

## Rationalising PMT routes – an example of reforming 30 routes

Dr Adhiraj Joglekar

[I have previously shown how PMT routes' planning is far from satisfactory.](#) The routes are too short, numerous and run at a frequency of one bus per 57 minutes on average.

This case example shows how longer, overlapping routes but fewer routes offer not just great frequency but also cover the same area as before.

Because I do not have hard data that drives such reforms in real life, I am forced to make presumptions, having said the model can be reconfigured without compromising the principles around any figures within a given set of hard data.

### Methodology:

1. The first 30 buses, routes 1-31 (there is no route no.4 anymore) as displayed on [www.pmtpun.org](http://www.pmtpun.org) are used in this case example.
2. An analysis of the routes gives following details –

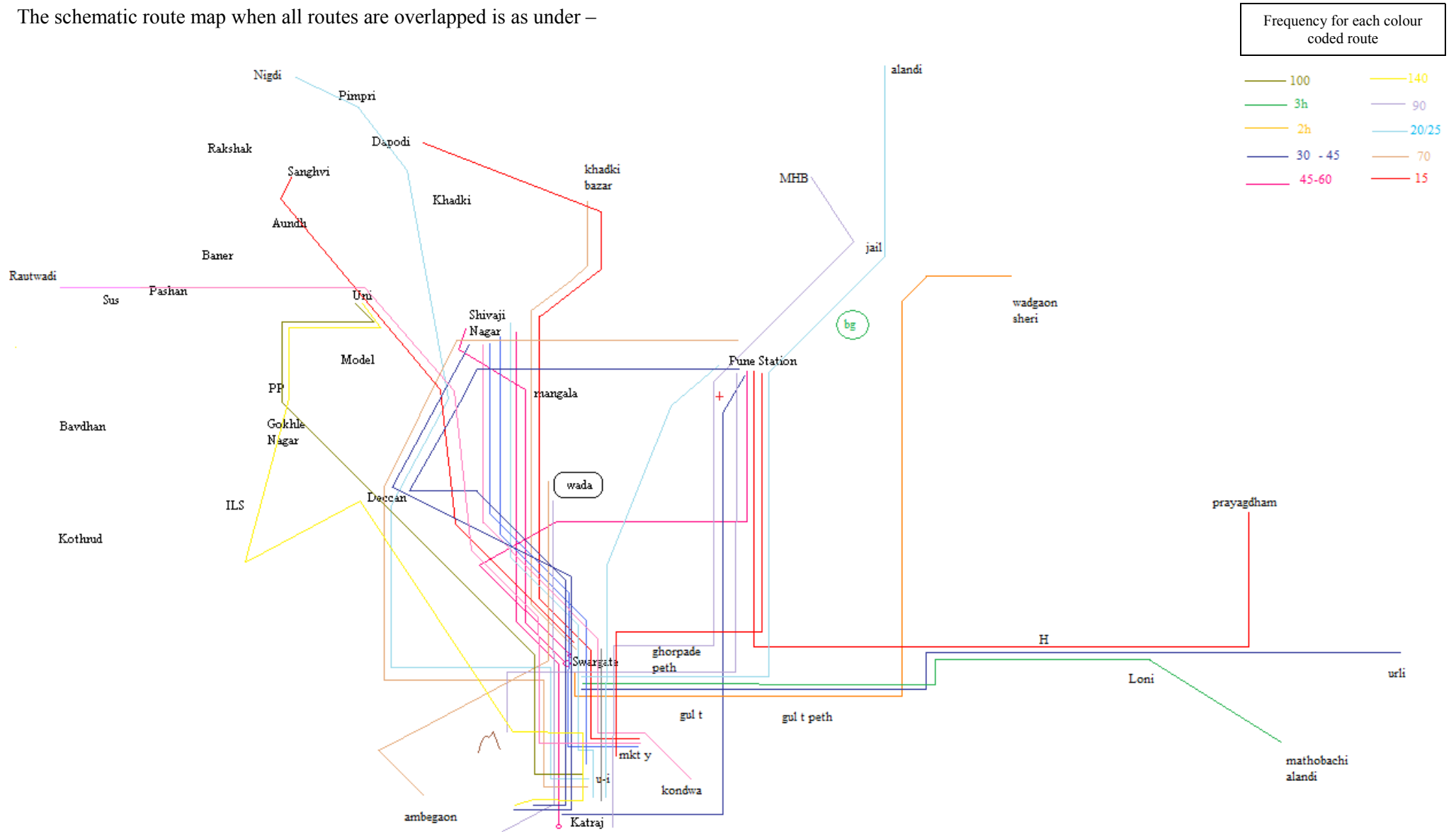
The routes in consideration are as under, the length of the route in kilometres is also detailed.

|    |   |      |
|----|---|------|
| 1  | <u>Swargate To Shivajinagr St.</u>            | 4    |
| 2  | <u>Katraj To Shivajinagr St.</u>              | 10.2 |
| 3  | <u>Swargate To Pune St.</u>                   | 7.5  |
| 5  | <u>Swargate To Pune St.</u>                   | 6.3  |
| 6  | <u>Swargate To Wadgaon Sheri</u>              | 16.6 |
| 7  | <u>Swargate To Uralikanchan</u>               | 30   |
| 8  | <u>Swargate To Mhatobachi Alandi</u>          | 28   |
| 9  | <u>Pune St. To Prayagdham</u>                 | 37.1 |
| 10 | <u>Swargate To Khadki Bazar</u>               | 8.5  |
| 11 | <u>Market yard To Dapodi (Mantri Niketan)</u> | 14.6 |
| 12 | <u>U. Indira Nagar To Nigdi</u>               | 28.2 |
| 13 | <u>U. Indira Nagar To Shivajinagr St.</u>     | 9.8  |
| 14 | <u>L. Indira Nagar To Shivajinagr St.</u>     | 7.1  |
| 15 | <u>Market yard To Shivajinagr St.</u>         | 7.6  |
| 16 | <u>U. Indira Nagar To Pune St.</u>            | 13.9 |

|    |  |      |
|----|--|------|
| 17 | <u>Shaniwarwadi To Nehregaon (Ambegaon)</u>  | 13.3 |
| 18 | <u>Vasant Talkies To Chandrabhaga nagar</u>  | 9    |
| 19 | <u>Shivajinagar St. To Kondwa Hospital</u>   | 16.1 |
| 20 | <u>Sahakarnagar To Pune St.</u>              | 9.5  |
| 21 | <u>Swargate To Shanghvi</u>                  | 14   |
| 22 | <u>Swargate To Sukhsagarnagar</u>            | 5.7  |
| 23 | <u>U. Indira Nagar To Pune St.</u>           | 11.7 |
| 24 | <u>Katraj To Maharashtra Housing Society</u> | 17   |
| 25 | <u>U. Indira Nagar To Pune University</u>    | 14.1 |
| 26 | <u>Dhankawdi To Pune St.</u>                 | 14.5 |
| 27 | <u>Bharati Vidyapeth To Shivajinagr St.</u>  | 11.1 |
| 28 | <u>Bharati Vidyapeth To Pune University</u>  | 16.2 |
| 29 | <u>Swargate To Alandi Darshan</u>            | 27.5 |
| 30 | <u>Market yard To Rautwadi</u>               | 28   |
| 31 | <u>Padmavati To Pune St.</u>                 | 10   |

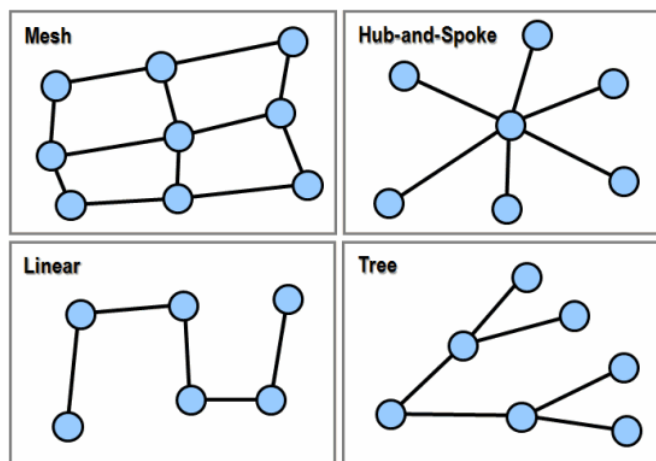
3. The average length of a route is 14.9 km
4. The average frequency is one bus per 53.5 minutes.

5. The schematic route map when all routes are overlapped is as under –

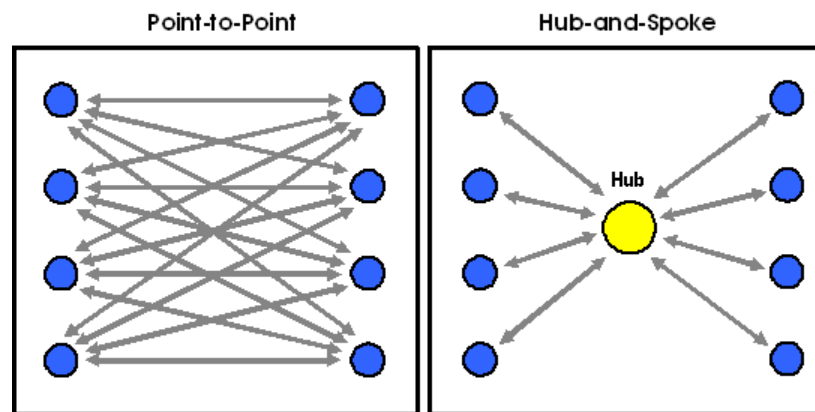


6. You may note that about 16 routes run between Katraj and Swargate. Thus for this patch, the frequency of buses as per above figures is on paper one bus every 3.5 minutes (in reality it may be one bus every 5-10 minutes if actual route frequency is used – given that the most frequent route is between Pune station and Prayagdhm or Swargate to Alandi Darshan – both not within this patch).
7. Thus far I have gone with data as is. Now I am attempting to estimate number of buses servicing each route. Given that length of some routes is disproportionately short compared with the actual frequency, a number of routes can be served by just one bus i.e. go from point A to B, then wait until its time to return. To make it more precise, Swargate to Shivaji-Nagar is a 4km route run once every 50 minutes.

8. Now, presuming the buses do an average speed of 20kph, I have worked out that between 102 to 115 buses may be in use on the 30 routes detailed above (more if average speed is less, less if average speed is more).
9. If you consider the routes superimposed on each other as done above and think of it from the perspective of route typology one would think PMT plans its routes using the linear approach.



However I suspect once all 209 routes are superimposed on a map one may end up with a linear model at the periphery and a mesh or grid model in the city centre. This is not as useful as one may think it to be.



As you can see, point to point (linear) grid or mesh approach between 8 points needs 16 routes in contrast to hub-n-spoke which does more or less the same work with 8 routes. Having said, nothing stops us from combining different approaches if need be.

10. For purpose of rationalising routes, further presumptions based on average speed of 20 kph is made –

- One needs one bus to run on a 20km route if frequency is one bus per hour.
- One will need 5 for a frequency of one bus per 10 minutes
- One will need 10 to run a bi-directional service at above frequency
- Considering breaks / rest periods, 12 buses will be needed for a 20 km route with frequency of one bus per 10 minutes.
- Based on above, 24 buses will be needed for a route with a length of 40km or 18 buses to serve a route 30 km long at above mentioned frequency.

11. Based on data above, following reformed routes are suggested –

| <b>Reformed / new routes and distances covered</b>  | <b>Buses needed to serve the routes at a frequency of 10 minutes</b> |
|---|--|
| Ambegaon (via Parvati paytha) – Swargate – Deccan - Shivaji Nagar – Pune Station (~ 20km).          | 12   |
| Bhartiya Vidhyapeeth – Swargate – Deccan - Uni – Baner (~20 km)                                     | 12   |
| Katraj – Swargate – Uni – Aundh – Sanghvi – Rakshak (~30km)   | 18   |
| Katraj- market yard – swargate – Uni – Pashan – Routwadi (~30km)                                    | 18   |
| Katraj – sukhsagar – upper/lower Indira Nagar – Swargate – Khadki Bazar – Dapodi – Nigdi (~30km)    | 18   |
| Pune Station to Prayagdham (as is via Hadapsar, Loni) (~40 km)                                      | 24   |
| Katraj to Maharashtra Housing society via Pune Station and Yerwada (~ 20Km)                         | 12   |
| Swargate to Loni via Gul Tekdi and Hadapsar rather than Urli which is out of Jurisdiction (~ 30 km) | 18   |
| Kondwa to swargate - Pune Station – Yerwada – Wadgaon Sheri (~30 km)                                | 18   |

12. Areas dropped from original coverage –

- Mathobachi Alandi where only 4 buses served per day which was served once every 2 hours. This destination may be better served by licensing it out to a private tour operator but ensuring price regulations (I won't be surprised if private bus operators are already plying this route more successfully than PMT). In essence a service every 2 to 3 hours in an urban city is not a service as inter-city services offer better frequencies.
- Alandi Darshan – when a city struggles to offer its tax payers a decent public transport, running buses every 20 minutes to an area beyond city limits is unjustified. This is a job for state transport department and not PMT (shown as a dashed line on diagram 2 below).
- Equally, I will question need to go to Urli Kanchan (shown as dashed line on diagram 2 below).

13. One may note that Deccan – Shivaji Nagar is now connected by only one route against previous 3 connections, but this comes frequencies better than before.

14. Khadki station loses its connection for now because it is well connected to city by train, however in the grand scheme of things it will have connections but more so with other parts of Pune rather than those where it remains linked by local trains.

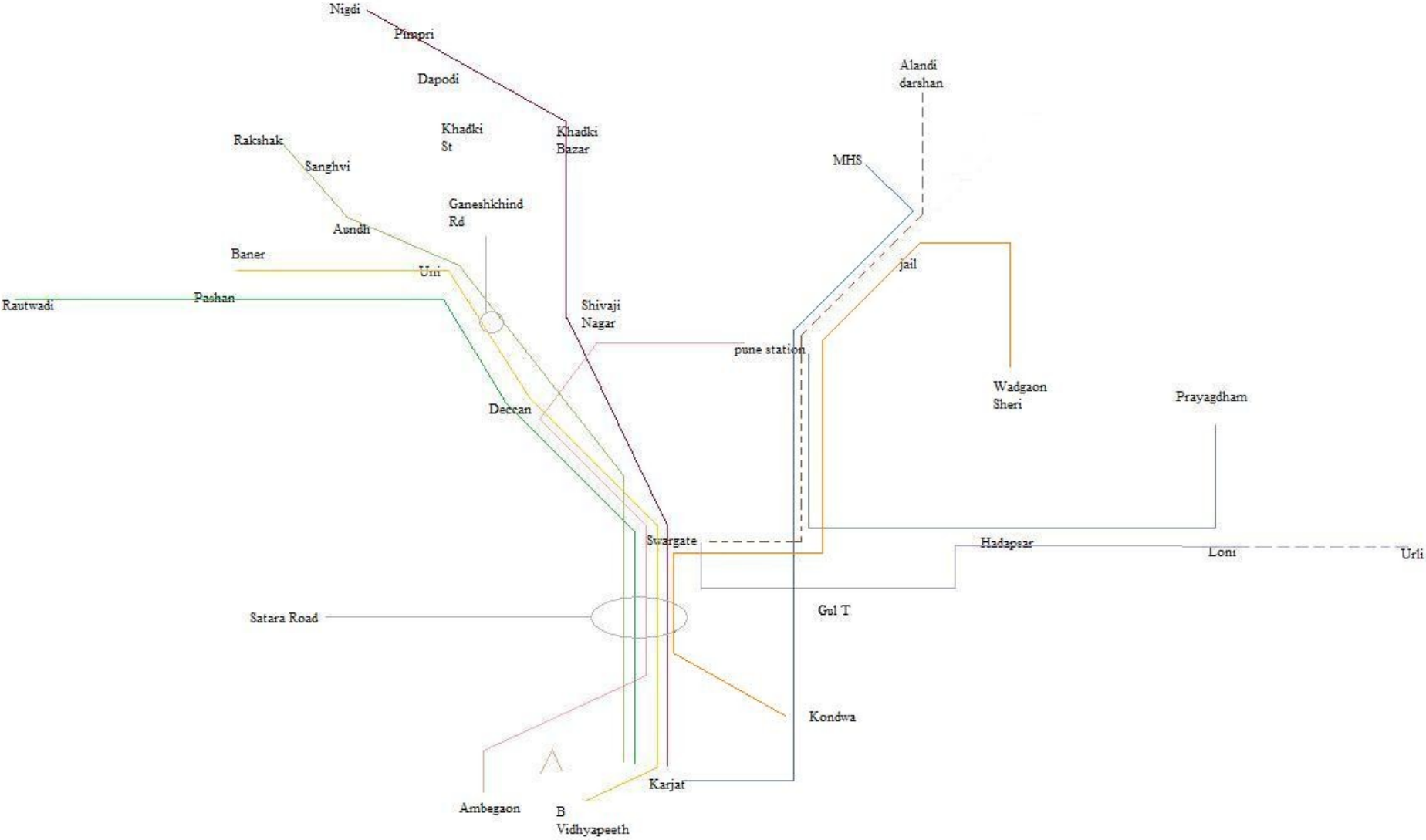
15. I have reduced number of routes to 9. Also the route distances have increased to average of just over 28km one way.

16. The number of buses I need has shot up to 150 – but this I am not too concerned about, because this comes at a phenomenal gain in frequencies and there are still almost 850 buses to play with (or more if current reports of 1200+ buses are correct). Remember this exercise looks at only 30 routes and there are 180 more routes to consider.

17. The above however offers great frequencies across all routes. The Katraj – Swargate patch is still served as effectively as before, but 2 routes via Ganeshkihind / university road, the Swargate – university patch is also offered a frequency of one bus every 5 minutes. Similarly the Swargate – Hadapsar patch is now offered at a 5-7 minute frequency. Also the routes cover two new areas – Baner and extended route beyond Sanghvi to Rakshak society.

If existing routes are said to be based on hard data, nothing within the suggested reformed routes contravenes it. If anything all destinations are served by a more realistic frequency of one bus every 10 minutes and hence likely to tap in to latent untapped demand (these figures should be worked out by PMT/PMC and not me). Finer adjustments can be easily made based on census data for each region and postulated demand or understanding of demand based on current ticket sales. Further the above frequencies can be

easily relaxed during non-peak times to one bus every 20 minutes, but once all 209 routes are re-mapped and reformed there is every chance that almost whole of the city will be covered with overlapping lengthier routes giving frequencies of a bus every 10-12 minutes or better. Readers will also find that I have reduced the number of routes starting from Swargate to 2 from 10. This is in keeping with the hub-n-spoke model of Singapore referred to in my [previous document setting the tone of this communication](#).



Reformed bus routes (use zoom tool if need be).

## Features of a good bus based transport

- It is a well known fact brought out through surveys across the globe, people give up cars for buses **when buses offer to replace the cars** i.e. they are **available within 5-7 minute walk from home and take them to within 5-7 minutes walk from their final destination.**
- Significantly transfer between buses and inter-changes are disliked and people prefer direct services. The reformed model also offers the same. One can imagine a handful of BRT routes or hubs with hundreds of short spokes forcing people to change buses at hubs, this effectively increases wait times and travel times negating any rapid throughput across BRT/bus priority routes. There is no reason for BRT buses to not ply on non-BRT routes, neither is there a reason to stop non-BRT buses from plying on BRT routes to maintain contiguity on services.
- As in Mumbai, in this model a feeder route and main route are served by same bus, hence role of mini-buses is inappropriate as sections of a route will be under huge demand for carrying masses. The proposed model runs across hubs and connects distant points of a city.

Below are excerpts from Dublin bus network review ([Click Here](#)). Note the similarities of the reforms suggested in Dublin and the model I have proposed above –

1. A substantial drop in the number of terminating buses in the City Centre (40% in the AM peak hour [0800-0900], and significantly more off-peak)
2. It was decided that the Cross City Core Network concept offered the best balance of strengths and weaknesses, and in addition was a concept that had been successfully implemented in other European cities with similar conditions to Dublin (e.g. all UK conurbations have networks based around significant use of cross-city operations), and further work proceeded on this basis. This delivers improved resource utilisation, reduces central terminus congestion, and may also offer opportunities for new passenger journeys without inconvenient city centre interchange.
3. Another very significant change will be that wherever feasible city services would now operate to a “regular interval” timetable, and that if possible frequencies will be so high that passengers will not need to refer to a timetable.
4. The simplification inherent in the new network will make it easier for passengers to comprehend, and will also lend itself to ensuring that different services serving common road sections can be adequately coordinated so that, for example, a road with four different services, each running every 20-minutes, can be offered a uniform frequency of a bus every 5-minutes.

Thus as shown above, a huge improvement is on offer by rationalising the currently ill-conceived routes. When marketed correctly at right ticket prices rider-ship will increase while reducing congestion and pollution on roads. Simple rationalisation of routes can revitalise the cities public transport provided like BEST travel worthy buses are on offer.

*Dr Adhiraj Joglekar*

[www.driving-india.blogspot.com](http://www.driving-india.blogspot.com)