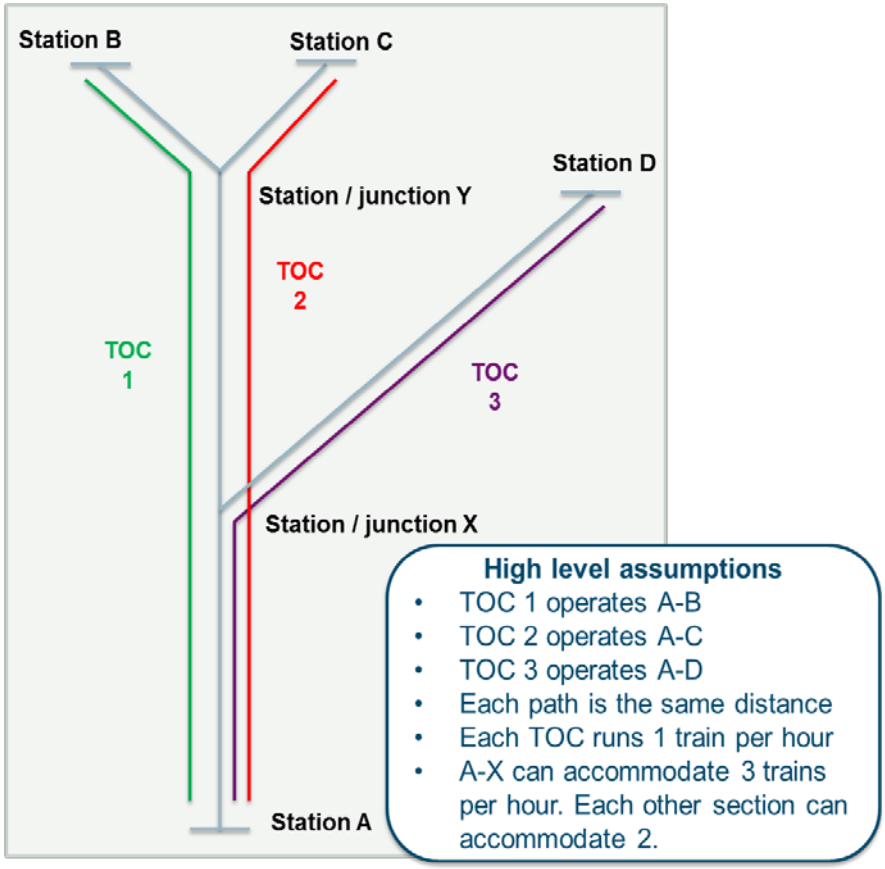
Annex E: Stylised example of charges set on value or cost

1. We have developed the following example to illustrate the concepts behind the infrastructure costs and value-based capacity packages. We use the example of geographical disaggregation of cost, but the general principles would apply to other forms of changes to better reflect cost/value in charges.

2. Figure 1 provides a simplified representation of a route, and how each service/train operating company (TOC) operates on this route.

Figure 1: Illustrative example of the infrastructure cost package and the value-based capacity package



3. Figure 2 sets out the remaining assumptions required for this example, including the costs for each route section and how many paths are available. The numbers used have been chosen for simplicity of explanation (i.e. they bear no relationship to actual network costs).

Figure 2: Assumed annual costs of each route section

Route section	Costs	Spare paths
A-X	£6,000	0
X-Y	£3,000	0
Y-B	£1,000	1
Y-C	£1,000	1
X-D	£2,000	1
Station / junction X	£12,000	N/A
Station / junction Y	£8,000	N/A
Station A	£3,000	N/A
Station B	£1,000	N/A
Station C	£1,000	N/A
Station D	£1,000	N/A
Common costs	£21,000	N/A

4. In this example, we have assumed:

    a) over time the full costs of building and maintaining infrastructure on track sections carrying more traffic are higher than on track sections with less traffic.

    b) all the TOCs run the same number of trains over the same distance.

5. Table 1 illustrates that under the current fixed track access charge (FTAC) methodology, each operator would pay the same charge: £20,000. This is because fixed costs are estimated at a route level, and then allocated to operators based on simple metrics (primarily train miles). Common costs, which are those that do not vary with traffic, such as an IT system, would be allocated in the same way.

Table 1: Illustration of charges under the current regime (counterfactual)

	TOC 1	TOC 2	TOC 3
Traffic related fixed costs	£13,000	£13,000	£13,000
Common costs	£7,000	£7,000	£7,000
Total	**£20,000**	**£20,000**	**£20,000**

6. Under the infrastructure cost package, costs would be allocated to TOCs on the basis of their use of each part of the network. In this example, TOC 1 would be incurring costs for: one third of the costs for stations A and X, one third of the route section between A and X; etc. There are many options for how common costs could be allocated but for simplicity we could continue to use the same approach as for the counterfactual (i.e. train miles).

7. Table 2 shows the difference between our current charging structure and the outcome if fixed costs were estimated and allocated to individual route sections (i.e at a more disaggregated level).

Table 2: Illustration of potential cost allocation under the infrastructure cost package

	TOC 1	TOC 2	TOC 3
Counterfactual	£20,000	£20,000	£20,000
Costs estimated at a route section level	£21,500	£21,500	£17,000
Change in cost estimate	**+£1,500**	**+£1,500**	**-£3,000**

8. A comparison between Table 1 & 2 illustrates some of the potential effects of better cost reflectivity:

    a) **TOCs would be allocated the costs of the parts of the network they actually use.** In this example, better cost allocation means TOC 1 & 2 face the (higher) cost of the network they use, and TOC 3 would benefit from using a less costly part of the network.

    b) **Improved understanding of costs and ability to reduce them**. This information would improve our understanding of which services cause costs to be incurred. If included in charges, TOCs 1 and 2 would retain the benefits from any cost reductions at station/junction Y, rather than having to share some of these costs savings with TOC 3.

c) **Improved capacity use.** Improved information about costs allows a better understanding of whether the overall benefits of each of these services are greater than the costs. Greater cost reflectivity might, for example, reveal that benefits (to society) from TOC1's service do not cover the full cost. Whereas, it might reveal that benefits from TOC3's services exceed costs significantly. If charges reflect these cost differences, incentives to expand services and/or for open access entry would better reflect the cost of accommodating these services.

9. Turning to the value-based capacity package. This could enable us to allocate costs based on the value of train paths on different route sections. Where demand for capacity exceeds what is available, a charge could reflect the value that operators generate by using those track sections.

10. To do this an approximation of this value is needed. This could be complex to calculate, as the value should reflect both the commercial value of the service and other benefits that are not reflected in ticket prices or freight users' ability to pay. For example, rail services can reduce road congestion or overcrowding on other trains. A number of approaches could be used to estimate this value, which are discussed further in Chapter 5 of the consultation document.

11. In our worked example, there are no spare paths on track sections A-X and X-Y. Table 3 shows illustrative value-based charges on these sections (with this charge only being levied where there is a lack of spare capacity).

Table 3: Indicative value-based charges

Track section	Spare paths	Charge based on value of capacity (per train, per hour)
A-X	0	£5,000
X-Y	0	£2,500
Y-B	1	N/A
Y-C	1	N/A
X-D	1	N/A

12. Under a value-based approach, TOC1 and TOC2 would be faced with a per hour charge of £5,000 each per path to continue using track section A-X, and a charge of £2,500 each per path to continue using track section X-Y. TOC3 would be faced with an hourly charge of £5,000 per path to continue using section A-X.

13. Table 4 compares total charges paid by the three operators under the counterfactual above and charges paid after the introduction of the value-based capacity charges.

Table 4: Change in charges between the counterfactual and value-based charges

	TOC 1	TOC 2	TOC 3
Charges in counterfactual scenario	**£20,000**	**£20,000**	**£20,000**
Value based capacity charge (A)	£7,500	£7,500	£5,000
Remaining fixed costs allocated as in the counterfactual scenario (B)	£13,333	£13,333	£13,333
Total charge under value based capacity option (A+B)	**£20,833**	**£20,833**	**£18,333**
Change in total charges	*+£833*	*+£833*	*-£1,666*

14. If the income recovered from value-based capacity charges does not fully cover all fixed costs, any remaining infrastructure costs would need to be allocated to operators in some way. There are different options for how this could be done. For costs not recovered by the value-based capacity charge, the remaining fixed costs are allocated in the same way as in the counterfactual above (Table 1).

15. Value-based capacity charges would ensure that operators continue to use these parts of the network only if their services are generating at least as much value as the level that the charge is set at – i.e. it is ensuring that the highest value services are priced onto the network. TOC 3 faces higher charges in the value-based capacity option compared with the infrastructure cost option due to its use of congested parts of the network, despite it generally using parts of the network that have a lower cost.

16. Paying higher charges to use route sections which are congested could provide incentives for operators to, for example, retime, reroute or withdraw services. Alternatively, this information could be used to modify franchise specifications. In this case, value-based charges could incentivise TOC 3 changing its service to stop at Station X rather than continuing onto track section A-X.

17. In both examples charges increase on the more costly/congested parts of the network. This is because we have chosen numbers that have a higher cost where there is more intensive use. This may be reasonable when compared to the current structure of charges. Heavily congested infrastructure is likely to face higher costs in total. Where costs are currently only disaggregated at a route level, and don't fully reflect cost drivers relating to service characteristics, this is likely to

spread the higher costs of this congested section over a larger area and therefore dilute them. Greater cost reflectivity of these costs would mean that those operators using the more congested section would directly pay for the costs pertaining to that section. This illustrates that – if costs are higher where congestion and value is higher – the infrastructure costs package could move charges towards better reflecting the value of use.

18. In either case, there may be benefits to obtaining improved information about cost and value, without necessarily passing this information in to charges.