Software is Vital

Secure Software Engineering for the Age of Smart Cities
Wherever safety and security are critical, Thales delivers. Together, we innovate with our customers to build smarter solutions. **Everywhere.**
Our track record. Over 40 years of leadership delivering data protection solutions around the world

Our customers. We secure some of the world’s most valuable information and > 80% of payment transactions

Our commitment. Hundreds of R&D staff dedicated to excellence in applied cryptography

Our certifications. All our offerings are independently security certified - more than anyone else!

Our support services. Our Advanced Solutions Group (ASG) provides world-class consulting, training, and deployment assistance

Hardware Security Modules
Key management systems
Network encryption
Signing and time stamping
About your speaker

Chief Technology Officer at Thales e-Security

Career in security at many scales

- nCipher (Lead Architect, Director Technical Strategy)
  - And founder of OASIS KMIP

- ARM (Director of Technology, Secure Services Division)
  - And Board Director at GlobalPlatform

- Trustonic (Chief Technology Officer)
  - And Chair of GlobalPlatform Security Task Force

- Thales e-Security (Chief Technology Officer)

Planes, trains and automobiles. And smart phones. And credit cards…
So...why are we here?
So... why are we here?

Security, Trust, and Privacy

- Security and Privacy for Internet of Things and Cyber-Physical Systems
- Security control and management in smart cities
- Trust and credential negotiations in dynamic environments
- Privacy and citizen-profiles
- Intrusion prevention and containment
- Security in clouds and visualization approaches
- Architectural support for security
- Security, privacy, and dependability
- Security in cooperative networks
- Data protection strategies
- Collaborative Internet attack containment
- Micro-kernels and robustness
- Surveillance
- Biometrics
- Electronic Data Interchange (EDI)
- Cyber Security
- Cryptography
- Secure protocols
So...why are we here?
“Smart Cities”
Smart cities...a mainstream idea

Revolution on the streets as cities go high tech

Technology has the potential to make cities more efficient, safer, and more sustainable, improving the quality of life for residents.
Smart cities…a mainstream idea
Smart cities...a mainstream idea
Smart cities...a mainstream idea

MOBILITY

As technology advances, travelers’ expectations of seamless movement and their insistence with outdated transport systems forced to grow from smart parking, in which users are sent mobile signals on the nearest available spaces, to the growing availability of grab-and-go cars in some countries, and travel apps on mobile devices. The growth of mobility apps shows no signs of slowing. For those looking for a more connected, real-time transport updates by mobile phones can help navigate overcrowding and congestion in busy cities.

30%

drivers in cities are looking for a better way

Barcelona, awash with the idea of the Smart City, has a city-wide, 3G and 4G network with 400 access points, and aims to increase the network with 1,000 points across public spaces, parks, schools and major stations.

30%
Smart cities…not ambitious enough?

Why does a Smart Nation matter?

Singapore, a tech innovation hub, is tackling tomorrow’s big challenges today

By Melissa de Villiers, Editor Group

Topping global league tables isn't exactly a new state of affairs for Singapore. For
Smart cities…not ambitious enough?

Why does a Smart Nation need to be so smart? Singapore, a tech leader tackling tomorrow’s big challenges today

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Topping global league tables isn’t exactly a new state of affairs for Singapore. For
Smart Cities…Connected Living…but how will we get there?
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What about ‘Cloud’?

Image Author=Brian Solis, License=Creative Commons Attribution 2.0 Generic
What about ‘Cloud’?

Six decades into the computer revolution, four decades since the invention of the microprocessor, and two decades into the rise of the modern Internet, all of the technology required to transform industries through software finally works and can be widely delivered at global scale.

In short, software is eating the world.

Image Author=Brian Solis, License=Creative Commons Attribution 2.0 Generic
What could possibly go wrong?
The Internet of Things

A new model economy
Connected Home
ON THE INTERNET

NOBODY KNOWS

YOU'RE A DOG
IoT

On the Internet of things, nobody knows you’re a dishwasher.

Image Wikimedia Commons, verified copyright free
As the devices around us become smarter they will become less loyal, and it's not just about malware (whether written by cops or crooks). We can expect all kinds of novel business models, many of them exploitative, as well as some downright dishonesty.
That’s all very well in the home, but…
That’s all very well in the office, but...
Worlds collide

Software is … everything
Worlds merge

Toyota to spend $1bn on artificial intelligence project in Silicon Valley

Company to employ 200 people in a new facility that will include development of robotics

Associated Press

Friday 6 November 2015 06.36 GMT

450 shares 46 comments

Save for later
Cloud residue. It’s raining Data.
A critical problem for Smart Cities
A critical problem for Smart Cities

The biggest blocker to the modernisation of public services is information sharing or the lack of it.
A critical problem for Smart Cities
Data is EVERYTHING is Data
Accidental Problems
Accidental Problems

Over-reuse
Remember this?

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In short, software is eating the world.
Diversity
That’s all very well in the cloud, but...

Uber and Volvo take on Ford in race to launch self-driving vehicles

Automated trucks and – gasp! – SUVs could be here in five years' time
"That’s all very well in the cloud, but…"

“Both Uber and Volvo will use the same base vehicle for the next stage of their autonomous vehicle strategies”

“This will involve Uber adding its own self-developed autonomous driving systems to the Volvo base vehicle”
That’s all very well in the cloud, but…

SC Magazine > News > Connected car vulnerabilities could be reduced with an ounce of prevention

Robert Abel, Content Coordinator/Reporter

August 09, 2016

Connected car vulnerabilities could be reduced with an ounce of prevention

IOActive researchers found that half of the cyber vulnerabilities in connected vehicles could grant an attacker full or partial control of a vehicle, the majority of which could be fixed with an ounce of prevention.
"It’s somebody else’s problem"
everybody’s

“It’s somebody else’s problem”
Not Accidental Problems
Not Accidental Problems

Malign intent
Unintended consequences
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"You are at Risk!"

Seeing this does not always mean you are at risk.
Hard Problems
Hard Problems
Cryptography is Hard

Alice & Bob
Cryptography is Hard

Alice & Bob

...if only it were this simple...
Hard Problems

Available expertise
Hard Problems

Reliability and Durability
How long is a lifetime?

Image Author=S_Sepp, License=Creative Commons Attribution-Share Alike 3.0 Unported
What can we do?
Why don’t we just write better code?

Code Quality 2

Why don’t we just write better code?

Ugh, I hate reading your code.

It’s like you ran OCR on a photo of a Scrabble board from a game where JavaScript reserved words counted for triple points.

It looks like someone transcribed a naval weather forecast while woodpeckers hammered their shift keys, then randomly indented it.

It’s like an e.e. cummings poem written using only the usernames a website suggests when the one you want is taken.

This looks like the output of a Markov bot that’s been fed bus timetables from a city where the buses crash constantly.

Whatever, it runs fine for now.

So does a burning bus.

XKCD.com
Developing areas that will help

- **Think like an attacker!**
  - Software has to work in adverse conditions, not just ideal ones

- **The cloud can help**
  - Concentrating expertise where it's needed
  - Population level analytics
  - Being online can move the hard parts of protocols around

- **Isolation technologies**
  - Software and hardware

- **Software quality tools**
  - If they are used properly!
  - Simulation needs to catch up

- **More sophisticated security standards**
  - Common Criteria iTC?

- **Regulation**
  - Money talks…
Because this is the world we want...
…not this one!
Questions?