

Use of 'Big Data'

- London 2012 Olympics, subsequent developments and Opportunities for Tokyo 2020

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‘New Technology’ used in London 2012

- Bluetooth: crowd numbers & flows
- Mobile phone data and information push to users including social medias.
- Mobile spectator journey planner
- Olympic Family vehicle location tracking and run-time monitoring
- Games Lane and general highway performance management & control
- Customised satellite navigation systems for freight and Games vehicles



Advances in Transport Planning & Analytics since London 2012

Advances in **Modelling**
Capabilities

Advances in **Machine**
Processing Speed

Advances in **real-time monitoring**
and dynamic digital control

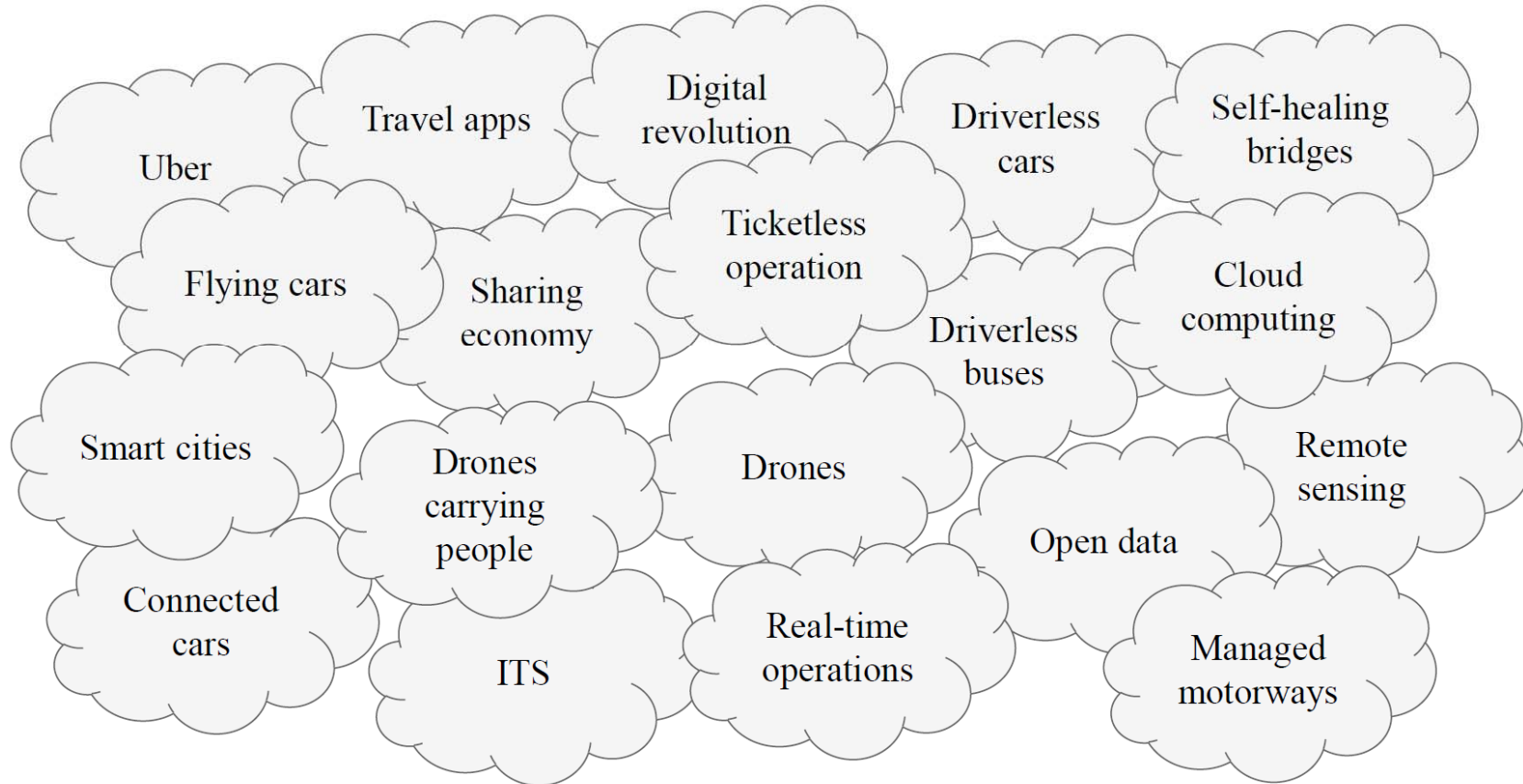
Advances in **Data Exports**
and Interfaces

Advances in **Data**
Collection and Richness

Advances in **Visualisations**
and Dynamic Reporting

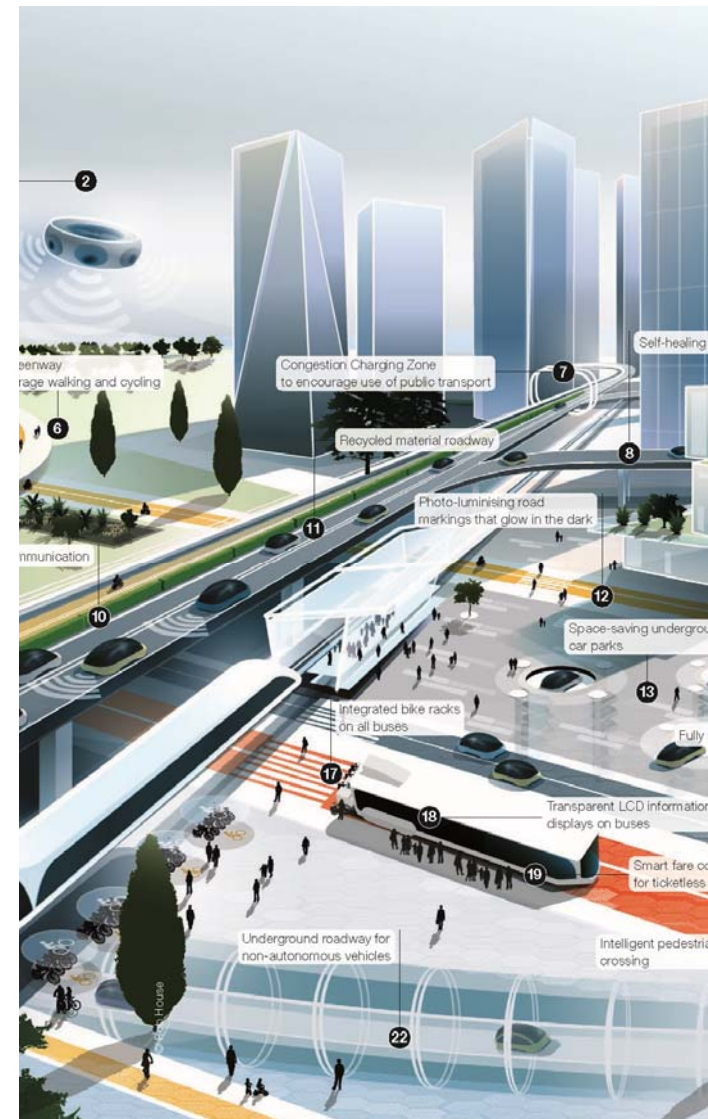
Disruptive Technology

Lots of disruption and change



Big discontinuities in road, rail and air transport are imminent and can be used for Tokyo 2020 and beyond

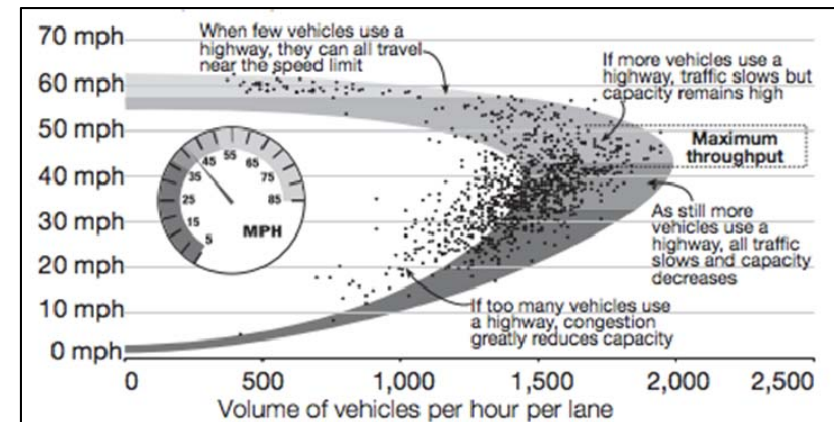
- Energy: efficient power units
- Digital: dynamic control
- Connected: always on
- Big data: real-time, mobile data, bluetooth, wireless



Road: major mobility, space and capacity changes

- On-demand cheap mobility
- 30% to 100% capacity increase
- Shared and clean vehicles
- Connected vehicles
- Changed road space
- Increasing acceptance of new technology

Moving the athletes and the “Games Family” would have been faster, cheaper and easier.



Rail: operational change not cost reduction dominates

- Digital control:
 - 20% to 30% service volume increase
 - Service flexibility increase: dynamic scheduling, skip-stopping...
- Customer information: pervasive, real-time and fully multi-modal
- Ticketing and pricing: integrated, phone based and demand responsive
- Changed urban, regional and national travel patterns
- Faster service recovery

Spectator transport by rail could have been even more day specific, flexible and demand responsive



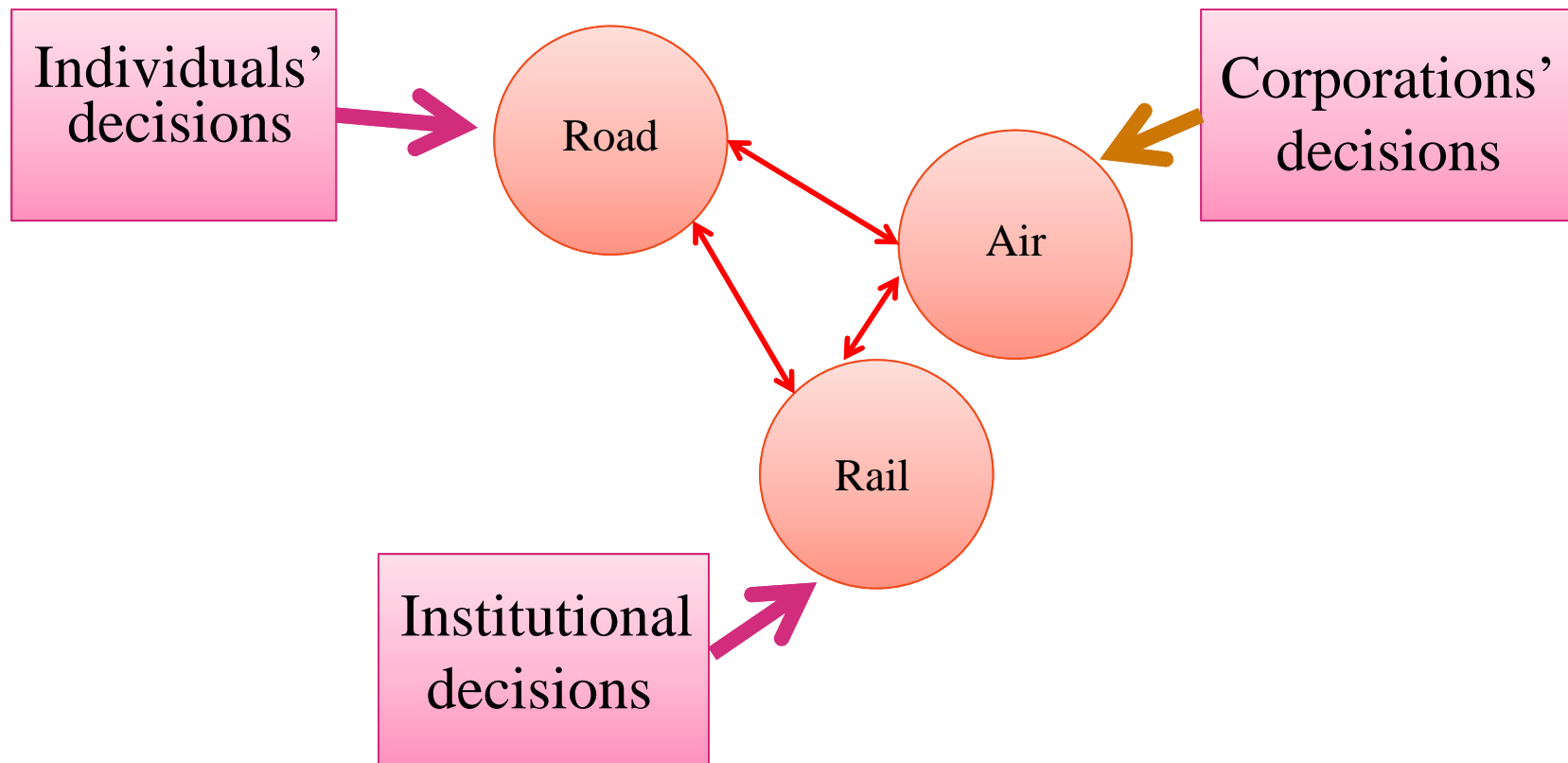
Air: a more incremental change, but just as profound

- Aircraft: efficiency and range
- Airlines: low cost operating models
- Airports: process driven
- Airports: purpose led
- Competition, connectivity and cost
- Increasing focus on customer satisfaction, e-ticketing & smart media

Games-time air travel and its management easier



The big challenge for Tokyo 2020 and for future cities will be achieving coherence between these interlinked and fast changing road, rail and air modes



These changes provide a wide range of opportunities for Tokyo to use for the 2020 Games and beyond

- Autonomous and green vehicles: e.g. in village transport shuttles
- Transport Co-ordination Centre: version 2.0
- Real time crowd monitoring, prediction and management
- Spectator accommodation e.g. Airbnb V2.0, underwritten
- Vehicle fleet management systems e.g. Uber/Lyft V2.0
- Travel Demand Management: V2.0, targeting, push, viral



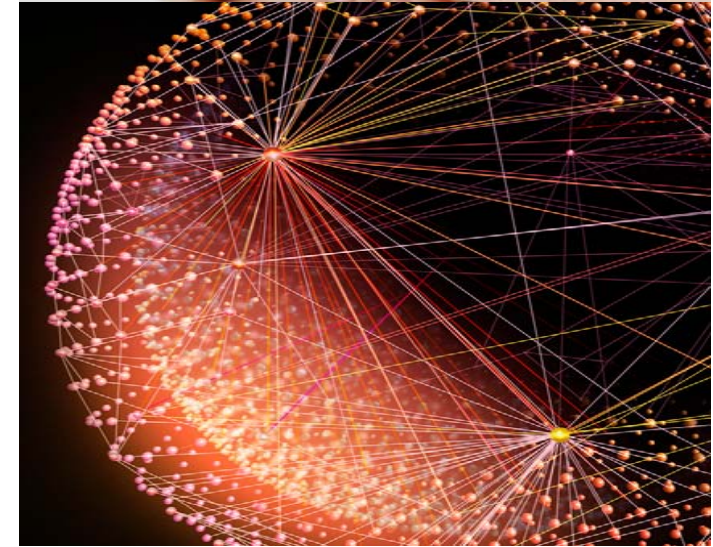
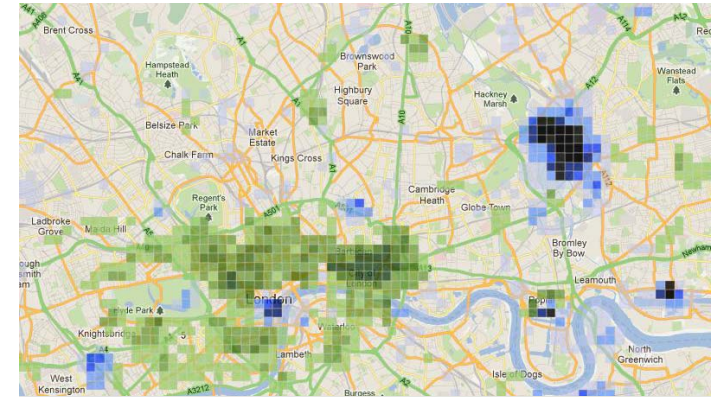
Smart Transport – Recent London Examples

- Mobile Technology
- Open data and GPS integration e.g. bus location, cycle availability
- Isochrone modelling and distribution of public transport
- One Transport – Internet of things



Mobile Phone Data

- Not widely available for 2012 Games but used for Live Sites, City Ops & Legacy events (New Years Eve)
- Rapid evolution since:
 - Highways England creating 5 sub regional UK models using mobile phone data
 - Transport for London in-vehicle Bluetooth for ONE model
 - TfLs Project EDMOND – mobile phone data for London & the SE
 - Fusion with other big data sets (Oyster, WiFi) to create multi modal platform
 - Opportunities for ‘real time’



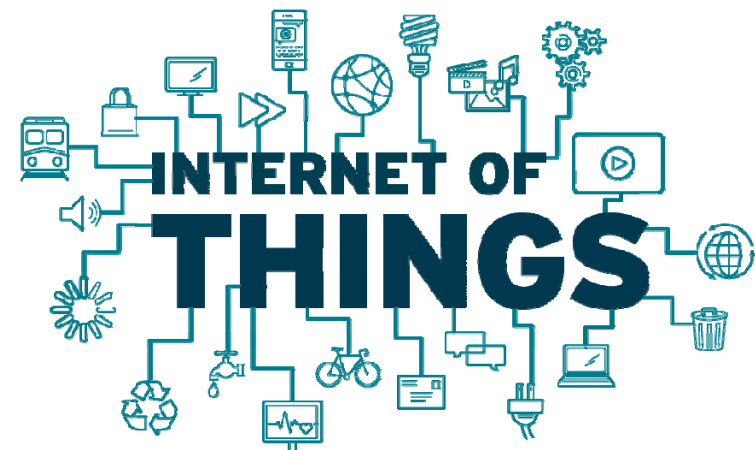
Advancing Technologies

- Mobile phone data
- iBeacon/Bluetooth/RFID technologies
 - send transport updates, queue information and wayfinding etc.
 - collected for real-time tracking people movements
 - Increasing accuracy of technology
- Payment Methods including Near Field Communications, Smart Phones and Wearable technology
- Tickets for transport, venue access and events through phone apps and wearable technology



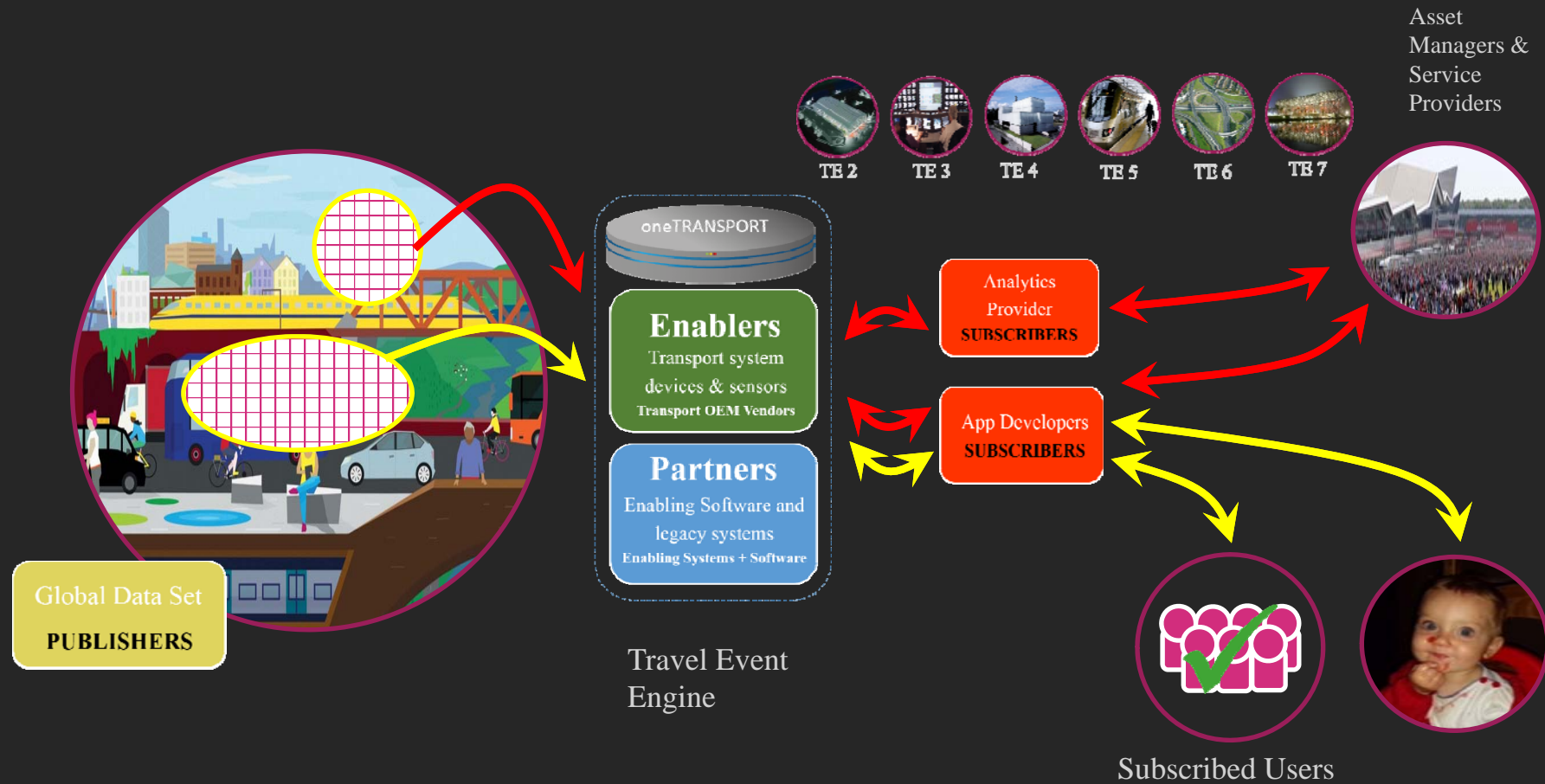
OneTRANSPORT

- Brings together ‘locked’ proprietary data assets and IoT sensors in one location
- Envisaged as the ‘transport’ component that provides improved mobility within the ‘smart cities’ agenda
- Based upon internationally standardised technology fully compatible with ‘smart city’ solutions of the future
- Smart Parking - Car parking and bicycle space sensors to give live reading of capacity and provide usage data over time



One Transport

Establishing an open market place to develop services



Conclusions

- The London 2012 Games stretched London and the nation's transport systems: a good test bed for the future
- Transport for 2012 was a success: The 2012 “ingredients” and “total transport” planning worked
- The coming road, rail and air transport discontinuities resonate well with the lessons from 2012
- Technologies can offer increased resilience
- This gives confidence that the transport challenges of mega-cities can be met, and at the same time...
- These changes provide significant opportunities for Tokyo 2020 to grasp and take forward as legacies.