according to the present disclosure may provide for safer, faster, and more flexible power delivery to electronic devices in a data center. Also, implementations according to the present disclosure may facilitate greater redundancy of power delivery to electronic devices in a data center.

[0084A] In one aspect, there is provided a data center power system which can include: a live electrical power conductor assembly configured to carry direct current (DC) power from a power source through a human-occupiable workspace of a data center, the live electrical power conductor assembly comprising a grid of orthogonally criss-crossing electrical conductors that delivers the DC power to a planar conductor surface of the live electrical power conductor assembly that extends two-dimensionally across a width and a length of the human-occupiable workspace of the data center at a height above a plurality of data center racks that support a plurality of electronic devices, the grid of orthogonally criss-crossing electrical conductors and the planar conductor surface defining a ceiling that is secured to a structure of the data center and extends above all of the human-occupiable workspace; at least one shroud positioned adjacent to and surrounding a first portion of at least one of the electrical conductors, the shroud comprising a barrier to contact to the first portion of the at least one electrical conductor, the shroud positioned to expose a second portion of the electrical conductor to the planar conductor surface; a grounded conductor positioned in the human-occupiable workspace apart from the electrical power conductor; a first electrical connector configured to mount to a data center rack that supports a portion of the plurality of electronic devices, the first electrical connector moveable to electrically contact the live conductor surface of the electrical power conductor; and a second electrical conductor positioned on the rack and configured to electrically contact the grounded conductor.

[0084B] In one aspect, there is provided a method of delivering direct current (DC) power to a data center rack, comprising: providing DC power to a live electrical power conductor assembly from a data center power source, the live electrical power conductor assembly comprising a grid of orthogonally criss-crossing electrical conductors that extend through a human-occupiable workspace of a data center, at least one of the electrical conductors comprising at least one shroud positioned adjacent to and surrounding a first portion of the electrical conductor, the shroud comprising a barrier to contact to the first portion of the electrical conductor, the shroud positioned to expose a second portion of the electrical conductor to a planar conductor surface; moving a data center rack of a plurality of data center racks that support a plurality of electronic devices into a position in the human-occupiable workspace near the live electrical power conductor; based on the data center rack being at the position, moving a first electrical connector that is mounted on the data center rack to electrically contact the planar conductor surface that receives the DC power from the grid of orthogonally criss-crossing electrical conductors, the planar conductor surface extends two-dimensionally across a width and a length of the human-occupiable workspace of the data center at a height above the plurality of data center racks, the planar conductor surface defining a ceiling that is secured to a structure of the data center and extends above all of the human-occupiable workspace; based on the data center rack being at the position, electrically contacting a grounded conductor positioned in the human-occupiable workspace apart from the live electrical power conductor with a second electrical conductor positioned on the rack to complete an electrical power circuit; and providing DC power from the electrical power conductor to a plurality of electronic devices supported by the data center rack based on the completed electrical power circuit.

[0085] The details of one or more implementations of the subject matter described in this disclosure are set forth in the accompanying drawings and the description below. Other features, aspects, and advantages of the subject matter will become apparent from the description, the drawings, and the claims.

CLAIMS

WHAT IS CLAIMED IS:

1. A data center power system, comprising:

a live electrical power conductor assembly configured to carry direct current (DC) power from a power source through a human-occupiable workspace of a data center, the live electrical power conductor assembly comprising a grid of orthogonally criss-crossing electrical conductors that delivers the DC power to a planar conductor surface of the live electrical power conductor assembly that extends two-dimensionally across a width and a length of the human-occupiable workspace of the data center at a height above a plurality of data center racks that support a plurality of electronic devices, the grid of orthogonally criss-crossing electrical conductors and the planar conductor surface defining a ceiling that is secured to a structure of the data center and extends above all of the human-occupiable workspace;

at least one shroud positioned adjacent to and surrounding a first portion of at least one of the electrical conductors, the shroud comprising a barrier to contact to the first portion of the at least one electrical conductor, the shroud positioned to expose a second portion of the electrical conductor to the planar conductor surface;

a grounded conductor positioned in the human-occupiable workspace apart from the electrical power conductor;

a first electrical connector configured to mount to a data center rack that supports a portion of the plurality of electronic devices, the first electrical connector moveable to electrically contact the live conductor surface of the electrical power conductor; and

a second electrical conductor positioned on the rack and configured to electrically contact the grounded conductor.

2. The data center power system of claim 1, wherein at least a portion of the planar conductor surface is exposed to the human-occupiable workspace.

3. The data center power system of claim 2, wherein the first electrical connector is configured to mount to a top portion of the data center rack.

4. The data center power system of claim 1, wherein the grid of criss-crossing electrical conductors is attached to the structure.

5. The data center power system of claim 1, wherein the first electrical connector is biased to move away from the data center rack to electrically contact the planar conductor surface.

6. The data center power system of claim 5, wherein the first electrical connector comprises a pantograph.

7. The data center power system of claim 1, wherein the live electrical power conductor assembly comprises a first live electrical power conductor assembly, the system further comprising a second live electrical power conductor assembly configured to carry DC power from the power source through the human-occupiable workspace of the data center to the planar conductor surface.

8. The data center power system of claim 7, wherein the first electrical connector is moveable to simultaneously electrically contact the planar conductor surface of the first and second live electrical power conductors.

9. A method of delivering direct current (DC) power to a data center rack, comprising:

providing DC power to a live electrical power conductor assembly from a data center power source, the live electrical power conductor assembly comprising a grid of orthogonally criss-crossing electrical conductors that extend through a human-occupiable workspace of a data center, at least one of the electrical conductors comprising at least one shroud positioned adjacent to and surrounding a first portion of the electrical conductor, the shroud comprising a barrier to contact to the first portion of the electrical conductor, the shroud positioned to expose a second portion of the electrical conductor to a planar conductor surface;

moving a data center rack of a plurality of data center racks that support a plurality of electronic devices into a position in the human-occupiable workspace near the live electrical power conductor;

based on the data center rack being at the position, moving a first electrical connector that is mounted on the data center rack to electrically contact the planar conductor surface that receives the DC power from the grid of orthogonally criss-crossing electrical conductors, the planar conductor surface extends two-dimensionally across a width and a length of the human-occupiable workspace of the data center at a height above the plurality of data center racks, the planar conductor surface defining a ceiling that is secured to a structure of the data center and extends above all of the human-occupiable workspace;

based on the data center rack being at the position, electrically contacting a grounded conductor positioned in the human-occupiable workspace apart from the live electrical power conductor with a second electrical conductor positioned on the rack to complete an electrical power circuit; and

providing DC power from the electrical power conductor to a plurality of electronic devices supported by the data center rack based on the completed electrical power circuit.

10. The method of claim 9, wherein moving the first electrical connector comprises moving the first electrical connector away from a top portion of the data center rack to electrically contact the planar conductor surface exposed to and extending through the human-occupiable workspace above the top portion of the data center rack.

11. The method of claim 9, wherein the grid of criss-crossing electrical conductors is attached to the structure of the data center.

12. The method of claim 9, wherein moving the first electrical connector comprises biasing the first electrical connector away from the data center rack to electrically contact the planar conductor surface with a biasing device.

13. The method of claim 12, wherein the biasing device comprises a pantograph.

14. The data center power system of claim 4, wherein the live electrical power conductor assembly comprises a first live electrical power conductor assembly, the system further comprising a second live electrical power conductor assembly configured to carry DC power

from the power source through the human-occupiable workspace of the data center to the planar conductor surface.

15. The data center power system of claim 14, wherein the first electrical connector is moveable to electrically contact the planar conductor surface to receive DC power from the first and second live electrical power conductors.

16. The data center power system of claim 1, wherein the DC power comprises between 750 VDC and 1000 VDC.

17. The data center power system of claim 16, wherein the DC power is transformed from the 750 DC to 1000 VDC power to a lower DC power value at the plurality of data center racks.

18. The data center power system of claim 17, further comprising at least one rack stop configured to position at least a portion of the plurality of data center server racks in the human-occupiable workspace.

19. The method of claim 9, wherein the DC power comprises between 750 VDC and 1000 VDC.

20. The method of claim 19, further comprising transforming the 750 DC to 1000 VDC power to a lower DC power value at the plurality of data center racks.

21. The method of claim 20, further comprising positioning at least a portion of the plurality of data center server racks in the human-occupiable workspace with at least one rack stop.