Claims:

1. A system for dynamic hardware acceleration, the system comprising:

a process monitor to identify a candidate task from a plurality of tasks executing in an operating environment, the operating environment within a hardware enclosure, the candidate task amenable to hardware optimization;

a hardware controller to instantiate, in response to identifying the candidate task, a hardware component in the operating environment to perform hardware optimization for the task; and

a scheduler to execute a class of tasks amenable to the hardware optimization on the hardware component,

wherein:

the process monitor is to identify a second candidate task from the plurality of tasks;

the hardware controller is to fail to instantiate a second hardware component for a second class of tasks amenable to a same hardware optimization as the second candidate task;

the scheduler is to:

find an IoT service device in a hierarchy of a plurality of IoT service devices that can instantiate the second hardware component based on physical closeness to an IoT requestor; and

transfer the second class of tasks to the IoT service device.

2. The system of claim 1, wherein the operating environment implements an internet-of-things (IoT) gateway.

3. The system of claim 2, wherein the IoT gateway is one of a plurality of IoT service devices serving an IoT device set.

4. The system of claim 3, wherein the plurality of IoT service devices are arranged hierarchically with IoT gateways directly serving the IoT device set at one end of the hierarchy and network-edge servers at the other end of the hierarchy.

5. The system of claim 1, wherein to identify the candidate task, the process monitor is to:

measure utilization of a processor; and

identify the task when the utilization is beyond a threshold.

6. The system of claim 1, wherein the candidate task is amenable to hardware optimization when a marker of the task includes a corresponding class of hardware components in a database.

7. The system of claim 1, wherein to instantiate the hardware component, the hardware controller is to:

find a component configuration in a database that corresponds to the class of tasks;

configure the hardware component with the component configuration; and

allocate the configured hardware component to the operating environment.

8. A method for dynamic hardware acceleration, the method comprising:

identifying a candidate task from a plurality of tasks executing in an operating environment, the operating environment within a hardware enclosure, the candidate task amenable to hardware optimization;

instantiating, in response to identifying the candidate task, a hardware component in the operating environment to perform hardware optimization for the task, the hardware component being previously inaccessible to the operating environment; and

executing, by the operating environment, a class of tasks amenable to the hardware optimization on the hardware component,

the method further comprising:

identifying a second candidate task from the plurality of tasks;

failing to instantiate a second hardware component for a second class of tasks amenable to a same hardware optimization as the second candidate task;

finding an IoT service device in a hierarchy of a plurality of IoT service devices that can instantiate the second hardware component based on physical closeness to an IoT requestor; and

transferring the second class of tasks to the second IoT service device.

9. The method of claim 8, wherein the operating environment implements an internet-of-things (IoT) gateway.

10. The method of claim 9, wherein the IoT gateway is one of a plurality of IoT service devices serving an IoT device set.

11. The method of claim 10, wherein the plurality of IoT service devices are arranged hierarchically with IoT gateways directly serving the IoT device set at one end of the hierarchy and network-edge servers at the other end of the hierarchy.

12. The method of claim 8, wherein identifying the candidate task includes:
measuring utilization of a processor; and
identifying the task when the utilization is beyond a threshold.

13. The method of claim 8, wherein the candidate task is amenable to hardware optimization when a marker of the task includes a corresponding class of hardware components in a database.

14. The method of claim 8, wherein instantiating the hardware component includes:
finding a component configuration in a database that corresponds to the class of tasks;
configuring the hardware component with the component configuration; and
allocating the configured hardware component to the operating environment.

15. A program that, when executed, cause the machine to perform operations for dynamic hardware acceleration, the operations comprising:

identifying a candidate task from a plurality of tasks executing in an operating environment, the operating environment within a hardware enclosure, the candidate task amenable to hardware optimization;

instantiating, in response to identifying the candidate task, a hardware component in the operating environment to perform hardware optimization for the task, the hardware component being previously inaccessible to the operating environment; and

executing, by the operating environment, a class of tasks amenable to the hardware optimization on the hardware component,

the program further causing the machine to perform operations, the comprising:

identifying a second candidate task from the plurality of tasks;

failing to instantiate a second hardware component for a second class of tasks amenable to a same hardware optimization as the second candidate task;

finding an IoT service device in a hierarchy of a plurality of IoT service devices that can instantiate the second hardware component based on physical closeness to an IoT requestor; and

transferring the second class of tasks to the second IoT service device.

16. The program of claim 15, wherein the operating environment implements an internet-of-things (IoT) gateway.

17. The program of claim 16, wherein the IoT gateway is one of a plurality of IoT service devices serving an IoT device set.

18. The program of claim 17, wherein the plurality of IoT service devices are arranged hierarchically with IoT gateways directly serving the IoT device set at one end of the hierarchy and network-edge servers at the other end of the hierarchy.

19. The program of claim 15, wherein identifying the candidate task includes:

measuring utilization of a processor; and

identifying the task when the utilization is beyond a threshold.

20. The program of claim 15, wherein the candidate task is amenable to hardware optimization when a marker of the task includes a corresponding class of hardware components in a database.

21. The program of claim 15, wherein instantiating the hardware component includes:

finding a component configuration in a database that corresponds to the class of tasks;

configuring the hardware component with the component configuration; and

allocating the configured hardware component to the operating environment.

22. A machine readable recording medium having the program of any one of claims 15-21 stored thereon.