Providing the most digitally and socially connected Games ever

The legacy of London 2012

Phillip Morris
CTO of BT Japan

What was the challenge?

"Staging the Olympic and Paralympic Games is one of the biggest logistical peacetime challenges a country will ever face."

Sebastian Coe, LOCOG Chair

The London Organising Committee of the Olympic Games and Paralympic Games Ltd

14,700 athletes
46 sports events
805 medal events
27,500 media reps

How big was the challenge?

- The first major sporting event in the UK since Commonwealth Games 2002
- The Olympic and Paralympic Games are the equivalent to 46 World Championships
- The largest park development in Europe for over 100 years
- Connecting London to a worldwide audience of 4.8bn people
- Predicted to be the first truly digital Games

Over 10.8 million spectators

London 2012 – flawless delivery by BT

The **most socially connected** Games ever

Largest, high-density public wi-fi installation in the world

The **most digitally connected** Games ever

80,000 connections across **94** locations

Up to **60Gb** of information carried each second

1,550 wireless access points

5,500km of internal cabling

16,500 telephone lines

14,000 mobile SIM cards

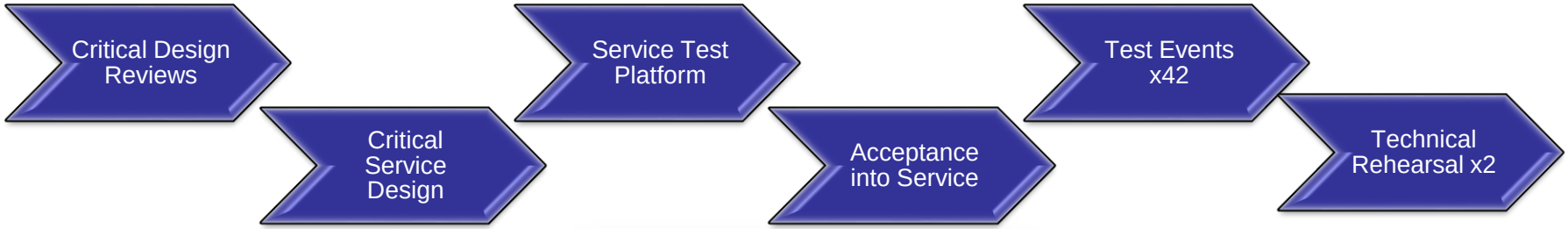
10,000 cable TV outlets

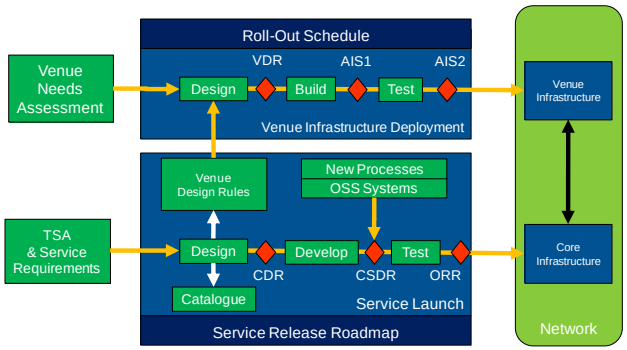
1,000,000 man-hours

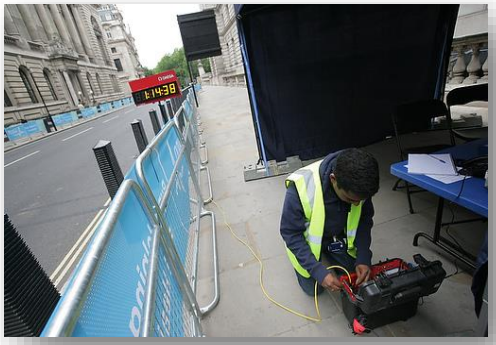
Over **1,000** people on the ground at Games' Time

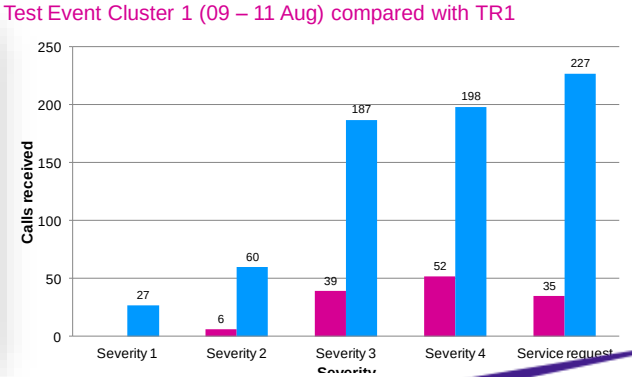
Design and service assurance drives “Right First Time”

- Right First Time requires coordinated testing & assurance
- Critical Design and Critical Service Design Reviews validate the non-functional design principles
- Operational readiness reviews and Accept into Service verify implementation
- Test events validate the operational processes and team working
- Technical rehearsals stress test technology team and incident processes







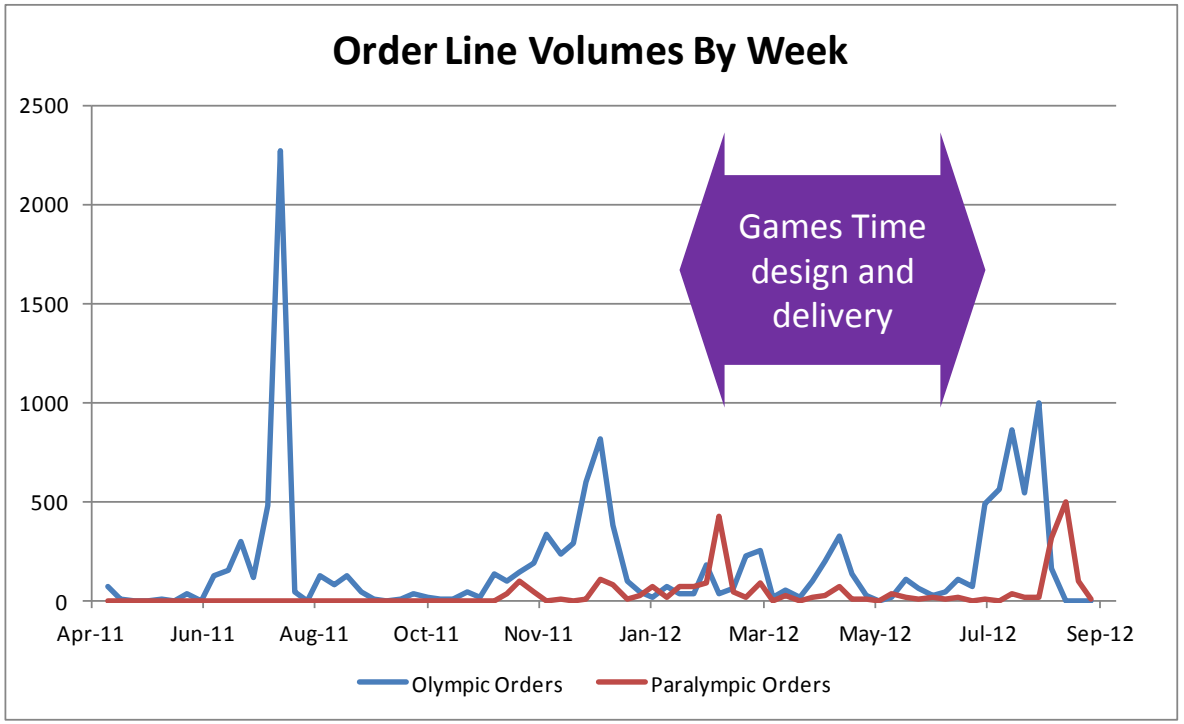


This comprehensive model led to Games-Time success

- 1552 Incidents and 1653 Service Requests logged to BT over 19 days
- 192,944 equipment alarms generated
- No Severity 1 Incidents logged against BT
- Only 21 Severity 2 Incidents logged versus a service base across 94 venues of 3,000 switches, 10,000 CATV End Points, 10,500 IPT handsets
- Severity 2 primarily indicates loss of resilience not service
    - 48% were at Outdoor Venues, reflecting the difficult environment

Challenging operational environment both for delivery and service

Peak Hour Time to resolve		
Problem level	**London**	**Beijing**
Severity 1	**1 hr**	**2 hr**
Severity 2	**2 hr**	**4 hr**
Severity 3	**4 hr**	**8 hr**
Severity 4	**6 hr**	**12 hr**
Service Request	**8 hr**	**16 hr**



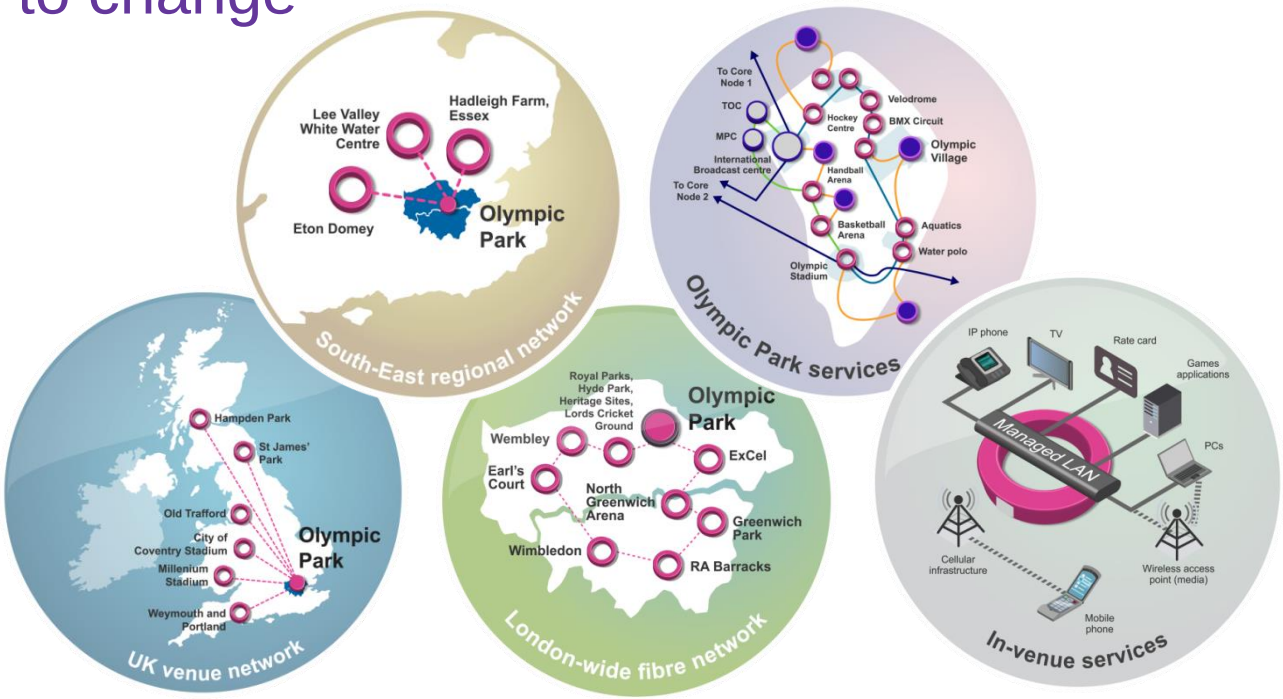
Broadcast Standard Order Period

Press Standard Order Period

Late Order Period

Games Time Orders

Contractual requirement was high level with volumes subject to change



80,000 connections across
94 different locations
4,500km of internal cabling
Venue <100Mb/s connection

400 wireless access points
16,500 telephones
16,000 mobile phones
10,000 cable TV outlets

Public mobile + limited infill
642,000 man-hours of effort
Over 700 people supporting the solution in Games Time

65,000 connections across
73 different locations
5,500km of internal cabling
Venue <10Gb/s connection

1,600 wireless access points
10,500 telephones
14,000 mobile phones
9,000 cable TV outlets

54 venues enhanced mobile
1,000,000 man-hours of effort
Over 850 people supporting the solution in Games Time

The Wi-Fi Challenge

- Private “back of house” services for all Olympic venues and Athlete’s Village
- Public Wi-Fi in the Olympic Park
- Wi-Fi connectivity for the ticketing system in the Olympic Park
- Wi-Fi usage was highest in the public areas of the park (44 per cent), as spectators caught up on other sports when not watching their events.

The Wi-Fi Challenge

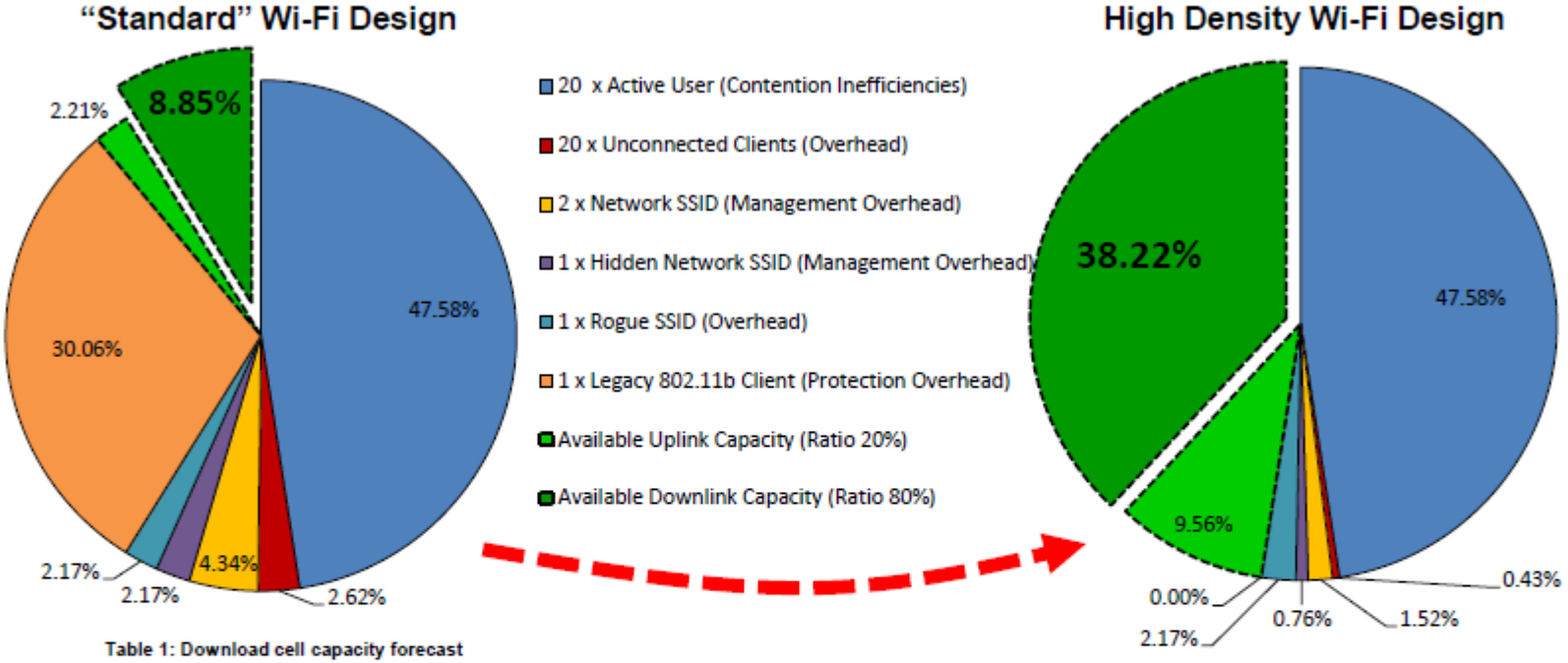
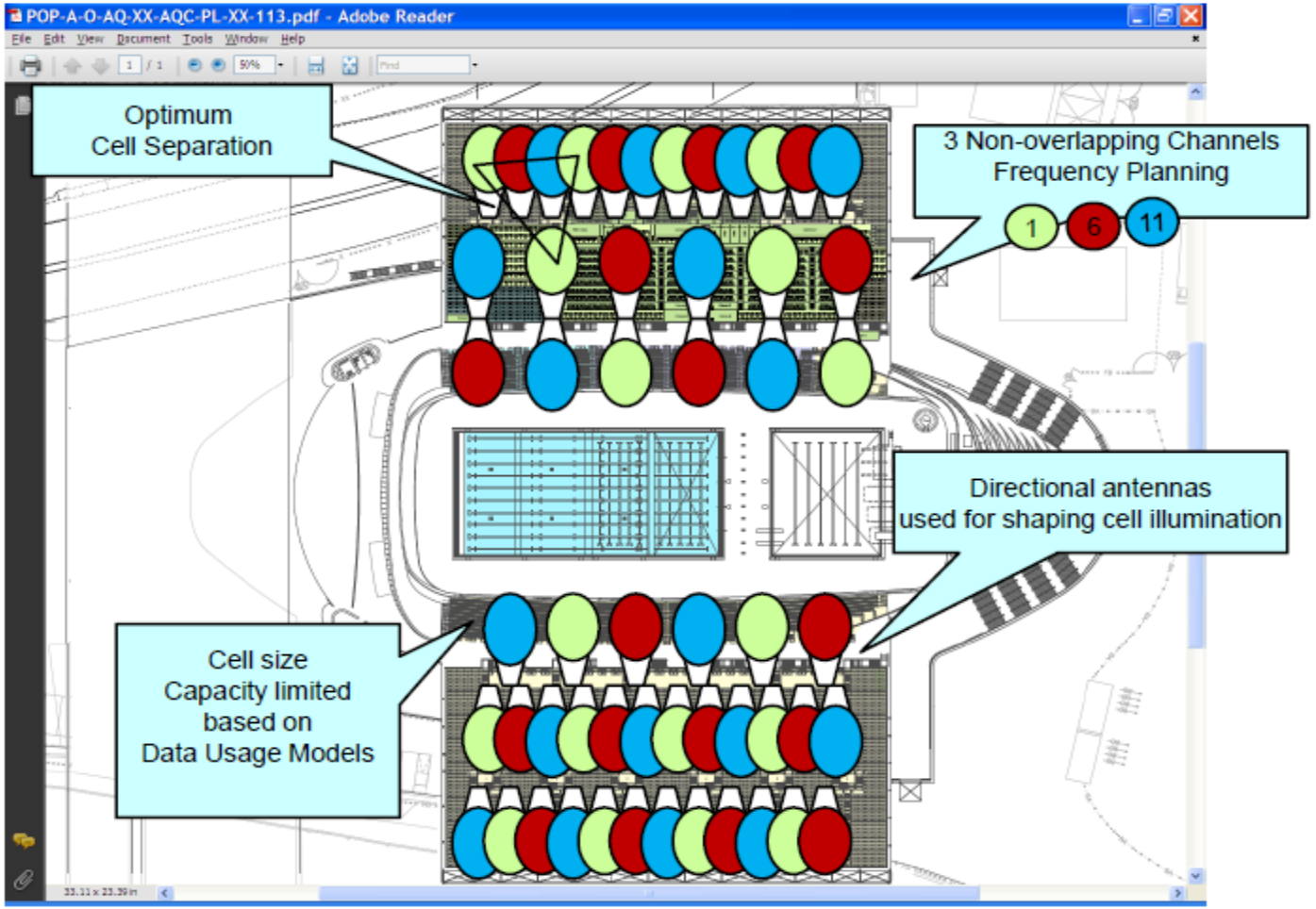


Table 1: Download cell capacity forecast

	Poor RF Conditions (modulation 6Mbps)	Estimated RF Conditions (modulation ~36Mbps)	Ideal RF Conditions (modulation 54Mbps)
"Standard" Wi-Fi Design (8.85% of available capacity)	0.3Mbps	**1.5Mbps**	1.6Mbps
High Density Wi-Fi Design (38.22% of available capacity)	1.7Mbps	**6.6Mbps**	8.3Mbps

On the Olympic Park alone the team installed more than 1,500 wireless access points, interconnected by over 100 kilometres of cable across 250 hectares. The forecast across all services was for 200,000 simultaneous wireless sessions .

Example of a Micro-Cellular Deployment for Wi-Fi



- The wireless network management system and the use of pre-written templates meant that reconfiguration of all 60 Olympic Park wireless access controllers typically took just three minutes. Historically such an operation might have soaked up 10 engineering hours, plus the time and trouble of moving between the 60 wireless access points.

Protecting the Games

THE LONDON 2012 WEBSITE HAD OVER

460MILLION VISITS ACROSS THE GAMES

275 YEARS OF AUDIO

504 DAYS OF HD VIDEO PLAYBACK

Web security

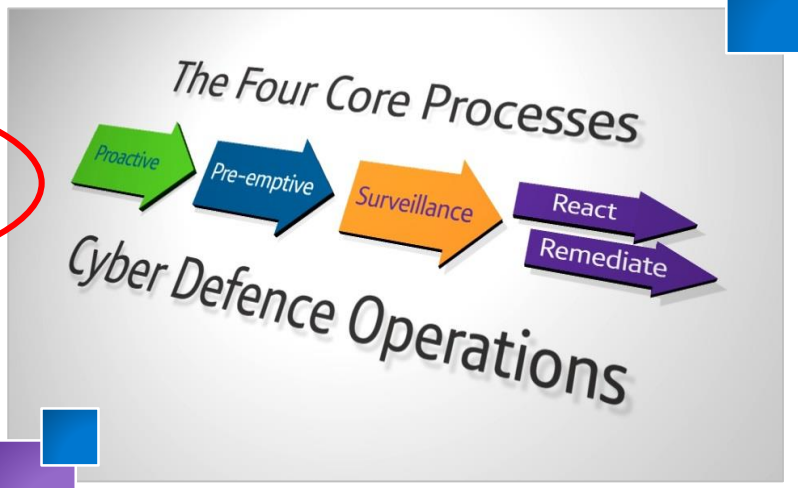
Flawless Execution
- No breaches or downtime

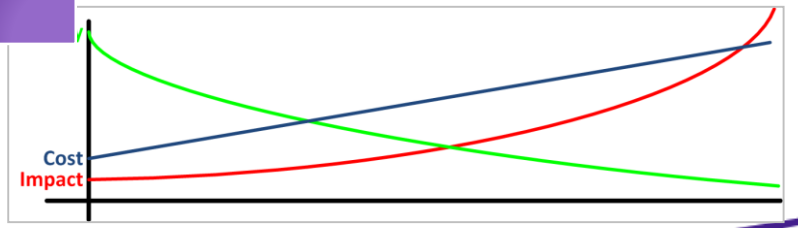
- ✓ 2.31 billion counterpane events analysed = 77 incident tickets
- ✓ 50 Terabytes of web traffic via Proxy Servers
- ✓ 212 million Malicious Connection attempts blocked
- ✓ Super Saturday 4 August alone 128 Million events detected
- ✓ At least 1 hactivism campaign each day
- ✓ At peak of London2012.com attack - BT prevented 11,000 malicious requests per second
- ✓ 30,000 media professionals – Bring your own device

BT Assure. Security that matters

Cyber Defense Operations in BT

- Understand our critical assets
- Apply a risk based approach
- Investment in tools
- Investment in behaviours
- Investment in people and skills
- Build on heritage and organise for success
- Consolidate detect and response skills
- Increase security reduce impact and cost





“War Gaming”

- ‘FLAMING TORCH’ - program of table top exercises
- ‘BENDING METAL’ - specific cyber / CERT testing
- Command Post Exercises – fully integrated testing
- LIVE EX (live exercise)
- Torch relay
- Technical rehearsals – test events

War Gaming

Rules on Engagement

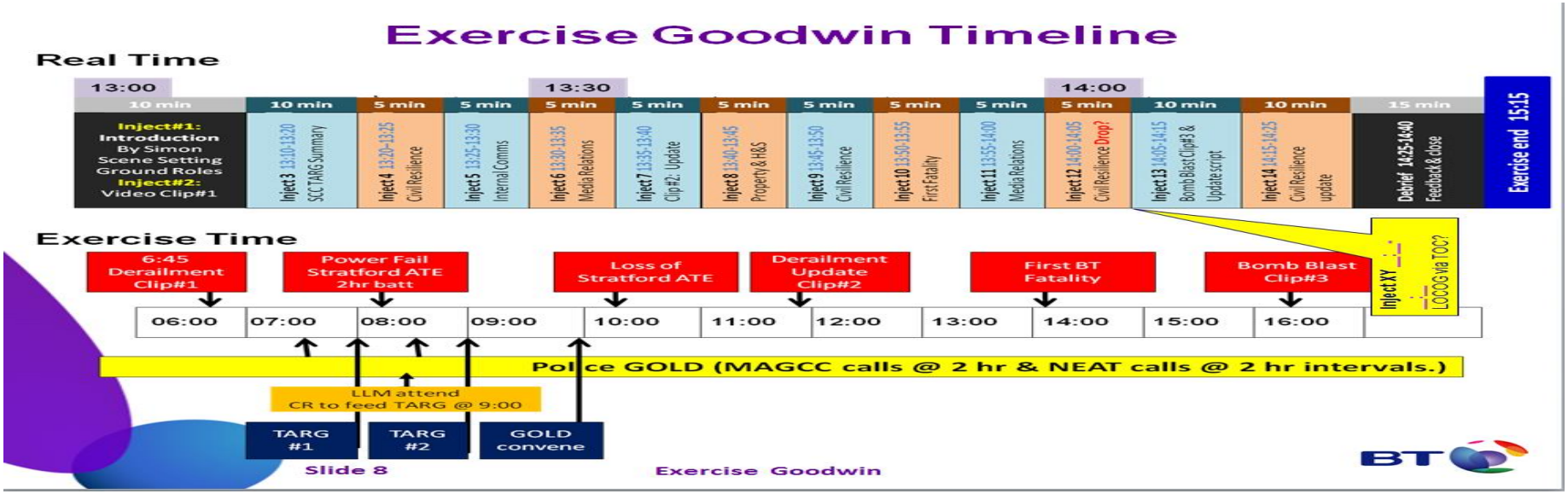
- This exercise is being recorded
- This is a desk top exercise
- Exercise duration: 2:15 hours (including post exercise review)
- This is a learning exercise not a pass/fail test of individuals
- Any action item needing further clarification will be noted for future discussion, with an action owner appointed
- Gold Members are not required to make contact outside the exercise room
- Gold Member's actions will be used in subsequent Silver/Bronze exercises

Objective

The exercise objectives will be to review the decision making processes of the BT Gold Command Team, and to start to familiarise the members with the special requirements for London 2012. More specifically they are:

- To promote cross LoB understanding of BT's London 2012 implications
- To identify gaps in the BT's response capability
- To identify the incremental communications channels required for London 2012
- To understand the decision making implications of deploying the Emergency Response Teams
- To provide awareness to the Gold Members of the potential impacts of their decisions and the Multiagency Gold Coordination Committee (MAGCC) and the National Emergency Alert for Telecommunications (NEAT)

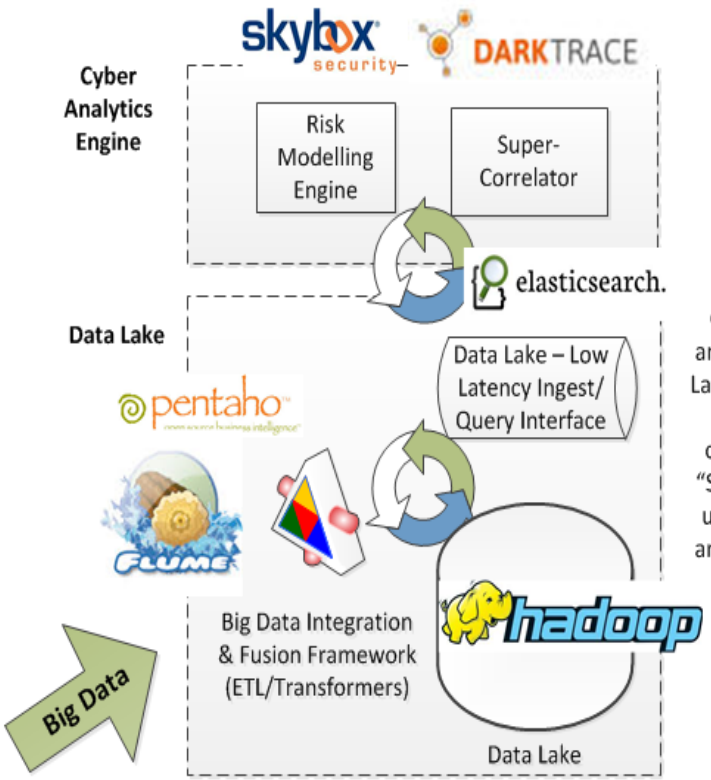
Exercise Goodwin Timeline



Unified Cyber Platform

Risk Modelling Engine:
Contextualises all threats relative to the specifics of the organisation, policies being assessed against and the assets being protected.

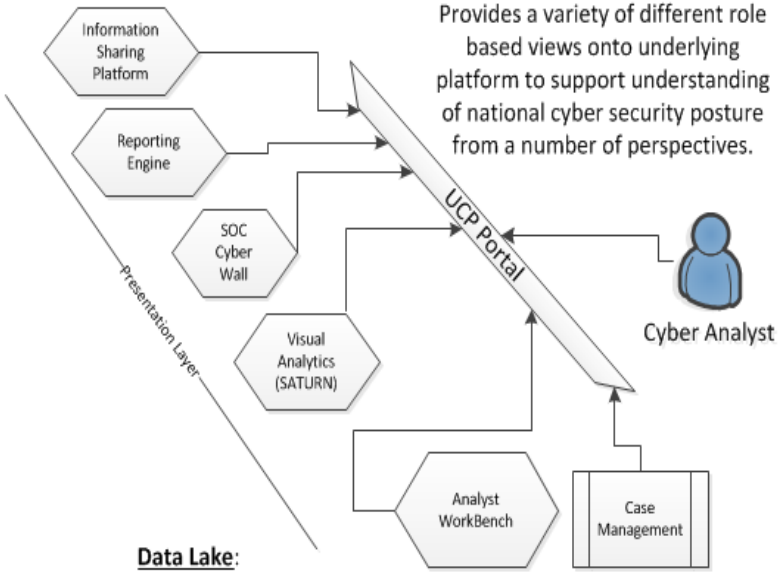
Super-Correlator:
Intelligent engine capable of piecing together the small clues in Big Data to detect nascent threats. Employs next generation anomaly detection technology to illuminate previously unknown threats in the mountain of disparate data.



Data Lake:
Capable of supporting storage and analytics across PBs of data. The Data Lake provides the underlying power to identify trends, run heuristics and correlate across mountains of data. "Schemaless" approach easily digests unstructured / semi-structured data and is flexible to changing data feeds.

Big Data Integration and Fusion Framework: A framework for integrating and fusing disparate data sources and for easily composing automated ETL and data analysis / fusion workflows.

UCP Portal:
Provides a variety of different role based views onto underlying platform to support understanding of national cyber security posture from a number of perspectives.



UCP Analyst Workbench:
Workbench for building interactive/ shareable into the analytics and data in the rest of the platform. Supports a wide range of visualisation.

L2012 Lessons Learned 7 Phases

Deliver Projects Flawlessly

Clear vision	INSPIRING Cohesive strategy, right people, strong leadership and transparent E2E process
People	MOTIVATION Quality not quantity, believe in the Vision, spirit, ethos and motivation
Contract	TRANSARENT Trust and Reflect E2E delivery and experience
Requirements	THINK BEYOND THE PRESENT Who are the power users and end users
Design	FLEXIBLE RATHER THAN TACTICAL Reflects changing requirements from all stakeholders
Implementation & testing	STAGING BRT testing simulating real life experience
In-Life	VIRTUAL CONTROLLED ENVIRONMENT TOC (virtual operations center) and collaboration technology

BT Connect	BT Compute	BT One	BT Assure	BT Contact
Networks that think	Services that adapt	Unified Comms	Security that matters	Relationships that grow