Department for Transport

Bus Open Data

Collaboration to put the passenger first

April 2018

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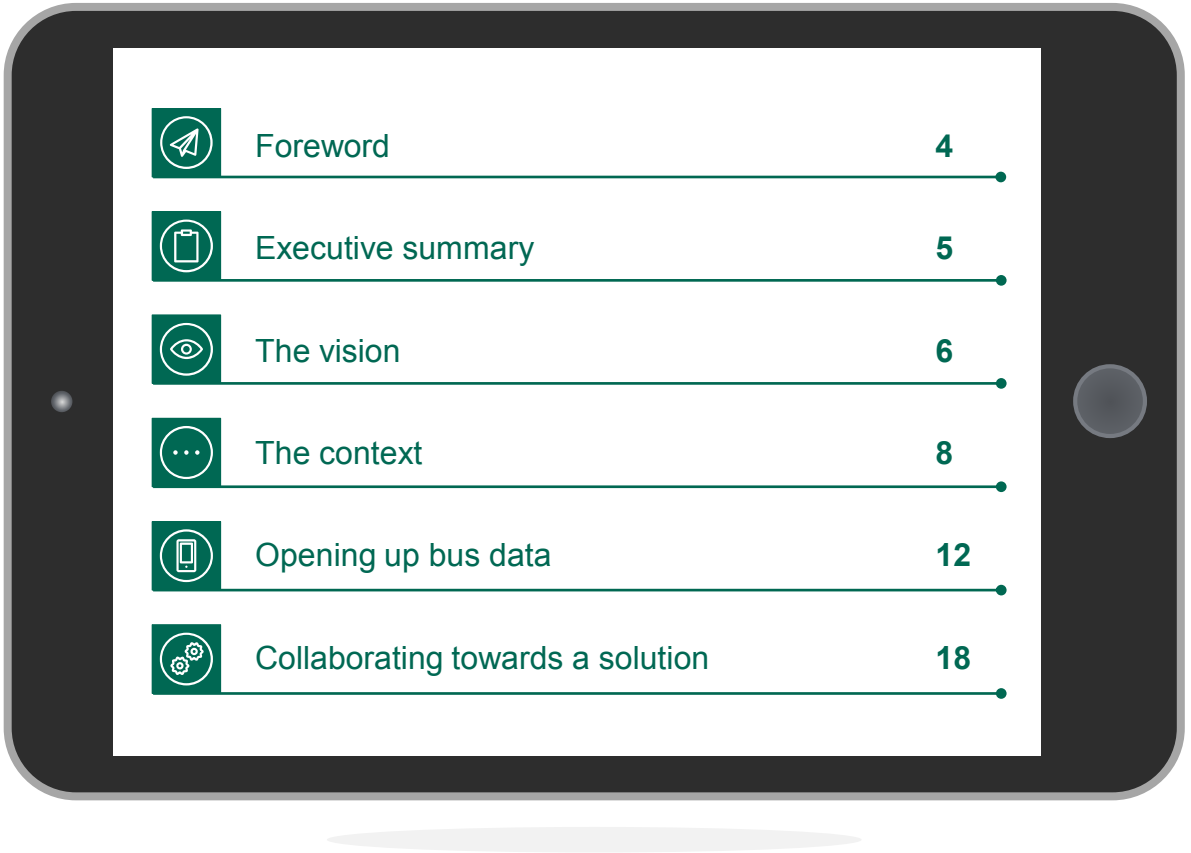

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Making open data work for everyone

Open data is enabling a transformation in how we travel

The way we travel is undergoing profound changes. On-demand services and real-time journey planners are empowering consumers to make the best choices for their needs and circumstances, saving them time, hassle and money. This is being enabled by open data – data that is available to everyone to access, use and share.

In the longer run, we expect open data to enable the full range of transport services to be fully integrated, through 'mobility as a service', allowing seamless payment and booking, and greater choice and convenience. Bus services will need to feature in this transport future. They already play an important part in the transport system, providing access to services in local communities, and offering economic, environmental and social benefits.

Open data is already being adopted by the bus industry

Consumers are increasingly using data to make informed choices across a range of sectors. In the bus industry, open data is enabling new business opportunities, with examples seen around the country. The problem is that the progress in opening up bus data is not happening fast enough, or consistently.

Government wants to support the move to Bus Open Data

The Government is working with industry to pursue open data. A key part of this is the Bus Services Act, which came into force in April 2017. This enables Government to set legislation which will require information from all bus operators on timetables, fares and routes.

Bus open data will deliver a range of benefits to passengers, operators, local authorities, and the wider population

The aim of bus open data is to provide greater convenience for travellers and to facilitate bus use. This will deliver benefits to operators, who have seen falling demand in some areas over recent years. It will also help local authorities with planning of public transport provision, and enable new business models and innovation by opening data up to anyone who needs it. This includes app developers, who can develop products for passengers to help with journey planning.

We need collaboration to open up bus data

This document sets out the case for bus open data and calls for collaboration between Government, operators, local authorities, passenger groups and technology companies to work together. Each group will have a role to play in opening up bus data to best serve all parties and deliver the widest benefits.

Executive summary

Bus Open Data can make journeys better for passengers, address challenges in the industry and achieve better outcomes.

The role of the bus

Buses provide vital services for local communities and deliver substantial socioeconomic benefits. However the industry is facing a challenge of falling demand in some areas, and is behind other modes on fare and timetable data.

Bus success

Necessary	Accessible	Low emissions
1st choice for commuters[1]	98% accessible fleet[2]	Only 10% NOx emissions per passenger km using diesel bus vs. diesel car[3]

Role for data

Bus data gaps	Demand for data	Data as an enabler
9% in England do not provide real time bus information[2]	46% of young passengers primarily use Google Maps[4]	Patronage up ~2% with real-time open data[5]

Benefits to everybody

We are moving to an on-demand and more convenient transport system. This innovation will be driven by open data – data that is available to everyone to access, use and share.

Open data in the bus industry will support increased patronage and offer benefits to passengers, operators, local authorities and wider technology companies.

Passengers
- More convenient travel

Operators
- Increased revenue

Local authorities
- Cost savings and better decision making

Tech companies
- New business opportunities

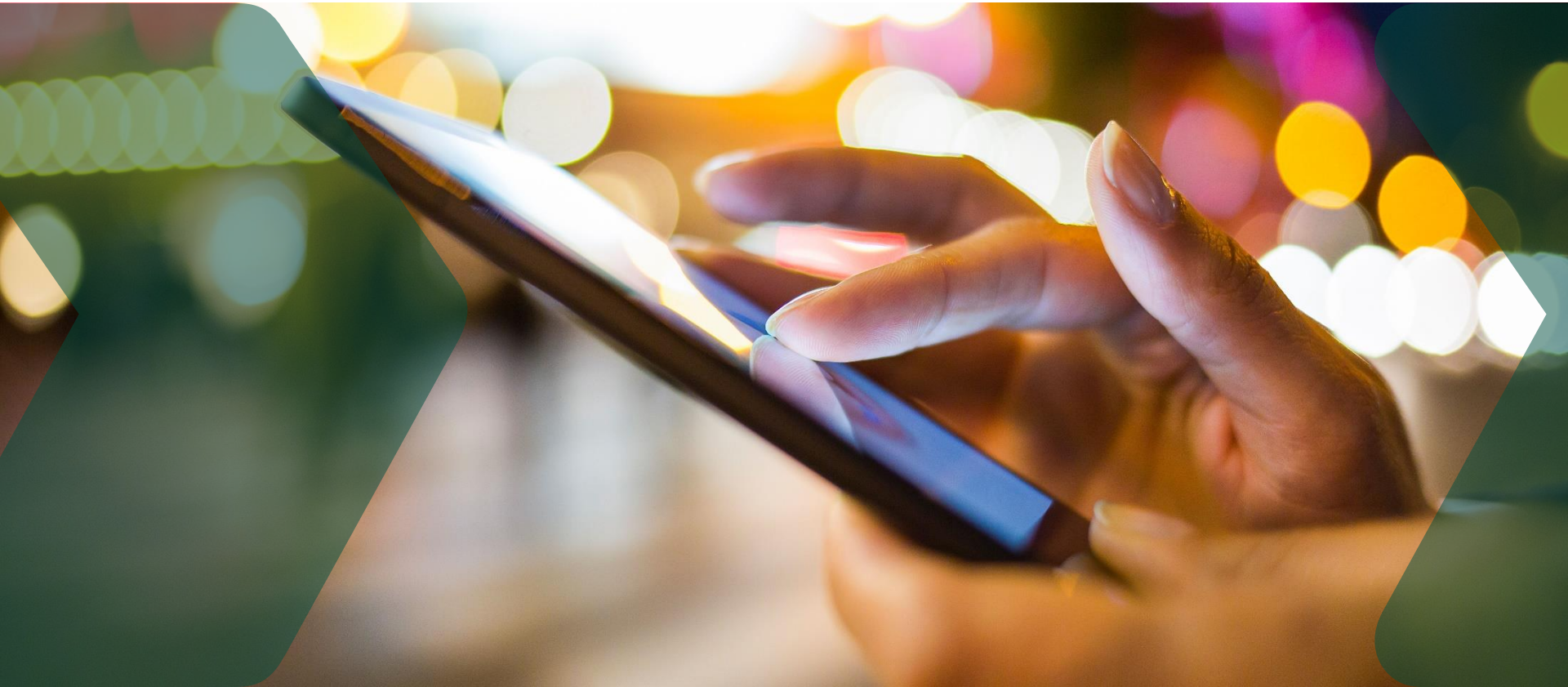
Collaborative approach

Passengers want the bus sector to open up its data. This is already happening, but it is not consistent, reliable and widespread. This is why Government is setting regulations on bus open data.

We need all parties to work together and adopt the required changes to facilitate bus open data and to:

- **Put the passenger first**
- **Be digital by default**
- **Collaboratively develop regulation**

The vision



Putting the passenger first

We want a mobility ecosystem that delivers seamless intermodal transportation faster, cheaper, cleaner, more responsive and safer than today. This will be enabled by open data on fares and journeys across all modes – data that is available to everyone to access, use and share[1].

Passengers need all transport options[2,3]

Different transport modes have different characteristics (such as cost, speed, comfort, flexibility, availability and accessibility).

These characteristics are suited to different types of journey and passenger, which means that an efficient, effective and equitable transport system requires a blend of transport provision.

Passengers need these transport options to be easy to use, integrated and responsive[2,3]

Today's passengers have to locate, book, and pay for each mode of transportation separately, often without complete or real-time fare and journey data.

In the longer term we are moving to 'Mobility as a Service', where users can receive real-time data, and plan and book door-to-door trips using a single app.

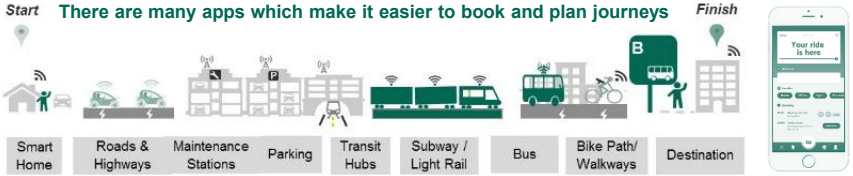
Data will play a key role in enabling lower-hassle transport services[2]

A key enabler for effective transport integration is consistent, secure, real-time and open data on routes and fares.

Transport integration will also need the widespread penetration of smartphones on 3G/4G/5G networks, high levels of connectivity, and cashless payment.

Case study: *Whim*[4]

Since 2016, Helsinki residents have been able to use an app called Whim to plan and pay for all modes of public and private transportation within the city. In 2017, the Whim app launched a beta version in the UK (currently available in the West Midlands to access bus, tram and taxi). It will shortly launch the app fully, providing access to a range of transport services including bus, tram, train, taxi, bicycle, car hire and others.



"We want to prove that we can beat the service level of a car. Or at least be comparable to it. We want to show that people want it, not just that we can do it"[5]

Sampo Hietanen,
MaaS Global CEO

The context

The bus sector today

Buses are the most-used form of public transport. They serve a vital role within communities, connecting people to key public services, such as schools and hospitals, local amenities, and work – with more people commuting by bus than all other forms of public transport combined[1]. Overall, there are three times as many trips in England made by local bus than made by rail, with over 60% of public transport trips made by bus[2].

Economic

Buses are an essential enabler for economic activity:

- **Business activity**: Buses generate an estimated £64bn in economic output each year. Buses are also the primary mode of access to city centres, facilitating an estimated 29% of city expenditure[3].
- **Productivity**: In the UK, around 400,000 people are estimated to be in more productive jobs as a direct result of access to bus services[3]. Based on average occupancy, a single bus moves 10 times as many people as a car[3], and a 10% reduction in congestion can result in increased economic productivity of 1%[4].
- **Affordability**: Buses provide a more affordable transport option, and are around 60% cheaper than commuting by car. Buses also primarily serve the lower income groups[5].
- **Flexibility:** Buses are a flexible form of public transport, taking on average 56 days to set up a new route, compared to years for a new train line[6].

Health and environment

Bus use can improve air quality and deliver significant health benefits:

- **Lower pollution**: A diesel bus emits 10 times less NOx emissions per passenger per kilometre compared to a diesel car[7].
- **Supporting active lifestyles**: Buses encourage passengers to walk and cycle, especially for the first and last miles[8]. In research about the impact of concessionary fares on active life-styles, it was found that 74% of the people studied participated in new activities or visited new places using public transport[9].
- **Improving well-being through social interaction**: Travelling by bus provides opportunities for meaningful social interaction and a sense of belonging and visibility in the public arena, with proven positive impact on well-being[10].

Social

Buses support the young, the older and the disabled passengers:

- **Accessible services:** 98% of buses in England are accessible for wheelchair users, with amenities such as boarding lifts and ramps, wheelchair spaces and wheelchair restraints[11].
- **Serving those in need:** There were 929 million concessionary bus journeys in England in 2016/17, amounting to a total of 34% of all local bus journeys and £1.13bn of concessions[12].
- **High satisfaction**: Bus passengers are generally very satisfied with bus services (for example, with 88% overall journey satisfaction outside London[13]).

The move to digital services

Consumers are increasingly using digital services, enabled by open data, across a range of industries. Transport customers also want information and data driven services – this data can lead to higher revenues for operators and new commercial opportunities.

Transport customers want[14,15,16]:

- Integrated information on multi-modal journeys
- A 'single source of truth', ideally using a single app or website
- Real-time reliable information including disruption alerts
- Information about prices and payment through a single platform

The progress on opening bus data

Open data already exists in the bus sector – data that is available to everyone to access, use and share. For example, Traveline publishes national bus data, including timetable and real-time information where available[6].

However, bus data availability is often insufficient or inconsistent. 9% of buses in England do not provide real time bus information[11] to passengers and there is no single source of bus data on arrival times, real-time location, fare prices and ticketing[6]. 57% of buses are not enabled for payment by contactless bank cards[11].

Overall, a lack of open data is important because of the context of the bus industry's patronage challenge. In England, patronage has fallen by 4% since 2009/10[11], with low satisfaction amongst some passengers because they do not have access to the information they need to plan their journey[15,16].

Most young passengers use a single source of information to plan their journey, with 46% using GoogleMaps and 44% using travel websites[16].

"You don't really know how much it will cost until you get on the bus, there is nothing to tell you how much it will be." Essex, 14-16 years[16]

Case Study
RDG Darwin: Open data in the rail industry[17]

The Rail Delivery Group's 'Darwin' is the official open data hub for the British rail industry. Darwin provides information from operators to all interested parties, including National Rail Enquiries, app developers and external journey planning apps such as Trainline, fostering innovation:

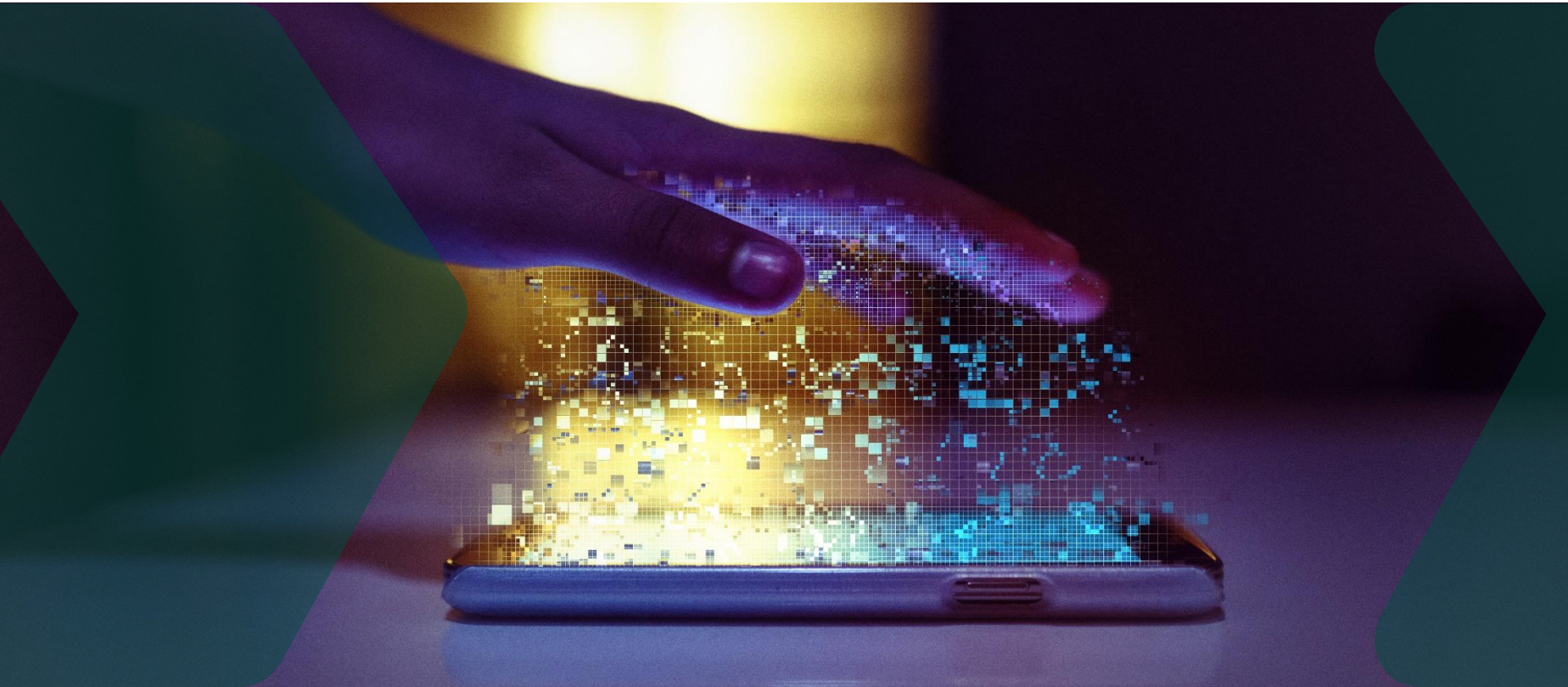
- RDG opened operators' data, including timetables, historic service performance and real-time information;
- Darwin provides better information to customers, increases customer satisfaction and reduces operators' operational costs;
- Third-party developers provide additional services. For example, Blackbox provides real-time information at stations, and app developers are currently building a platform to deliver real-time disruption updates to customers.
- By opening up data at no cost to individual developers, the rail industry has seen an increase in innovation and lowering of costs for real-time information signage and displays.

Rail Delivery Group

National Rail

BRITAIN RUNS ON RAIL

Opening up bus data



Case Study
Reading Buses: Digital and data-driven operator[1]

Reading Buses is an early adopter of digital services. It sees data as a business asset for new commercial opportunities, and emphasises using technology to improve customer experience.

It has a ‘data lab’ and continuously innovates. For example, it developed a tree-strike tool, allowing tree strikes on buses to be reported to the Local Authority. This innovation will soon be commercialised.

It publishes fare data, real-time information, vehicle specifications and other types of data. Customer satisfaction is ranked among the highest in the country, at 93%, supporting increased demand for bus services in the Reading area.

“We can see that opening our data allows third parties to use and integrate our services with their own ideas, improving our reach and helping us to think differently too".

John Bickerton, Reading Buses[2]

How publishing open data will work?

DfT wants to follow a distributed model for open data[3]

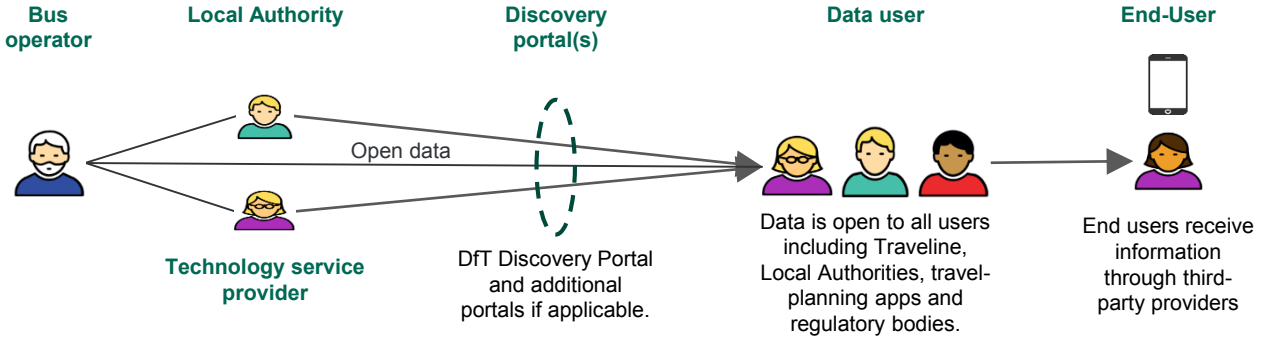
DfT will publish data standards for operators and build a 'Discovery Portal' (providing links to external websites and 'application programming interfaces' and providing an overview of available information).

Operators will publish data independently, through their website or API, through a local authority 'bureau service' or using a third party technology provider.

Local authorities can continue to provide bureau services to publish bus information. Local authorities should continue to validate the operators' data and provide training, support and tools to operators where appropriate.

Technology service providers can provide tools to operators and local authorities to publish their data, provide discovery portals with additional functionalities and use the data to provide value-adding services to end-users.

The process for open data – distributed model[3]



Benefits for everyone (1/2)

Open data can reduce uncertainty, make journeys more relaxing and empower consumers to make better decisions. This can support and stimulate patronage and increase revenue for operators.

Group	Passengers		Operators	
	"My bus arrived exactly on time and so I am feeling more relaxed about my journey now" Essex passenger, 14-16 years[4]		*"We openly publish our data because we understand that better, more accurate information can bring new passengers to our bus services"* *CEO, Medium bus operator*[5]	
Benefit	**Benefits for everyone**	**Accessible services**	**Increased patronage and satisfaction**	**Reduced operational costs**
Example	TfL's open data platform enabled better journey planning and certainty for passengers, valued at between £70m and £90m per year[6]. Together with smart ticketing, open data delivers tangible improvements through better insights to passengers and transport planners and improves passengers' journeys[7].	South Yorkshire Passenger Transport Executive provides real-time accessible information using audio visual technology to enable easier and more accessible transport services to the disabled passengers[8].	Where announcements and displays are present, bus passenger satisfaction rises from around 60% to 80%[9]. Providing real-time information through open data platform has been found to increase bus patronage by ~2%[10].	Opening up data directly to app developers saves operators the cost of developing apps and systems, which can amount to hundreds of thousands of pounds per year[11]. The marginal costs of providing open data are negligible[12]. There are one-off set-up costs for maintaining and validating data, but data improvement will drive operational benefits, improve customer satisfaction and support long-term growth[3,12].

Benefits for everyone (2/2)

Bus open data will offer benefits to local authorities and support innovation, enabling multi-modal, integrated journeys and a 'predict and provide' approach in transport.

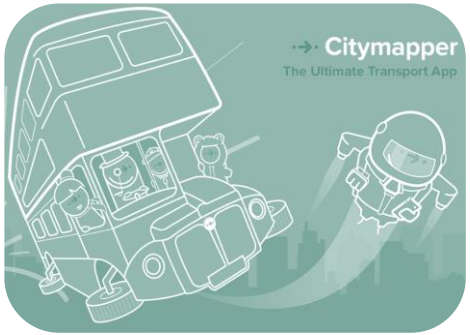
Group	Local Authorities		Wider society	
	"There are now over 600 apps powered by our data, used by 42 per cent of Londoners" Vernon Everitt, Transport for London[6]		*"If we can get an access to source data, we can provide better information to end-users, which will eventually also benefit the operators"* Operations Director, Global Journey-planning app[13]	
Benefit	**Cost savings and better decision making**	**Innovation opportunities from partnerships**	**Support innovation**	**New business opportunities**
Example	Local Authorities (LAs) and Public Transport Authorities, such as Transport for West Midlands, use real-time information to make decisions around traffic management and roadworks, and provide disruption alerts[14]. Other LAs, such as Norfolk, increased electronic registration and published data, reducing costs of customer support[15].	TfL's open data platform enabled partnerships with major data and software organisations, providing meaningful data on areas TfL itself does not collect data, for example crowdsourcing traffic data[6].	Transport System Catapult estimate that improved data sharing could lead to benefits through mobility solutions of around £15bn in value, by 2025. The direct economic benefits of UK public sector open data have been estimated as £8.9bn in 2016,[12] while the total impact could be around four times larger when including indirect and wider benefits[16].	TfL's open data is estimated to directly support around 500 jobs that would not have existed otherwise. With 13,000 registered users, TfL enabled the creation of over 600 apps, including Citymapper and other apps[6].

Enabling innovation

Open data allows other companies to use that data to deliver new services to passengers. This creates new revenue opportunities and enables innovation. For example, Citymapper, one of the first journey planning apps in London, was born through open data. It is now providing its own transport services, and opening up that data for other users[17].

Case study: *Citymapper*[17]

- **What is it?**: Citymapper, known for its journey planning app, launched an on-demand shared transport service called 'Smart Ride' that blurs the lines between buses and taxis[19].
- **How does it use open data?**: Citymapper's operations were enabled by TfL's open data database[17]. Citymapper advocates open data and releases routes, stops and schedule in GTFS format to support the transport data ecosystem[20].



Case study: *ArrivaClick*[21]

- **What is it?**: The ArrivaClick app connects users to on-demand vehicle services. The users can see the location of vehicles along the route and receive real-time expected arrival time.
- **How does it use a digital approach?**: ArrivaClick services are enabled by an effective partnership with a technology supplier, Via, and use passengers' location to calculate the most efficient route to match the demand for services with supply of vehicles in real-time.

"When TfL made its data available, there was an opportunity to design and develop a comprehensive transport app, starting in the world's most historic and iconic public transport city". Citymapper[20]

Collaborating towards a solution

Shaping open data

The Government will help ensure consistency and pace in opening up bus data. The Bus Services Act, which came into force in April 2017, enables Government to set legislation which will require information from all bus operators on timetables, fares and routes.

The government role in facilitating bus open data

- Setting vision and objectives
- Clarifying data standards and requirements, and signalling best practice
- Supporting industry collaboration towards open data
- Communicating the benefits and case for change

Principle	Bus Services Act
Put the passenger first	The government wants to provide a step change in the information available to bus passengers in England so that passengers have easy access to information on timetables, routes, and fares as a minimum.
Be digital by default	The data would then be open to anyone who needs it including app developers who can develop products for passengers.
Collaboratively develop regulation	DfT wants to develop a system that works for everyone, underpinned by secondary legislation. The government intends to shape this together with operators, local authorities and wider stakeholders, with the requirements to be phased in by 2020 in stages.

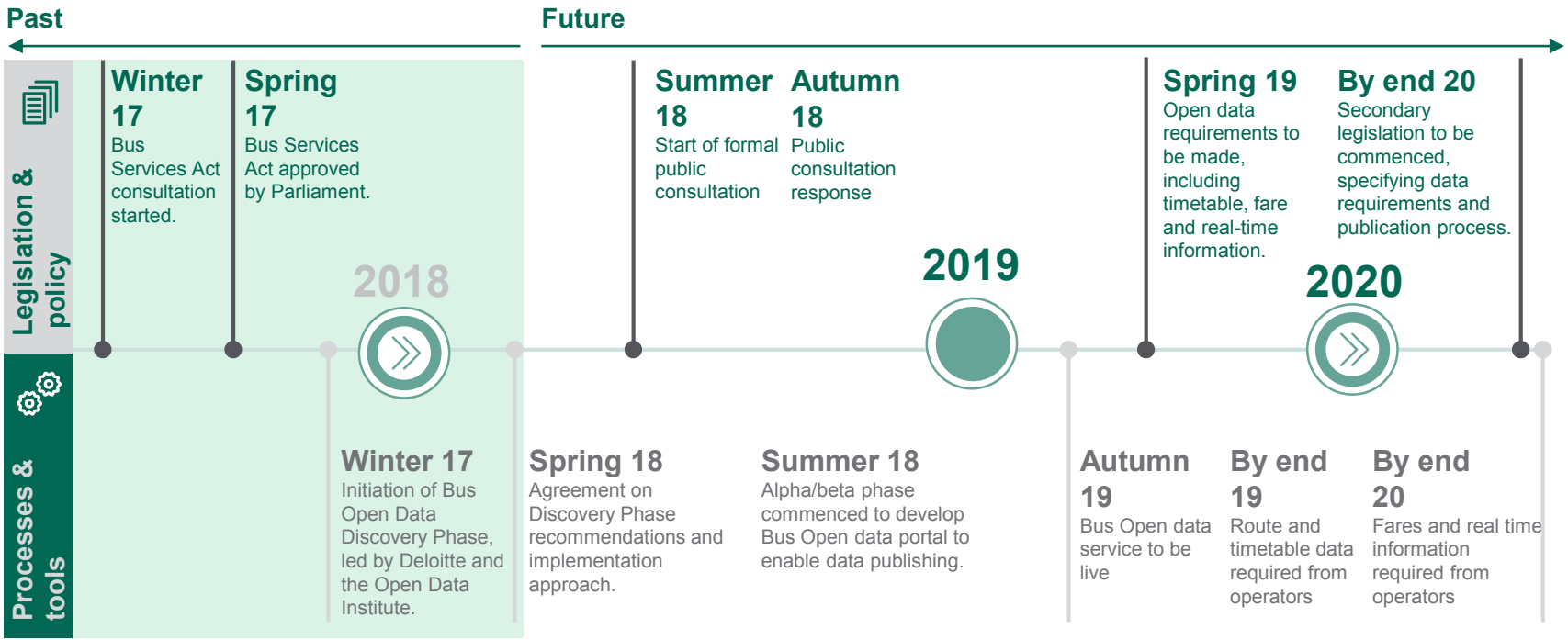
Local government role

Local authorities can enable digital adoption and open data.
They have an important role in data validation, and can empower operators to provide accurate data. Many LAs provide training and support, back-office services and tools to allow operators to provide better data. For example, Norfolk County Council provides free bus registration and a data management tool to operators, and gradually increased electronic registration to over 95% in the region.

Local authorities can support the move to open data by publishing their own transport data, including additional data sources where available.

The route map

The Government aims for bus open data legislation to be in place by the end of 2020. The current timeline is set out below.



How we will get there?

We need bus operators, local authorities, technology companies and passenger groups to work with government towards open data adoption.

Central government

- Signal best practice and key priorities to facilitate digital change
- Enable distributed publishing by specifying data requirements and developing a Discovery portal

Transport operators

- Engage with technology providers to identify opportunities for digital change and focus on technology-enabled processes and digital adoption
- Publish all required information to customers

Local authorities

- Engage with operators to solve data errors and inaccuracies
- Encourage adoption of digital tools and provide training and back-office functions for small operators where possible

Technology companies

- Identify business opportunities to provide better services to consumers
- Provide data publishing tools to allow operators and LAs to publish their own information

Passenger groups

- Continue to champion the consumer and share evidence to inform decision making

DfT encourages dialogue, consultation and engagement with these parties to develop data requirements and enable the benefits of open data

Together we need to work to:

Put the passenger first

Be digital by default

Collaboratively develop regulation

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