The first term of every cost equation shows the communication cost, while the second term shows the sync cost.

For all cases broadcasting scenarios:
N = 10 numbers * 4 bytes = 40 bytes
p = 8 processors
For simplicity, g and l are treated as constants

Naive Broadcasting

The cost of implementation is

$$Naive\ broadcast\ cost\ =\ pNg\ +\ l$$
$$Max\ Naive\ broadcast\ cost\ =\ 320g\ +\ l$$

Where p is the number of processors, N the size of array, g flops/word and l flops

Logarithmic Broadcasting

The cost of implementation is

$$Logarithmic\ broadcasting\ cost\ =\ (log\ p)Ng\ +\ (log\ p)l$$
$$Max\ Logarithmic\ broadcasting\ cost\ =\ 3 * 40g\ +\ 3l\ =\ 120g\ +\ 3l$$

Where p is the number of processors, N the size of array, g flops/word and l flops.

Two stage broadcast cost

The cost of implementation is

$$Two\ stage\ broadcast\ cost\ =\ (\tfrac{N}{p}pg + l) + (\tfrac{N}{p}pg + l)\ =\ 2Ng\ +\ 2l$$
$$Two\ stage\ broadcast\ cost\ =\ (\tfrac{N}{p}pg + l) + (\tfrac{N}{p}pg + l)\ =\ 80g\ +\ 2l$$

Where N the size of array, g flops/word and l flops.

Comparison

In comparison with the naive broadcasting, the communication cost is reduced if the logarithmic approach is used. But there have to be more synchronizations in the process, since there are more supersteps.

The 2 stage approach has a very small communication cost since its independent from the number of processors used.

Naive broadcasting has the smallest sync cost, but the greatest communication cost.

References:

PREDICTABLE PARALLEL PERFORMANCE THE BSP, by D B Skillicorn, Department of Computing and Information Science Queen's University