



# Cybersecurity Risk Management

*presented by*

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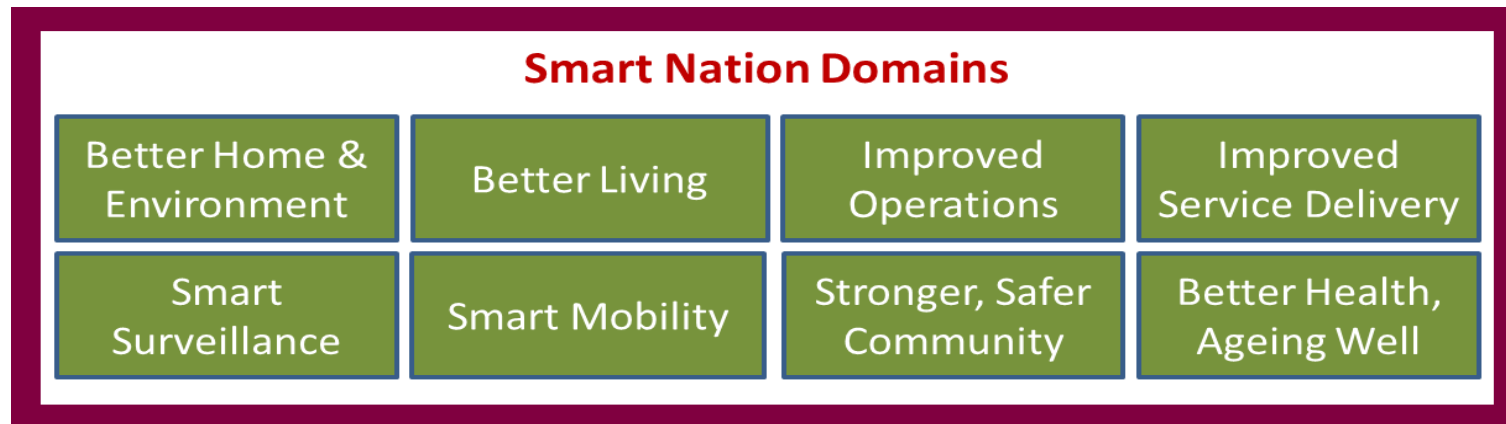
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# Programme Overview

- S\$11 millions funding awarded by NRF to establish a Translational R&D Centre for Smart Nation applications - the SPIRIT Centre
  - Perform Systems Research with the objective to design & develop a large-scale, complex **smart systems platform** for translational R&D of technologies relevant to smart nation applications
  - Platform will be a **testbed** for supporting rapid solutioning & fast prototyping of smart nation applications
  - To be a **one-stop shop** with broad capabilities



# Smart Nation: Technology Perspective

Smart Nation is enabled by the widespread **adoption of new technologies:**

- Sensors
- Internet of Things (IoT)
- Cloud computing
- Mobile technology and
- Big data analytics
- **Cybersecurity**



**to develop intelligent systems in order to improve government operations, support better living, create opportunities, and to support stronger and safer communities.**

Smart Nation/Cities is a systems engineering technology that aims to disrupt and challenge traditional operations and decision-making processes

# Cyber Security Requirements

Secure e-Banking Applications

Security Policy & Standards

Management Objectives

?

Security Requirements

?

Security Analysis & Design

Security Controls

Security Infrastructures

Security Architecture ?  
Reference Implementation ?  
Standards ?

# Cyber Security Risk Management

**Investment to Address  
Vulnerability**

Increasing spending reduces  
vulnerability, but at declining rate



**Address Threats through Private-  
Sector Collective Spending**

Collective spending/efforts



**Monetary Impact of Cyber Breach**

Cost due to loss of data/service,  
Cost related to regulatory  
reporting and investigation

**The Network Effect**

Access from business partners or  
service providers



# Cyber Security Risk Management

Increasing spending reduces vulnerability, but at declining rate

You spend on controls that you know.  
Do you know what you don't know?

Collective spending/efforts

Economy of scale

Cost due to loss of data/service,  
Cost related to regulatory reporting and investigation

Sharing of resources/expertise and  
Cyber Threat Intelligence

Access from business partners or service providers

Identify interfaces with external connectivity, control risk accordingly (minimal security control requirements)

Design | Control | Defend | Detect | Respond

# Fundamental Changes ...

Development of enterprise consumized apps is influenced by some **fundamental changes in the consumer internet infrastructure and app development ecosystem**:

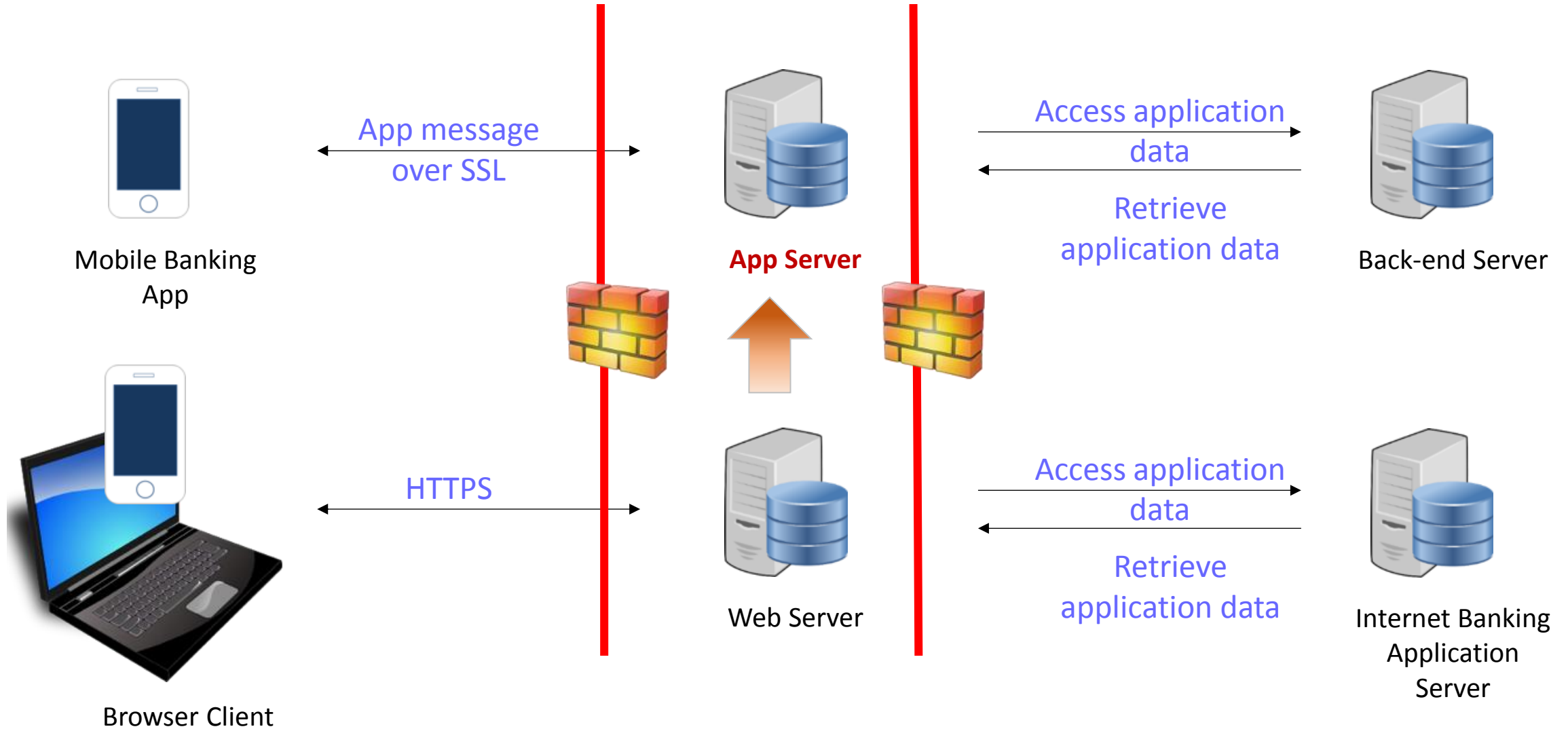
1. **Pervasive use of PKI** as an Infrastructure for software distribution and installation
2. Easy **availability of open source software** – code fragments, modules, apps, servers

## Trends:

1. **Less importance of browser-based applications**
2. **Custom-built banking apps and servers**



# Emerging Application Architecture





# Cyber Security Interests

Cybersecurity risk and requirement analysis

Enterprise Security Architecture design and review

Lightweight security infrastructure for mobile transactions

Blockchain-based mechanisms for Distributed Trust

Critical Information Infrastructure Protection

Biometric Authentication and Biometric Cryptography

IoT Security for Smart Nation systems

**Cyber threat intelligence sharing and analytics**

Design | Control | Defend | Detect | Respond