

The background of the entire image is a dark, deep blue. It is filled with numerous bright, glowing blue lines and streaks that originate from the right side and sweep across the frame towards the left. These lines vary in thickness and intensity, creating a sense of dynamic movement and energy. The overall effect is reminiscent of a cosmic or digital landscape.

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

in the Name of Allah, the Beneficent, the Merciful

Software Quality Assurance

**Critical Estimation Concepts
Revision**

Decomposition Techniques

- If problem is too complex, “divide and conquer” is adopted
- Two views
 - Decomposition of the problem
 - Decomposition of the process

Software sizing

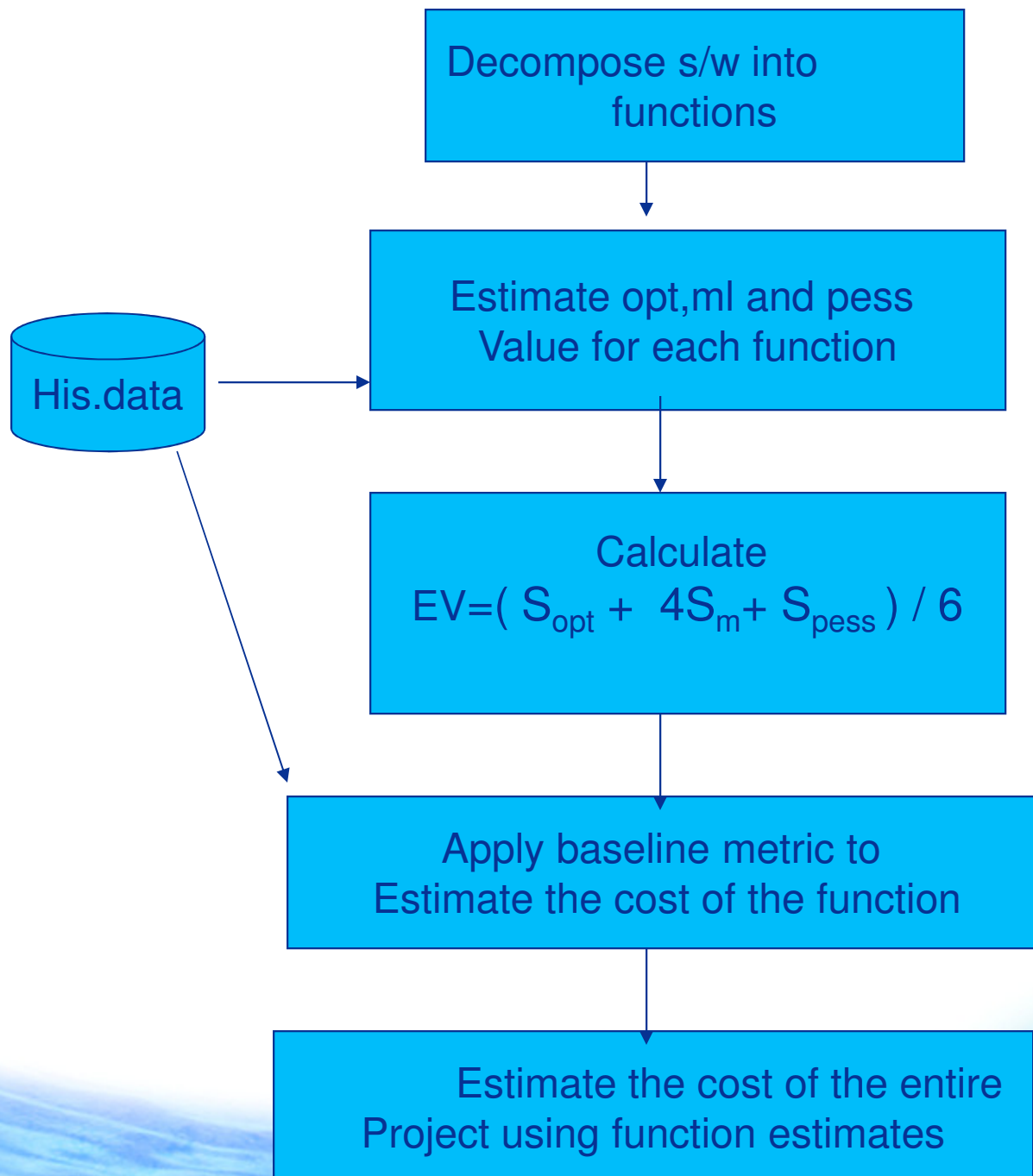
- Direct approach : Size is measured in LOC
- Indirect approach : Size is measured in FP

Problem based estimation

- Loc and FP are used in two ways
 - Estimation variable
 - Baseline metric from previous projects

Problem based estimation

- Steps involved
 - Decomposes software into functions
 - Using historical information, the planner estimates an optimistic, most likely and pessimistic value for each function
 - Expected value is calculated using
 - $EV = (S_{opt} + 4S_m + S_{pess}) / 6$
 - Baseline metric is then applied to derive the cost of each function
 - Function estimates are combined to form project estimate



Example (CAD software)

- CAD software will accept 2D and 3D geometric data from an engineer.
- The engineer interacts with s/w through a user defined interface.
- All geometric and supporting data are stored in DB.
- Design modules produce the required output.
- Peripheral control module produces the output on various output devices

Major functions of CAD

- 2D geometric analysis - 2DGA
- 3D geometric analysis - 3DGA
- User interface and control facilities - UICF
- Database management – DBM
- Design analysis modules -DAM
- Graphics display facilities - CGDF
- Peripheral control - PC

Loc based estimation

<i>Functions</i>	<i>Estimated Loc</i>
2D geometric analysis	5300
3D geometric analysis	6800
User interface and control facilities	2300
Database management	3350
Design analysis modules	8400
Computer graphics display facilities	4950
Peripheral control	2100

Contd ..

LOC Estimation

- Three point estimation technique was used to estimate LOC value

Example : For 3D geometric analysis

optimistic : 4600

most likely : 6900

pessimistic : 8600

Hence the expected value for 3DGA is 6800

Contd ..

LOC based estimation

- Historical data indicates the organization can produce 620 LOC/pm
- Labor rate is \$ 8000/month
- $\text{Cost} / \text{LOC} = 8000/620 = \$ 13.00$
- Hence the cost of the project is
$$= (5300 + 6800 + 2300 + 3350 + 8400 + 4950 + 2100) / 620$$
$$= 33,200 * \$13 = \$431,600$$
- Hence the effort of the project is
$$= 33,200 / 620 = 54 \text{ person/months}$$

FP based estimation

- FP focuses on estimates inputs, outputs, inquiries, files and external interfaces rather than software functions of CAD

Inf. Domain value	Est. value	Weight	FP count
Number of inputs	24	4	96
Number of outputs	16	5	80
Number of inquiries	22	4	88
Number of files	4	10	40
Number of external interfaces	2	7	14

Contd ..

FP based estimation

- Three point estimation technique was used to estimate FP value

Example : For number of inputs

optimistic : 20

most likely :24

pessimistic : 30

Hence the expected value for number of inputs is 24

FP based estimation

- Historical data indicates the organization can produce 6.5 FP/pm
- Labor rate is \$ 8000/month
- $\text{Cost / FP} = 8000/6.5 = \$ 1230.00$
- Hence the cost of the project is
$$= \Sigma \text{FP count} * [0.65 + .01 * \Sigma F_i]$$
$$= 318 * (0.65 + .01 * 52)$$
$$= 372 * \$1230 = \$457,560$$
- Hence the effort of the project is
$$= 372 / 6.5 = 58 \text{ person/months}$$