CLAIMS

What is claimed is:

1. A network exposure function (NEF) apparatus comprising:
a transceiver; and
a processor, wherein the transceiver and the processor are configured to:
receive, from an application function (AF), a discovery request for vertical federated learning (VFL), the discovery request indicative of selection criteria;
discover, based on the discovery request, one or more network data analytics functions (NWDAFs) to support a VFL operation for the selection criteria;
select, from the one or more NWDAFs, a list of candidate NWDAFs as VFL clients for the VFL operation;
transmit, to the AF, a discovery response including the list of candidate NWDAFs as VFL clients; and
transfer signaling for sharing VFL training data and feedback between the AF and each candidate NWDAF VFL client from the list of candidate NWDAFs.

2. The NEF apparatus of claim 1, wherein the selection criteria include an analytics identifier (ID), a list of requested analytics services, and a list of requested features.

3. The NEF apparatus of claim 2, wherein the selection criteria further includes at least one of: a time period of interest or a service area for the VFL operation.

4. The NEF apparatus of claim 1, wherein the transceiver and the processor are further configured to:
query a network repository function (NRF) to discover the one or more NWDAFs based on the selection criteria.

5. The NEF apparatus of claim 3, wherein the transceiver and the processor are further configured to:
select the list of candidate NWDAFs based on one or more network function (NF) profiles indicating VFL support for the analytics ID and for the list of requested features.

6. The NEF apparatus of claim 1, wherein the discovery response comprises at least one of: a list of identifiers associated with the list of candidate NWDAFs, and a list of supported features associated with the list of candidate NWDAFs.

7. The NEF apparatus of claim 1, wherein the transceiver and the processor are further configured to:

receive, from the AF after transmitting the discovery response, a VFL initiation request including an indication of a final set of VFL clients selected from the list of candidate NWDAFs.

8. The NEF apparatus of claim 7, wherein the VFL initiation request further includes a list of wireless transmit/receive units (WTRUs) to be used for VFL training.

9. The NEF apparatus of claim 7, wherein the transceiver and the processor are further configured to:

forward the VFL initiation request to each NWDAF VFL client in the final set of VFL clients.

10. The NEF apparatus of claim 1, wherein the transceiver and the processor are further configured to:

select one of the candidate NWDAFs, having an aggregation capability for aggregating a plurality of intermediate results from other NWDAF VFL clients, as a representative federated learning NWDAF (FL_NWDAF) for handling a service request from the AF.

11. A method performed by a network exposure function (NEF) apparatus, the method comprising:

receiving, from an application function (AF), a discovery request for vertical federated learning (VFL), the discovery request indicative of selection criteria;

discovering, based on the discovery request, one or more network data analytics functions (NWDAFs) to support a VFL operation for the selection criteria;

selecting, from the one or more NWDAFs, a list of candidate NWDAFs as VFL clients for the VFL operation;

transmitting, to the AF, a discovery response including the list of candidate NWDAFs as VFL clients; and

transferring signaling for sharing VFL training data and feedback between the AF and each candidate NWDAF VFL client from the list of candidate NWDAFs.

12. The method of claim 11, wherein the selection criteria include an analytics identifier (ID), a list of requested analytics services, and a list of requested features.

13. The method of claim 12, wherein the selection criteria further includes at least one of: a time period of interest or a service area for the VFL operation.

14. The method of claim 11, further comprising:

querying a network repository function (NRF) to discover the one or more NWDAFs based on the selection criteria.

15. The method of claim 12, further comprising:

selecting the list of candidate NWDAFs based on one or more network function (NF) profiles indicating VFL support for the analytics ID and for the list of requested features.

16. The method of claim 11, wherein the discovery response comprises at least one of: a list of identifiers associated with the list of candidate NWDAFs, and a list of supported features associated with the list of candidate NWDAFs.

17. The method of claim 11, further comprising:

receiving, from the AF after transmitting the discovery response, a VFL initiation request including an indication of a final set of VFL clients selected from the list of candidate NWDAFs.

18. The method of claim 17, wherein the VFL initiation request further includes a list of wireless transmit/receive units (WTRUs) to be used for VFL training.

19. The method of claim 17, further comprising:

forwarding the VFL initiation request to each NWDAF VFL client in the final set of VFL clients.

20. The method of claim 11, further comprising:

selecting one of the candidate NWDAFs, having an aggregation capability for aggregating a plurality of intermediate results from other NWDAF VFL clients, as a representative federated learning NWDAF (FL_NWDAF) for handling a service request from the AF.