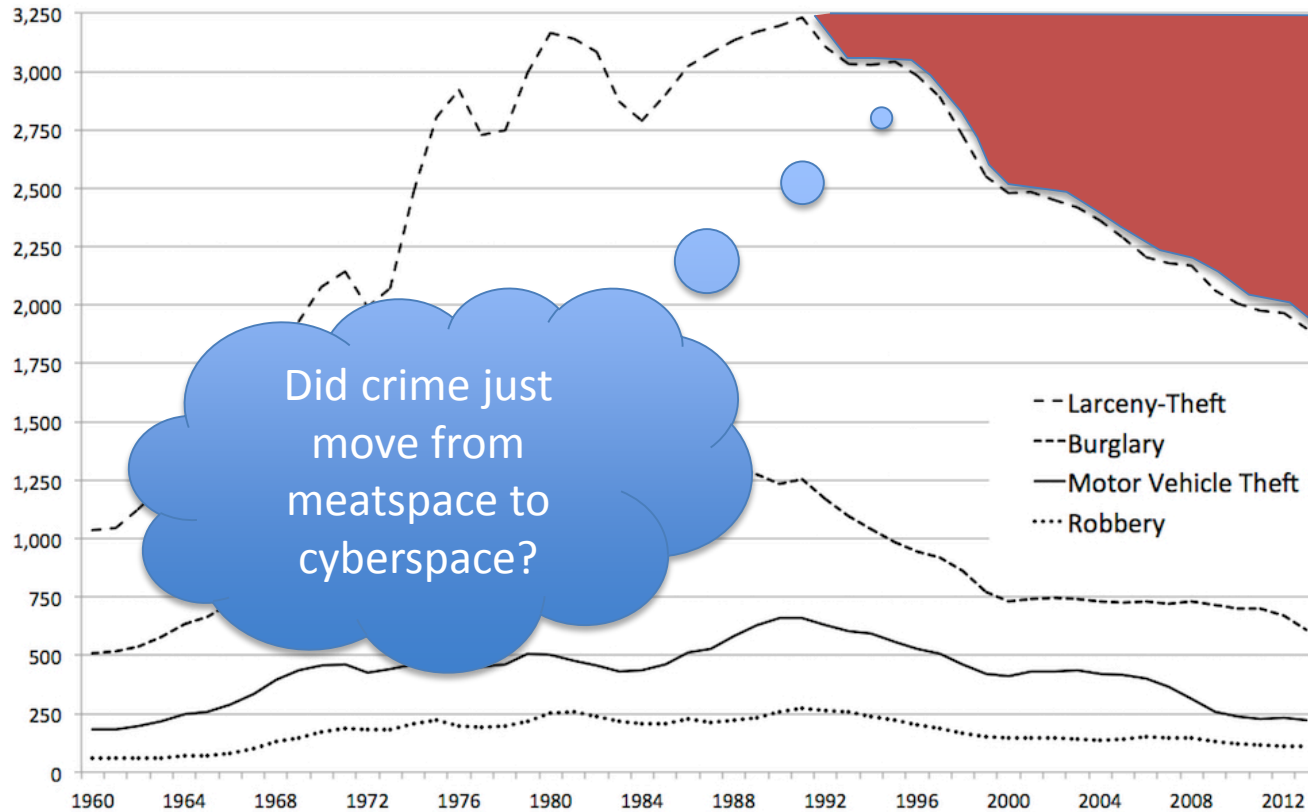
- I will never cite cybercrime statistics without the appropriate caveats
- I will always state exactly what is being measured and by whom
- Let's write the rest...





But I still say we need metrics

Rate of Property Crimes in United States, per 100,000 People, 1960-2013*

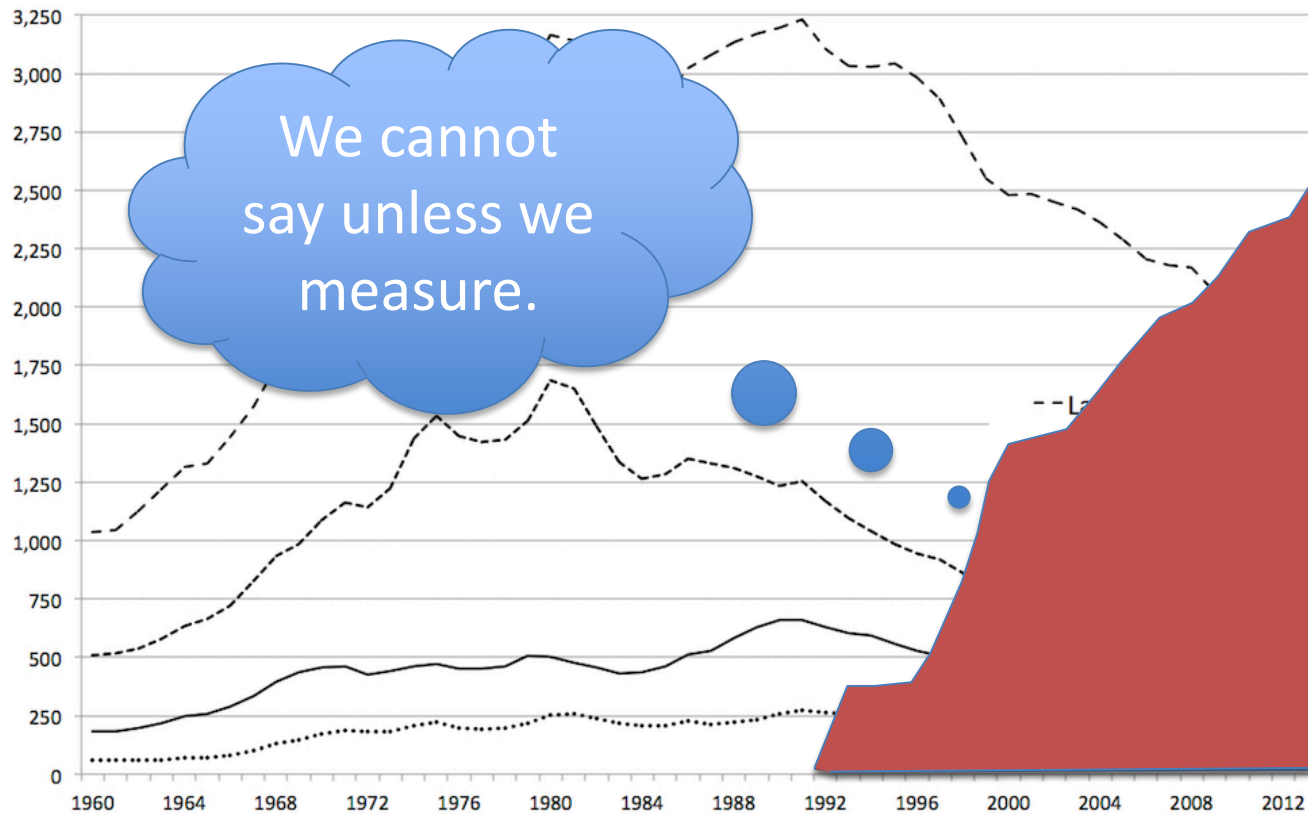


Based on FBI Uniform Crime Reporting (UCR) Data



Even if the news is bad

Rate of Property Crimes in United States, per 100,000 People, 1960-2013*



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Thank you, enjoy lunch!

- WeLiveSecurity.com
- stephen.cobb@eset.com
- [@zcobb](#) on Twitter and Slideshare

