Forecast of

Non-Residential Main Lines

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FORECAST OF NON-RESIDENTIAL MAIN LINES

LEGEND

T	=	Total area (the whole city, or a relatively large sub-area)
MET	=	METropolitan area
TRA	=	TRAffic area
z	=	zone
t	=	point of time
NR	=	no. of Non-Residential lines
CB	=	no. of Coin Box lines
BUS	=	no. of BUSiness lines
P	=	no. of PBX lines
PS	=	no. of PBX lines, specified for identified, larger enterprises
PN	=	no. of PBX lines, Not specified
B	=	no. of single Business lines
BB	=	no. of single Business lines, registered as Business lines
BR	=	no. of single Business lines, registered as Residential lines
SS	=	no. of Special Service lines
PB	=	Proportion B of BUS (B/BUS)
’(prime)		means intermediate (temporary) value

Preferably, non-residential lines are split into several categories. We can distinguish at least the following types:

- Special Service lines
- Coin Box lines
- Single Business lines
- PBX lines

Each of these types requires a particular treatment in order to obtain the best possible subscriber forecast, eventually arriving at an appropriate traffic forecast.

SPECIAL SERVICE LINES (SS)

It can be assumed that Special Service lines:

1. attract only incoming traffic and originate none (or, at least, very little);

2. are concentrated on one or, at most, only very few predetermined switching points of the network. Thus, in principle, we can treat the corresponding specification separately, in principle, as follows:

First, define different Special Service functions, e.g.:
a=Ambulance, b=Fire brigade, c=Information services of certain types, d=Other services.

Then determine those points in the network on which these servicefunctions should be concentrated.

Alt.1: All services on the same and only point;

Alt.2: Several points but all services on each point;

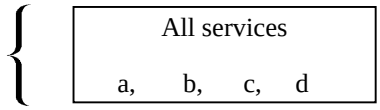
Alt.3: Several points, each dedicated to a limited number of services in such a way that each service is concentrated on only a single point.

Alt.4: Several points, at least some of which offer only a limted number of all services; at least some services offered by more than one point.

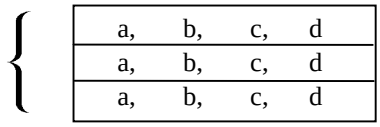
Using the functions, a-d in the example, these alternatives can be illustrated as follows:

Alt. 1: 1 switching point

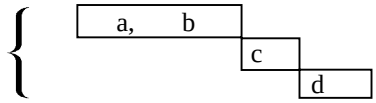
Alt. 2: Several switching points

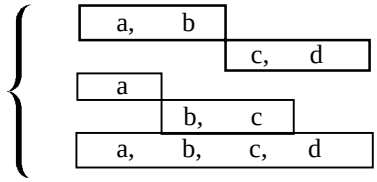


Alt. 3: Several switching points



Alt. 4: Several switching points





If we feel that it is necessary to calculate the corresponding traffic interests very accurately, we would then have to specify the following traffic cases for each traffic area:

Alt.1: Traffic $\rightarrow SS$ (only one traffic case)

Alt.2: Traffic $\rightarrow SS$ (only one traffic case)

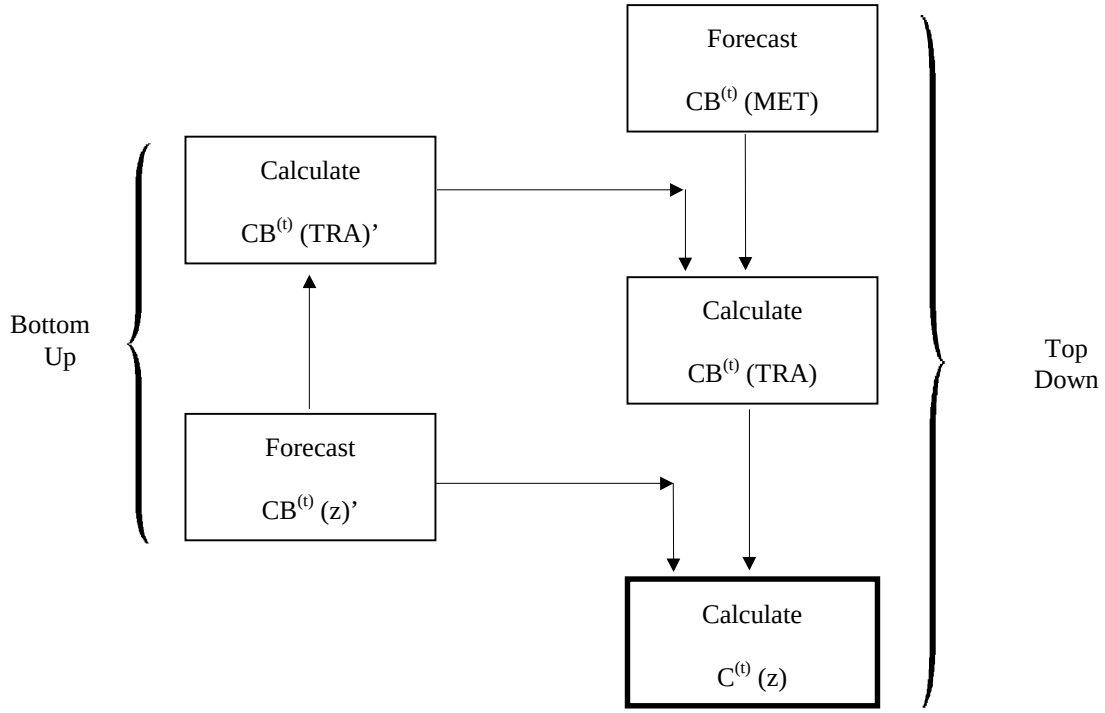
Alt.3: Traffic $\rightarrow SS_{a+b}$, Traffic $\rightarrow SS_c$, Traffic $\rightarrow SS_d$
(according to the given example, 3 traffic cases)

Alt.4: Traffic $\rightarrow SS_a$, Traffic $\rightarrow SS_b$, Traffic $\rightarrow SS$, Traffic $\rightarrow SS_d$
(4 traffic cases)

For alternatives 2 and 4, the relation should be specified between each Traffic Area and the corresponding Special Service points. For alternative 4, this specification will be relatively complex. Alternatives 1-3 should, however, cover almost all real cases.

COIN BOX LINES (CB)

The specification of Coin Box lines should raise no particular problems. Forecasts can usually quite easily be made for each zone of the city. After aggregation of zone forecasts into traffic areas, a top-down process could be combined with this bottom-up approach. One way to do this would be first to forecast the total number of coin box lines for the entire metropolitan area using a separate method, and then to use this total forecast as an envelope for the traffic area forecasts which obviously must be adjusted. The last step would then be to disaggregate the traffic area forecasts down to zone forecasts, with the proportions between the original zone forecasts remaining un-changed.



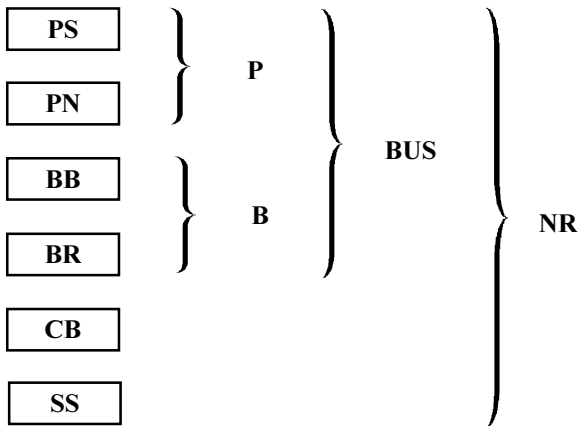
Bottom Up - Top Down Forecast of Coin Box lines

BUSINESS LINES (BUS)

The term "business lines" refers both to commercial lines and to non-commercial professional lines, as well as including official lines, e.g., governmental, hospital, and other similar lines.

Particularly from the traffic behaviour point of view, we can easily identify two main types of business lines, i.e., single business lines (B), and PBX lines (P). With respect to the single business lines, there is some uncertainty; normally lines that are used professionally are also registered as business lines (BB), but in quite a few cases, they may be registered as residential lines (BR), for example when the same premises are used both professionally and as a private residence. PBX lines do not offer this kind of difficulty, but their specification may still be split into two different classes, depending on the available information:

One class includes those identified, larger enterprises for which the locations and the required number of lines for defined points of time are known (PS). The other class includes the demand that is not identifed as dedicated to specific enterprises, but rather identified as the total demand for an area (PN).



Relation between different kinds of Non-Residential lines

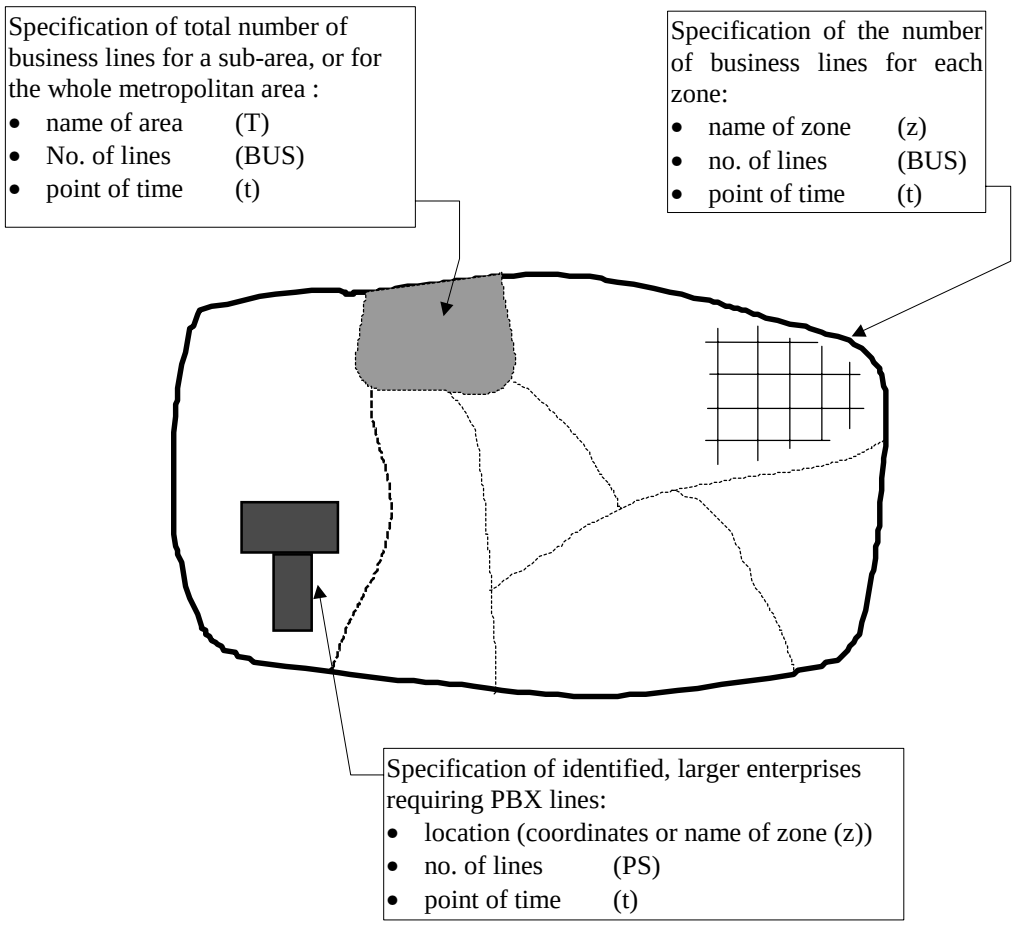
FORECAST SCHEMES FOR SINGLE BUSINESS LINES (B) AND PBX LINES (P)

Depending on how detailed our basic forecasts are, different forecast schemes may be applied. Two alternatives are given below:

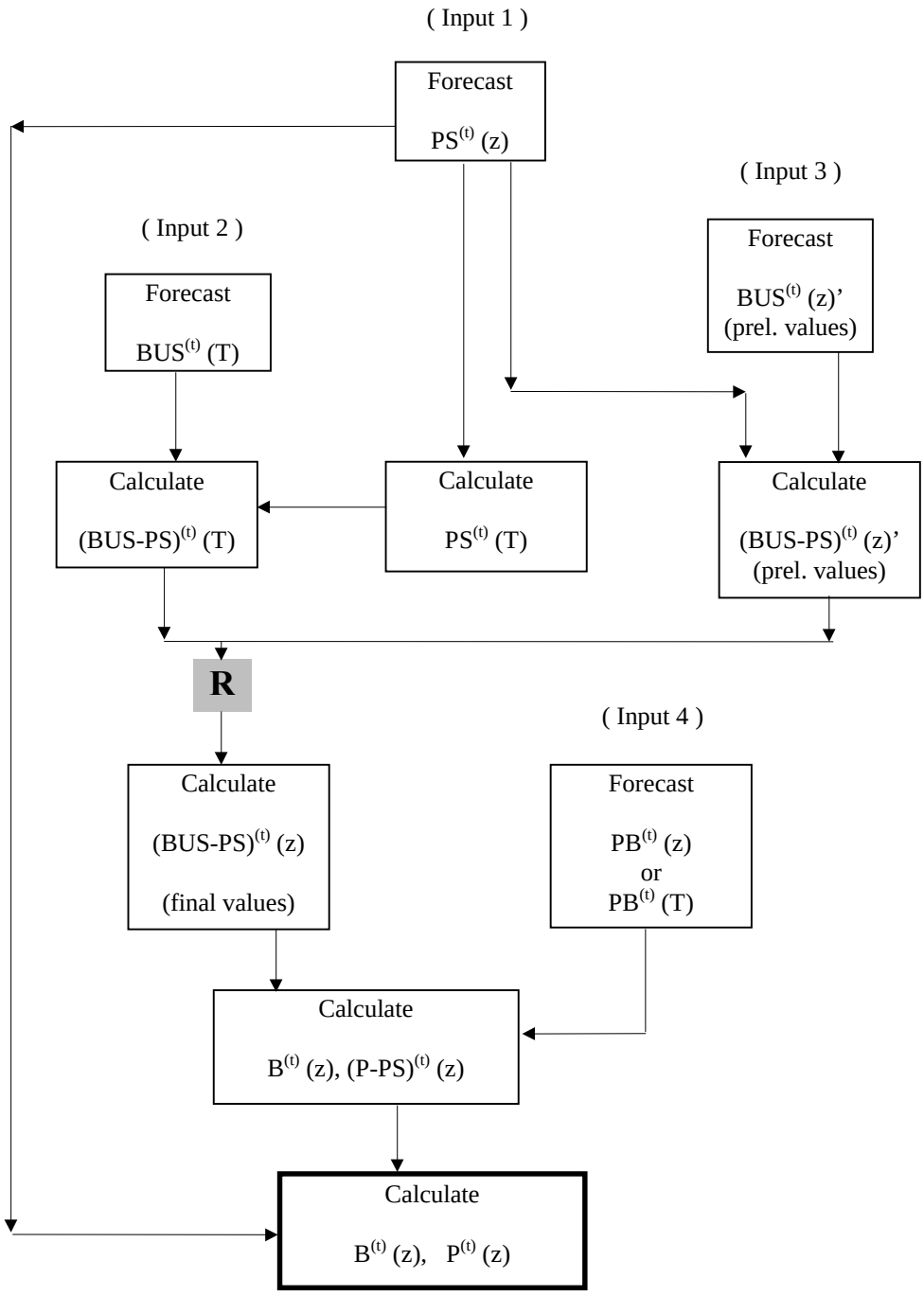
Alt.1: Besides possible forecasts of PBX lines for identified, larger enterprises (PS), only the total number of business lines (BUS) can be forecasted, separately for zones and for larger areas. A fair estimate of the proportion of single business lines (PB) is available, either for each zone or for larger areas.

Alt.2: More detailed basic forecasts are available, i.e., the total number of PBX lines (P) per zone, and the total number of single business lines (B), separately for zones and for larger areas. The single line business forecasts may besplit into the two classes, BB and BR (see legend).

Alt. 1 : Less detailed basic forecasts available



Specification of business lines in a metropolitan area (Alt. 1)



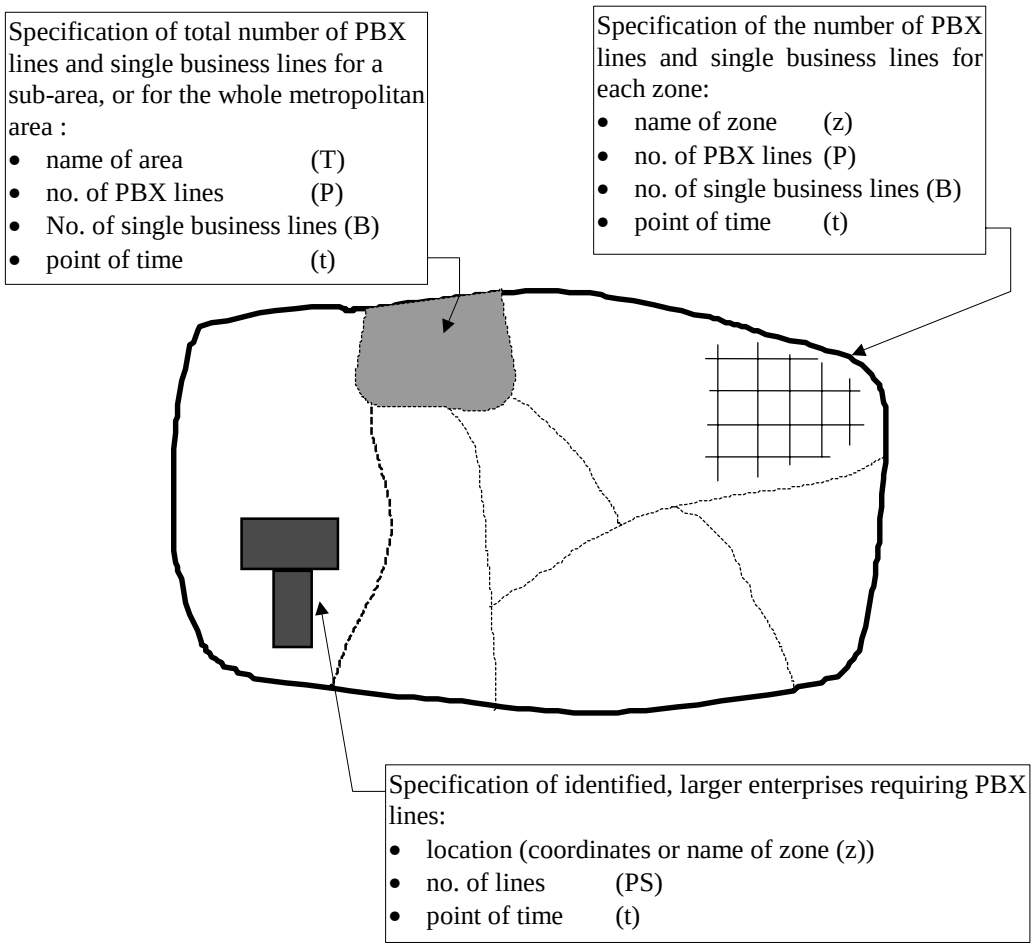
Forecast scheme for PBX and single Business lines, Alt. 1

R = Reconciliation

$(BUS\text{-}PS)^{(t)}$ (T) is normally trusted, while

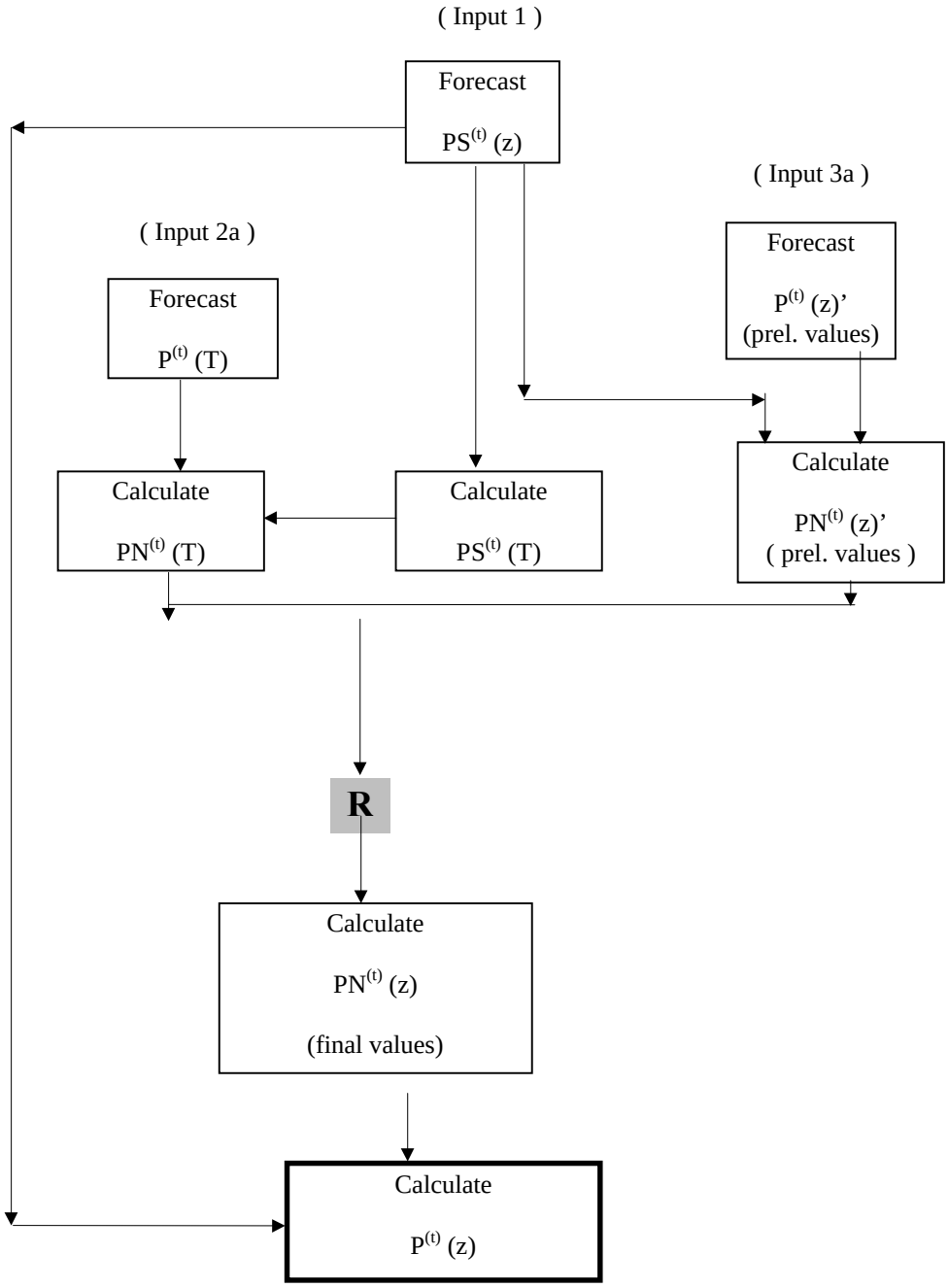
$(BUS\text{-}PS)^{(t)}$ (z)' is modified

Alt. 2 : More detailed basic forecasts are available



Specification of business lines in a metropolitan area (Alt. 2)

In this case, PBX lines and single business lines can be forecast according to separate schemes.

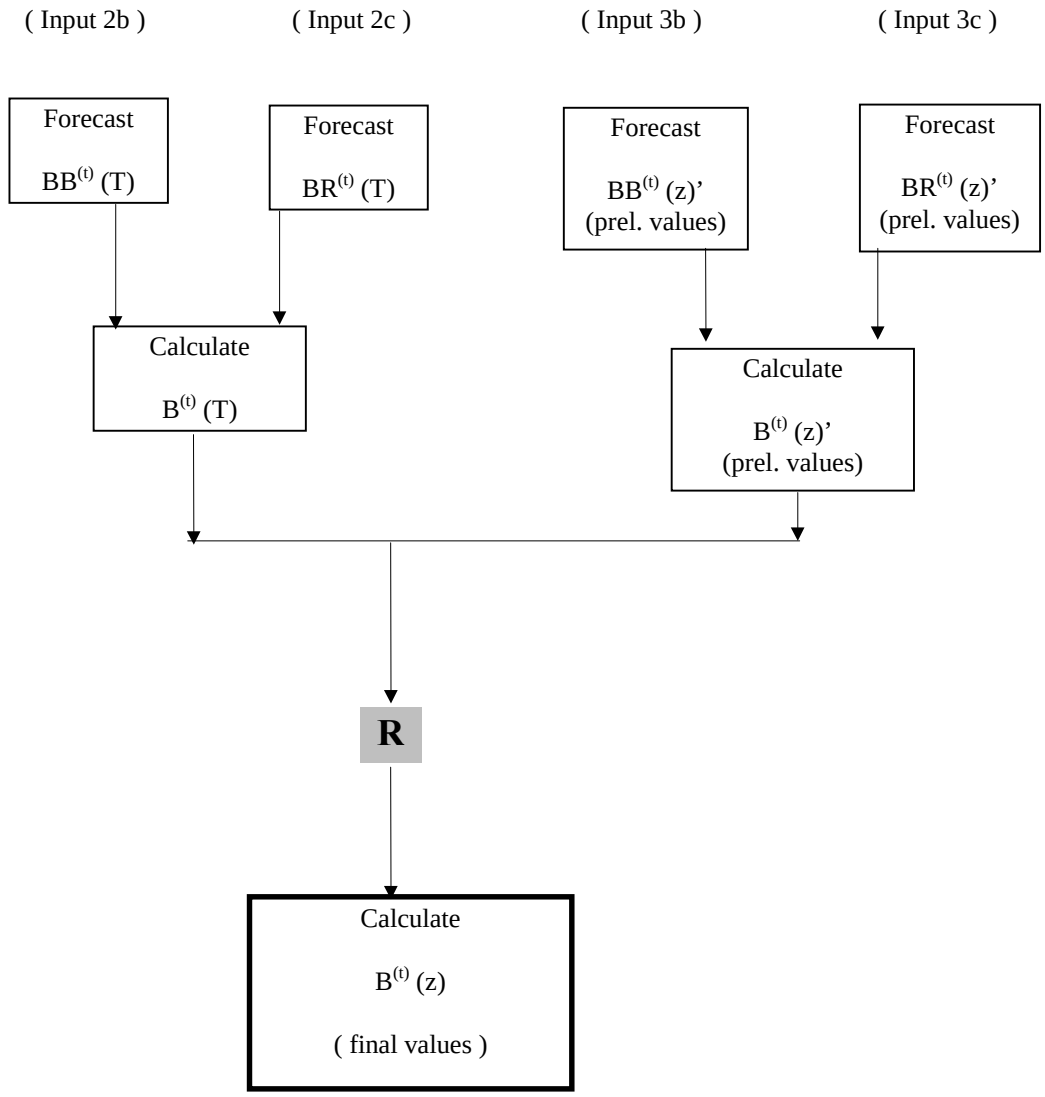


Forecast scheme for PBX lines, Alt. 2

R = Reconciliation

$PN^{(t)}$ (T) is considered reliable, while

$PN^{(t)}$ (z)' is modified.



Forecast scheme for single business lines, Alt. 2

R = Reconciliation

$B^{(t)}(T)$ is considered reliable, while

$B^{(t)}(z)'$ is modified

INPUTS TO THE BUSINESS LINE FORECASTS

Input 1: $PS^{(t)}{}_{(z)}$

In some cases, it is possible to identify specific, large, future enterprises e.g., "A new hospital x will come into service at a point of time 6 years hence; the location will be in zone A2; 60 PBX lines will be required". Now, if the hospital is the only new large enterprise known in zone A2 until year 6, then $PS^{(6)}(A2) = 60$.

Should another enterprise be planned for the same zone (A2), for example, "A large franchise of a sales company will be established in zone A2, in 5 years time, and 40 PBX lines will be required", then $PS^{(5)}(A2) = 40$ and $PS^{(6)}(A2) = 100$. (40+60=100!).

The $PS^{(t)}(z)$ values are accepted (considered to be relatively reliable).

Input 2: $BUS^{(t)}(T)$

This is the total number of future business lines (P+B) in the entire metropolitan area or, if good segmented basic data are available, in some sub-areas.

Several different forecasting methods should be combined since this will be the envelope for the detailed forecasts. Ideally, regression methods based on professional, trade, and socio-economic development would be combined with trend analysis and non-statistical approaches like comparative methods and subjective judgement.

Input 2a: $P^{(t)}(T)$

The total number of PBX lines (P) should be forecasted using the same kind of scheme as used for total business lines (BUS), but with lessemphasis on socio-economic factors and more emphasis on trade, business, and official activities.

Input 2b and 2c: $BB^{(t)}(T)$ and $BR^{(t)}(T)$

The total number of single business lines (B) should be forecasted again using the same scheme as used for total business lines (BUS), but unlike in Input 2a, ***more*** emphasis should be placed on socio - economic factors.

Depending on local conditions, and on the administration's policy, $BR^{(t)}(T)$ can be neglected, i.e., set = 0; alternatively, $B^{(t)}(T)$ can be forecasted directly, including an estimate of $BR^{(t)}(T)$.

Input 3: $BUS^{(t)}(z)'$

This is a micro-forecast by zone. Depending on the available information, many different kinds of direct methods can be used. Subjective judgement will be used to a large extent. Note that it is important to obtain a good ***relative*** distribution of business lines between the different zones since the values are only preliminary (absolute levels will be modified because ***total*** values for the entire city will be forecasted separately).

Input 3a: $PT^{(t)}(z)'$

The number of PBX lines in each zone will probably be forecasted on the basis of city planning, information from medium or large sized companies, institutions and official organizations, and on detailed investigations of the development possibilities in the zones.

Again, the ***relative*** distribution of PBX lines between zones is more important than the absolute numbers.

Input 3b and 3c: $BB^{(t)}(z)'$ **and** $BR^{(t)}(z)'$

The forecast of single business lines in each zone will rely on detailed zone development investigations even more than the PBX forecast does. Furthermore, in this case, the ***relative*** distribution between zones is of paramount importance.

As was the case with total forecasts, $BR^{(t)}(z)'$ may neglected, i.e., set =0; alternatively, $B^{(t)}(z)$ may be forecasted directly, including an estimate of $BR^{(t)}(z)'$.

Input 4: $PB^{(t)}(z)$ **, or** $PB^{(t)}(T)$

$PB^{(t)}(z)$ is preferable. Approximate values are acceptable. The basis for the forecast may be parameters which express the relative structure and character of the different zones.