

# Level Decomposition in Power System

Level	System	Monitoring and Control
First Level	Generating stations and substations	Local control centre
Second Level	Sub transmission and transmission networks	Area load dispatch centre
Third Level	Transmission system	State load dispatch centre
Fourth Level or Top Level	Interconnected power systems	Regional control centre

**Local Control Centre** – A number of control functions can be performed locally at power generating stations and substations using local equipment and automatic devices. The following are some of the typical control applications of a local control centre:

1. Local monitoring and control.
2. Protection
3. Auto reclosures.
4. Voltage regulation.
5. Capacitor switching.
6. Feeder synchronization.
7. Load shedding in the event of necessity
8. Network restoration

## **Area Load Dispatch Centre**

A group of generating stations and substations alongwith the associated network and loads may be considered as a unit for control under an area load dispatch centre. The area control centre receives information and processes it for appropriate control action.

**State Load Dispatch Centre** – The minute to minute operation of the power system at the state level may be carried out by the state load dispatch centre.

It may have the following functions:

- System generation, load monitoring and control.
- System wide state monitoring and control.
- Circuit breaker state monitoring and control.
- Load shedding and load restoration.
- Supervisory control for lines and equipment states.
- System alarm monitoring and corrective action
- Planning and monitoring of system operations.

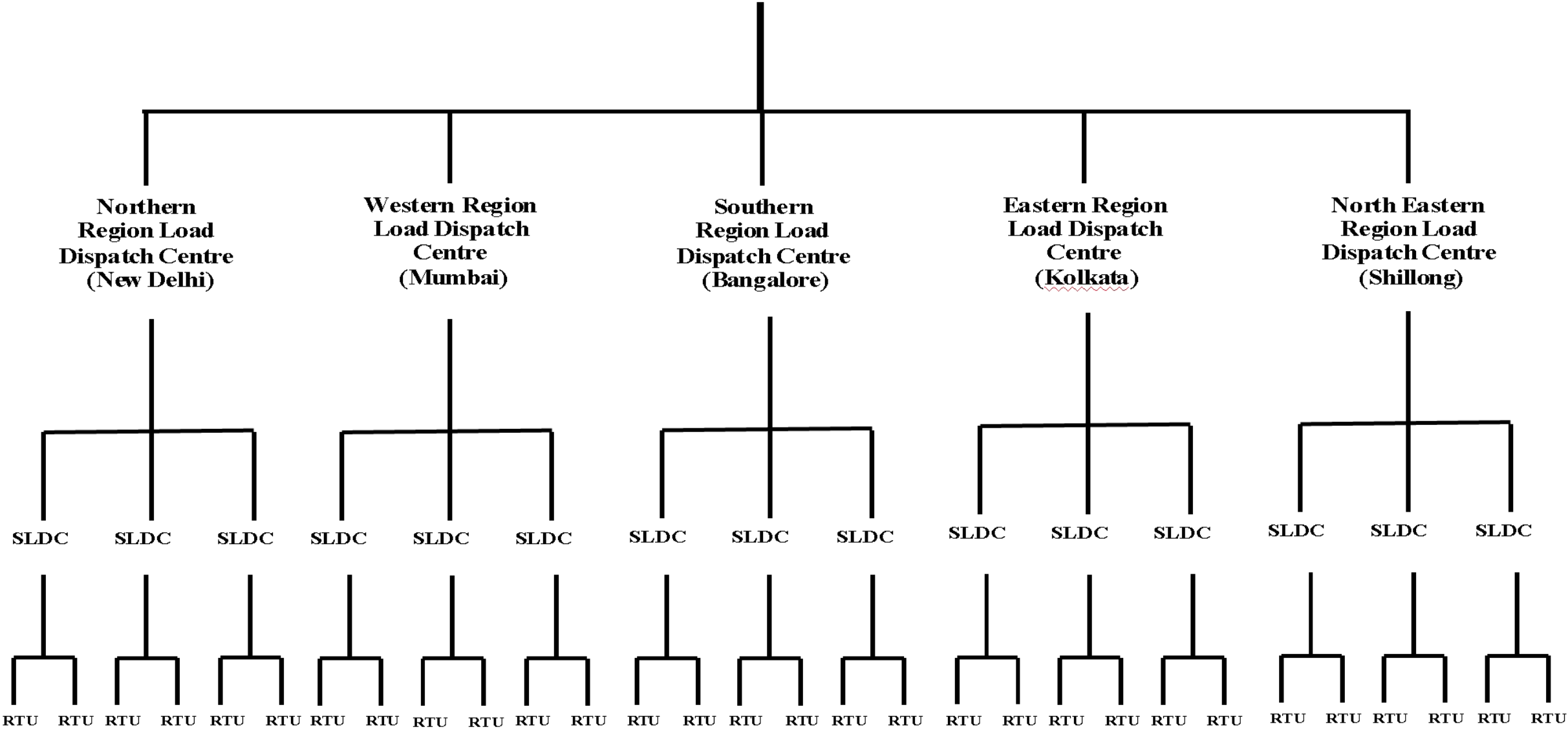
**Regional Load Dispatch Centre** – The regional load dispatch centre may be regarded as a coordinating and monitoring centre for state level dispatch centres with the following main objectives:

- Integrated operation of state level dispatch centres.
- Operation and maintenance schedules for the generating plant.
- Operation and maintenance schedules for maximum capacity utilization.
- Monitor and control inter state power transactions.
- Monitor and control inter regional power transactions.

# Regional Control Centres in India

Region	States Included	Regional Load Dispatch Centre
Northern Region	Haryana, Himachal Pradesh, Jammu & Kashmir, Rajasthan, Uttar Pradesh, Delhi, Uttarakhand and union territory of Chandigarh.	New Delhi
Western Region	Gujarat, Madhya Pradesh, Maharashtra, Chattisgarh, Goa and union territories of Daman, Diu, Dadra and Nagar Haveli.	Mumbai
Southern Region	Andhra Pradesh, Karnataka, Tamil Nadu, Kerala and union territories of Pondicherry and Lakshadweep.	Bangalore
Eastern Region	West Bengal, Bihar, Orissa, Sikkim, Jharkhand.	Kolkata
North Easter Region	Assam, Manipur, Meghalaya, Nagaland, Tripura, Arunachal Pradesh, Mizoram	Shillong

**National Load Dispatch Centre (New Delhi)**



# Hardware requirements for computer control of power system

- The main equipment is a computer with enough storage capability.
- Earlier main frame computers were used but now desktop computers with sufficient storage capability are enough
- Computers are connected in ring formation
- All computers have backup computers also. (It is kept updated to prevent loss of data or control)
- Main computer used for online program execution.
- Other computers used for duties like data acquisition etc.
- For emergency duties there are standby computers.
- CROs, printers are also used.
- changeover from main computer to standby computer is mostly automatic.
- The communication channels go out from the station to remote terminal units.
- Computer based telemetry and data processing facilities are also provided.
- The modern trend is to use computers for relaying also.

# Software for computer control of power system

The computers used in power system control centre are equipped with requisite softwares for performing the following functions:

- Online security monitoring and state estimation.
- Data acquisition, supervisory control etc.
- Real time monitoring and control
- Operating systems.