

CLAIMS

1. Method of providing a user (1, 2, 3) with a user session, wherein the user session requires the operation of a plurality of software applications processed by a system (100), the system operating with the user in a client/server mode, a plurality of software applications being linked to at least a part of a user context related to the user session, characterized in that it comprises the following steps performed with at least one data processor:
- for each user session, each software application that is linked to at least a part of a user context is processed by a dedicated application server (A1, A2,...) among a group (20, 30, 40, 50) of application servers (A1, A2,...) processing each independently that software application, defining thereby for each session a set of application servers (A3, B8, C4) having each an affinity with the user session,
 - providing each application server having an affinity with the user session with data storage means configured to store the part of the user context linked to the application software that is processed by said each application server,
 - at one or more routing means (10, 11, 12), one among the one or more routing means being a main routing means (10) in charge of the user session: receiving at least a request from the user and routing transactions of the user session toward at least the application servers (A3, B8, C4) having an affinity with the user session in order to fulfill the request, the step of routing transactions comprising:
 - assigning to the user session a correlation record (DCX) arranged to comprise Affinity Keys, each Affinity Key indicating an application server that has an affinity with the user session for a given software application,
 - propagating the correlation record with each transaction, allowing thereby the routing means (10, 11, 12) to read the correlation record for targeting the application servers (A3, B8, C4) that have an affinity with the user session and that process the software applications relevant to handle the transaction.
2. The method according to the preceding claim, wherein the one or more routing means (10, 11, 12) is configured to know how to reach every single application servers (A3, B8, C4).

3. The method according to any one of the preceding claims, wherein the correlation record is stored in data storage means associated to the main routing means (10).
- 5 4. The method according to any one of the preceding claims, wherein the main routing means (10) is the routing means (10, 11, 12) that receives the request from the user.
- 10 5. The method according to any one of the preceding claims, wherein the Affinity Keys are set by the routing means (10, 11, 12).
- 15 6. The method according to any one of the preceding claims, wherein the routing means (10, 11, 12) is an enterprise service bus (ESB).
- 20 7. The method according to any one of the preceding claims, wherein a routing means (10, 11, 12) receives, from an application server processing a software application, a transaction along with the correlation record assigned to the user session; then routes the transaction to another application server processing another software application, the step of routing the transaction comprises a step wherein the routing means (10, 11, 12) reads the correlation record.
- 25 8. The method according to the preceding claim, wherein upon reception of the correlation record at said routing means (10, 11, 12), if the correlation record does not contain an Affinity Key indicating said other application server, then the step wherein said routing means (10, 11, 12) routes the transaction to another application server comprises the following step: the routing means (10, 11, 12) determines if a life duration of the part of the user context linked to said other software application must be linked to the life duration of the user session.
- 30 9. The method according to any one of the two preceding claims, wherein upon reception of the correlation record at said routing means (10, 11, 12), if the correlation record does not contain an Affinity Key indicating said other application server and if a life duration of the part of the user context linked to said other software application must be linked to a life duration of the user session, then the step wherein

said routing means (10, 11, 12) routes the transaction to another application server comprises the additional following steps:

- said routing means (10, 11, 12) sends to the main routing means (10) a request for affinity initialization,
- 5 – then the main routing means (10):
 - selects said other application server among the group of application servers (B1, B2,...) that processes said other software application,
 - enriches the correlation record with an Affinity Key indicating said other application server,
 - 10 ○ sends to said other application server a message of affinity initialization,
 - receives from said other application a confirmation of affinity initialization,
 - sends the correlation record as enriched to said routing means (10, 11, 12),
- 15 – then said routing means (10, 11, 12) routes the transaction to said other application server according to the Affinity Key of the correlation record as enriched.

10. The method according to claim 8, wherein upon reception of the correlation record at said routing means (10, 11, 12), if the correlation record does not contain the Affinity Key indicating said other application server and if the life duration of the part of the user context linked to said other software application does not have to be linked to the life duration of the user session, then the step wherein the routing means (10, 11, 12) routes the transaction to said other application server comprises the additional following step: said routing means (10, 11, 12) selects said other application server among the group of application servers (B1, B2,...) that processes said other software application and routes the transaction to said other application server.

30 11. The method according to the preceding claim, wherein the correlation record is enriched with the Affinity Key indicating said other application server.

12. The method according to the preceding claim, wherein the correlation record is enriched by said routing means (10, 11, 12) and wherein the correlation record is

returned to the main routing means (10) and stored in data storage means associated to the main routing means (10).

5 13. The method according to claim 7, wherein upon reception of the correlation record at said routing means (10, 11, 12), if the correlation record already contains the Affinity Key indicating said other application server, then said routing means (10, 11, 12) routes the transaction according to the Affinity Key.

10 14. The method according to any one of the preceding claims, wherein an application server receives a transaction from a routing means (10, 11, 12), generates a part of the user context through processing the transaction and stores the part of the user context in data storage means provided with said application server.

15 15. The method according to the preceding claim, wherein the application server enriches the correlation record with an Applicative Context Key which allows retrieving from said application server said part of the user context.

20 16. The method according to the preceding claim, wherein the correlation record as enriched with the Applicative Context Key is sent to the main routing means (10) and is stored in data storage means associated to the main routing means (10).

25 17. The method according to any one of the two preceding claims, wherein upon reception at said application server of a further transaction related to said user session, said application server locates said part of the user context in said storage means based on the Applicative Context Key.

30 18. The method according to any one of claims 1 to 9, wherein if a life duration of a part of the user context linked to a software application must be linked to a life duration of the user session, then a stateful conversation is open between the main routing means (10) and the application server processing said software application as long as the user session is active, the stateful conversation being automatically closed upon ending of the user session.

35 19. A non-transitory computer-readable medium that contains software program instructions, where execution of the software program instructions by at least

one data processor results in performance of operations that comprise execution of the method as in any one of the preceding claims.

20. System (100) for providing a user (1, 2, 3) with a user session,
5 comprising a plurality of software applications, the operation of which being required for providing the user session, at least one of the software applications being linked to at least a part of a user context related to the user session,
characterized in that it comprises:
- 10 ○ a plurality of machines comprising each at least a processor,
 - a plurality of application servers (A1, A2,...) running each on a machine, each application server being arranged so that for that user session each software application is processed by one application server among a group (20, 30, 40, 50) of application servers (A1, A2,...) dedicated to that software application, defining thereby for each user session a set of application servers (A3, B8, C4) having each an affinity
15 with the user session,
 - data storage means associated to each application server that processes a software application linked to a part of the user context, each storage means being arranged to store the part of the user context that is linked to the software application that is processed by the application server associated to said storage means,
 - 20 ○ one or more routing means (10, 11, 12), among which a main routing means (10) (10) is arranged to be in charge of the user session, the one or more routing means (10, 11, 12) being configured to:
receive at least a request from the user and route transactions of the user session toward the application servers (A3, B8, C4) having an affinity with the user session in
25 order to fulfill the request, the routing means (10, 11, 12) being configured so that the transaction step comprises:
 - assigning to the user session a correlation record (DCX) arranged to comprise Affinity Keys, each Affinity Key indicating an application server that has an affinity with the user session for a given software application,
 - 30 ○ propagating the correlation record with each transaction, allowing thereby the routing means (10, 11, 12) to read the correlation record for targeting the application servers (A2, B3, C2) that have an affinity with the user session and that process the software applications relevant to handle the transaction.

CLAIMS

1. A method of providing a user with a user session in a distributed computing environment comprising a plurality of first application servers each having a first identity and
5 a first software application, the method comprising:

receiving a first request from a user at a first routing device as part of the user session;

assigning at the first routing device a correlation record to the user session;

determining with a processor of the first routing device that the first software

10 application is required to process a first transaction relating to the first request;

selecting with the processor of the first routing device one of the first application servers to process the first transaction;

enriching with the processor of the first routing device the correlation record with a

first reference that designates the identity of the first application server selected to

15 process the first transaction;

routing the first transaction and the correlation record from the first routing device to

the first application server with the identity designated by the first reference; and

processing the first transaction with the first software application at the first

20 application server with the identity designated by the first reference.

2. The method of claim 1, further comprising:

storing the correlation record at the first routing device.

3. The method of claim 1 wherein processing the first transaction with the first software
25 application at the first application server with the identity designated by the first reference further comprises:

generating user context when the first software server processes the first transaction using the first software application; and

30 storing the user context at the first application server with the identity designated by the first reference.

4. The method of claim 3 further comprising:

enriching the correlation record with a second reference that designates that the user context is stored at the first application server with the identity designated by the first

35 reference; and

returning the correlation record containing the first reference and the second reference to the first routing device.

5. The method of claim 4 further comprising:

during the user session, receiving a second request from the user at the first routing device;

determining at the first routing device that the second request requires a second transaction using the first software application;

reading the first reference from the correlation record;

sending the second transaction and the correlation record from the first routing device to the first application server identified by the first reference; and

processing the second transaction with the first software application at the first application server identified by the first reference.

6. The method of claim 5 wherein processing the second transaction with the first software application at the first application server identified by the first reference further comprises:

reading the second reference from the correlation record at the first application server identified by the first reference; and

retrieving the user context based upon the second reference for use in processing the second transaction at the first application server identified by the first reference.

7. The method of claim 1 wherein the distributed computing environment further comprises a second plurality of application servers each having a second identity and a second software application executing on each of the second plurality of application servers, and further comprising:

during the user session, receiving a second transaction for the second software application from the first application server at a second routing device;

selecting with the second routing device one of the second application servers to process the second transaction;

enriching the correlation record with a second reference that designates the identity of the second application server selected to process the second transaction; and

returning the correlation record containing the first reference and the second reference from the second routing device to the first routing device.

8. The method of claim 7 further comprising:

routing the second transaction and the correlation record from the second routing device to the second application server identified by the second reference; and

processing the second transaction with the second software application at the second application server.

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9. The method of claim 1 wherein the distributed computing environment further comprises a plurality of second application servers each having a second identity and a second software application executing on each of the second plurality of application servers, and further comprising:

10 during the user session, receiving a second transaction for the second software application and the correlation record from the first application server identified by the first reference at a second routing device;

determining at the second routing device that the second transaction will generate user context; and

15 based upon the determining, calling the first routing device to select one of the second application servers to process the second transaction that will generate the user context.

10. The method of claim 9 further comprising:

20 selecting at the first routing device one of the second application servers to process the second transaction that will generate the user context;

enriching the correlation record at the first routing device with a second reference that designates the identity of the second application server selected to process the second transaction; and

25 communicating the correlation record with the second reference to the second routing device.

11. The method of claim 10 further comprising:

30 reading at the second routing device the second reference from the correlation record; and

routing the second transaction from the second routing device to the second application server identified by the second reference.

12. The method of claim 10 further comprising:

35 before routing the second transaction from the second routing device to the second application server identified by the second reference, sending a message from the first

routing device to the second application server identified by the second reference to open a stateful conversation with the first routing device.

13. The method of claim 12 further comprising:

5 when the user session ends, closing the stateful conversation.

14. The method of claim 1 further comprising:

when the user session ends, deleting the correlation record at the first routing device.

10 15. A non-transitory computer-readable medium that contains software program instructions, where execution of the software program instructions by at least one data processor results in performance of operations that comprise execution of the method as in claim 1.

15 16. A distributed computing environment comprising:

a plurality of first application servers each having a first identity and a first software application; and

a first routing device comprising a processor configured to receive a first request from a user as part of a user session, to assign a correlation record to the user session, to
20 determine that the first software application is required to process a first transaction relating to the first request, to select one of the first application servers to process the first transaction, to enrich the correlation record with a first reference that designates the identity of the first application server selected to process the first transaction, and to route the first transaction and the correlation record from the first routing device to the first application
25 server with the identity designated by the first reference,

wherein the first application server with the identity designated by the first reference is configured to process the first transaction with the first software application.

17. The distributed computing environment of claim 16 wherein the first routing device
30 further comprises storage coupled with the processor, the storage configured to store the correlation record.

18. The distributed computing environment of claim 17 wherein the first application server with the identity designated by the first reference is configured to store the user
35 context, to enrich the correlation record with a second reference that designates that the

user context is stored, and to return the correlation record containing the first reference and the second reference to the first routing device.

19. The distributed computing environment of claim 18 wherein the first routing device is further configured to receive a second request from the user during the user session, to determine that the second request requires a second transaction using the first software application, to read the first reference from the correlation record, and to send the second transaction and the correlation record from the first routing device to the first application server identified by the first reference,

wherein the first application server with the identity designated by the first reference is configured to process the second transaction with the first software application.

20. The distributed computing environment of claim 18 wherein the first application server with the identity designated by the first reference is configured to process the first transaction with the first software application by reading the second reference from the correlation record at the first application server identified by the first reference, and retrieving the user context based upon the second reference for use in processing the second transaction at the first application server identified by the first reference.

21. The distributed computing environment of claim 16 wherein the first application server with the identity designated by the first reference is configured to process the first transaction with the first software application by generating user context when the first software server processes the first transaction using the first software application, and storing the user context at the first application server with the identity designated by the first reference.

22. The distributed computing environment of claim 16 comprising:

a second plurality of application servers each having a second identity and a second software application executing on each of the second plurality of application servers; and

a second routing device configured to receive a second transaction for the second software application from the first application server, to select one of the second application servers to process the second transaction, to enrich the correlation record with a second reference that designates the identity of the second application server selected to process the second transaction, and to return the correlation record containing the first reference and the second reference from the second routing device to the first routing device.

23. The distributed computing environment of claim 22 wherein the second routing device is configured to route the second transaction and the correlation record to the second application server identified by the second reference,

5 wherein the second transaction is processed with the second software application at the second application server.

24. The distributed computing environment of claim 16 comprising:

10 a second plurality of application servers each having a second identity and a second software application executing on each of the second plurality of application servers; and

15 a second routing device configured to a second transaction for the second software application and the correlation record from the first application server identified by the first reference during the user session, to determine that the second transaction will generate user context, and to call the first routing device to select one of the second application servers to process the second transaction that will generate the user context.

25. The distributed computing environment of claim 24 wherein the first routing device is configured to select one of the second application servers to process the second transaction that will generate the user context, to enrich the correlation record with a second reference
20 that designates the identity of the second application server selected to process the second transaction, and to communicate the correlation record with the second reference to the second routing device.

26. The distributed computing environment of claim 25 wherein the second routing
25 device is configured to read the second reference from the correlation record and to route the second transaction from the second routing device to the second application server identified by the second reference.

27. The distributed computing environment of claim 25 wherein the first routing device is
30 configured to send a message to the second application server identified by the second reference to open a stateful conversation with the first routing device.

28. The distributed computing environment of claim 27 wherein the first routing device is
35 configured to close the stateful conversation when the user session ends.

29. The distributed computing environment of claim 16 wherein the first routing device is

configured to delete the correlation record at the first routing device when the user session ends.