

Web Services Optimization Model

$$\text{Max } P_1y_1 + P_2y_2 + P_3y_3 + P_4y_4 + P_5y_5 - F_1z_1 - F_2z_2 - C_1x_1 - C_2x_2 - C_3x_3 - C_4x_4 - C_5x_5 - C_6x_6$$

Subject to:

$$x_1 - z_1 \geq 0$$

$$x_2 - 2z_1 \geq 0$$

$$x_3 - 3z_1 \geq 0$$

$$x_4 - 2z_2 \geq 0$$

$$x_5 - 3z_2 \geq 0$$

$$x_6 - 4z_2 \geq 0$$

$$y_1 - z_1 \leq 0$$

$$y_2 - z_1 \leq 0$$

$$y_3 - z_1 \leq 0$$

$$y_4 - z_2 \leq 0$$

$$y_5 - z_2 \leq 0$$

$$y_1 \leq D_1$$

$$y_2 \leq D_2$$

$$y_3 \leq D_3$$

$$y_4 \leq D_4$$

$$y_5 \leq D_5$$

All decision variable are greater than or equal to zero.

Definitions of Variables

x_1 = units of atomic service 1 purchased by web service with technology T:123

x_2 = units of atomic service 2 purchased by web service with technology T:123

x_3 = units of atomic service 3 purchased by web service with technology T:123

x_4 = units of atomic service 2 purchased by web service with technology T: 234

x_5 = units of atomic service 3 purchased by web service with technology T: 234

x_6 = units of atomic service 4 purchased by web service with technology T: 234

y_1 = units of atomic service produced by technology T:123 sold to customer 1

y_2 = units of atomic service produced by technology T:123 sold to customer 2

y_3 = units of atomic service produced by technology T:234 sold to customer 2

y_4 = units of atomic service produced by technology T:234 sold to customer 3

y_5 = units of atomic service produced by technology T:234 sold to customer 4

z_1 = number of times technology T:123 is run by web service provider

z_2 = number of times technology T:234 is run by web service provider

P_1 = price per unit of web service produced by technology T:123 sold to customer 1

P_2 = price per unit of web service produced by technology T:123 sold to customer 2

P_3 = price per unit of web service produced by technology T:234 sold to customer 3

P_4 = price per unit of web service produced by technology T:234 sold to customer 4

P_5 = price per unit of web service produced by technology T:234 sold to customer 5

F_1 = cost each time technology T:123 is run by web service provider

F_2 = cost each time technology T:234 is run by web service provider

C_1 = cost per unit of atomic service 1 purchased by web service with technology T:123

C_2 = cost per unit of atomic service 2 purchased by web service with technology T:123

C_3 = cost per unit of atomic service 3 purchased by web service with technology T:123

C_4 = cost per unit of atomic service 2 purchased by web service with technology T:234

C_5 = cost per unit of atomic service 3 purchased by web service with technology T:234

C_6 = cost per unit of atomic service 4 purchased by web service with technology T:234