Patent claims

1. A method of provisioning a software application on edge devices (104A-N) in an Internet-of-Things (IoT) environment (100), comprising:

generating, by a processor (202), a plurality of simulation instances (402A-N) capable of simulating behavior of the software application on one or more edge devices (104A-N) in the IoT environment (100), wherein said each simulation instance (402A-N) is configured with a unique resource configuration (404A-N);

processing the software application on said each simulation instance (402A-N) using data from a plant (103); and

computing an optimum resource configuration (404B) associated with the software application based on processing of the software application on the simulation instances (402A-N), wherein computing the optimum resource configuration (404B) associated with the software application comprises:

determining at least one simulation instance (402B) from the plurality of simulation instances (402A-N) on which the behavior of the software application is satisfactory; and

determining the unique resource configuration (404B) associated with the determined simulation instance (402B), wherein the unique resource configuration (404B) is the optimum resource configuration which indicates least resources required for executing the software application on the one or more edge devices (104A-N).

2. The method according to claim 1, further comprising:

storing the optimum resource configuration (402B) in a metafile associated with the software application in an application repository (112).

3. The method according to claim 1, wherein generating the plurality of simulation instances (402A-N) capable of

simulating the behavior of the software application comprises:

selecting a set of unique resource configurations (404A-N) from a plurality of unique resource configurations, wherein the set of unique resource configurations (404A-N) correspond to real-time resource capabilities of the edge devices (104A-N) in the IoT environment (100); and

generating the plurality of the simulation instances (402A-N) based on the selected set of unique resource configurations (404A-N).

4. The method according to claim 1 or 3, wherein said each unique resource configuration (404A-N) comprises resource constraints influencing the behavior of the software application.

5. The method according to claim 1, wherein processing the software application on said each simulation instance (402A-N) using the data from the plant (103) comprises:

simulating the behavior of the software application on said each simulation instance (402A-N) using the data from the plant (103) based on the unique resource configuration (404A-N) of said each simulation instance (402A-N); and

capturing parameter values indicative of the behavior of the software application during simulation of the software application on said each simulation instance (402A-N).

6. The method according to claim 5, wherein computing the optimum resource configuration (404B) required for deploying the software application on the one or more edge devices (104A-N) comprises:

determining at least one simulation instance (402B) from the plurality of simulation instances (402A-N) on which the behavior of the software application is satisfactory based on the captured parameter values; and determining the unique resource resource configuration.

7. The method according to claim 1, further comprising:

evaluating real-time resource capabilities of at least one edge device (104A) in the IoT environment (100) to execute the software application based on the optimum resource configuration (404B) associated with the software application; and

provisioning the software application on said edge device (104A) based on evaluation of the real-time resource capabilities of said edge device (104A).

8. A system (102) for provisioning software applications on edge devices (104A-N) in an Internet-of-Things (IoT) environment (100), comprising:

one or more processors (202);

a memory unit (204) coupled to the processors (202), wherein the memory unit (204) comprises an application repository (112) capable of storing a plurality of software applications;

a simulation module (106) configured for:

generating a plurality of simulation instances (402A-N) capable of simulating behavior of the software application on one or more edge devices (104A-N) in the IoT environment (100), wherein said each simulation instance (402A-N) is configured with a unique resource configuration (404A-N);

processing the software application on said each simulation instance (402A-N) using data from a plant (103); and

computing an optimum resource configuration (404B) associated with the software application based on processing of the software application on the simulation instances (402A-N), wherein the simulation module (106) is configured to compute the optimum resource configuration (404B) associated with the software application by:

determining at least one simulation instance (402B) from the plurality of simulation instances (402A-N) on which the behavior of the software application is satisfactory; and

determining the unique resource configuration (404B) associated with the determined simulation instance (402B),

wherein the unique resource configuration (404B) is the optimum resource configuration which indicates least resources required for executing the software application on the one or more edge devices (104A-N).

9. The system (102) according to claim 8, wherein the simulation module (106) is configured for:

storing the optimum resource configuration (404B) in a metafile associated with the software application in the application repository (112).

10. The system (102) according to claim 8 or 9, wherein the simulation module (106) is configured for:

selecting a set of unique resource configurations (404A-N) from a plurality of unique resource configurations, wherein the set of unique resource configurations (404A-N) correspond to real-time resource capabilities of the edge devices (104A-N) in the IoT environment (100), and wherein said each unique resource configuration (404B) comprises resource constraints influencing the behavior of the software application; and

generating the plurality of the simulation instances (402A-N) based on the selected set of unique resource configurations (404A-N).

11. The system (102) according to claim 8 or 10, wherein the simulation module (106) is configured for:

simulating the behavior of the software application on said each simulation instance (402A-N) using the data from the plant (103) based on the unique resource configuration (404A-N) of said each simulation instance (402A-N); and

capturing parameter values indicative of the behavior of the software application during simulation of the software application on said each simulation instance (402A-N).

12. The system (102) according to claim 11, wherein the simulation module (106) is configured for:

determining at least one simulation instance (402B) from the plurality of simulation instances (402A-N) on which the behavior of the software application is found as satisfactory based on the captured parameter values; and

determining the unique resource configuration (404B) associated with the determined simulation instance (402B), wherein the unique resource configuration (404B) is the optimum resource configuration.

13. The system (102) according to claim 8, further comprising:

an edge device management module (110) configured for evaluating real-time resource capabilities of at least one edge device (104A) in the IoT environment (100) to execute the software application based on the optimum resource configuration (404B) associated with the software application.

14. The system (102) according to claim 13, further comprising:

provisioning the software application on said edge device (104A) based on evaluation of the real-time resource capabilities of said edge device (104A).

15. A computer-readable medium, having computer-readable instructions stored therein, that when executed by a processor (202), cause the processor (202) to perform method steps according to any of the claims 1-7.