(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
02 July 2020 (02.07.2020)

WIPO | PCT

(10) International Publication Number
WO 2020/136427 A1

(51) International Patent Classification:
G06F 9/50 (2006.01) *G06F 9/48* (2006.01)
G06F 21/52 (2013.01)

(21) International Application Number:
PCT/IB2018/060697

(22) International Filing Date:
28 December 2018 (28.12.2018)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant: **ATOS INTERNATIONAL GERMANY GMBH** [DE/DE]; Otto-Hahn-Ring 6, 81739 München (DE).

(72) Inventors: **CHAMARTY, Prashant**. **HALBHERR, Ulrike**.

(74) Agent: **DEBAY, Damien**; DEBAY IP, 126 Résidence Elysée 2, 78170 La Celle St Cloud (FR).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,

(54) **Title:** CLOUD ASSESSMENT TOOL

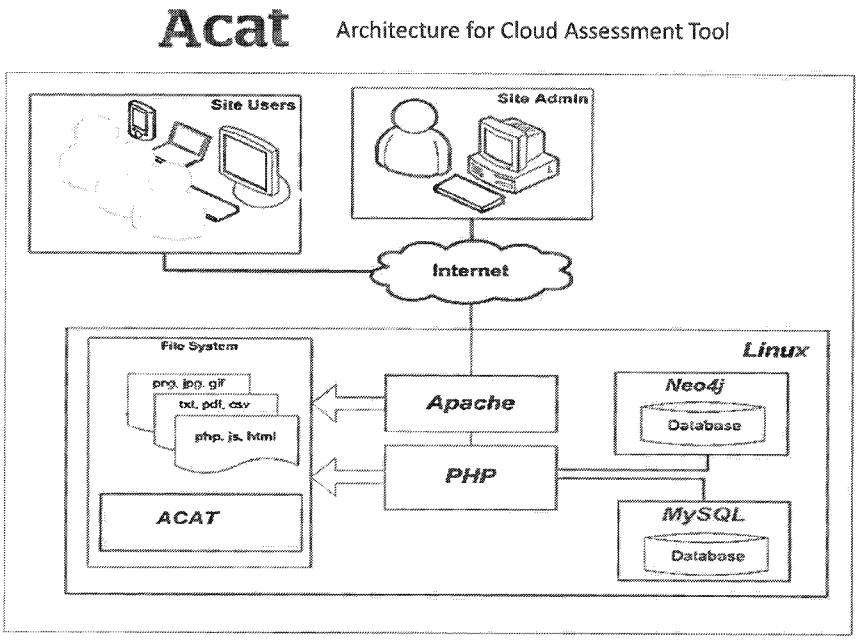


Figure 1A

(57) **Abstract:** A multi-tenant, multi-user computer executed Cloud Assessment Tool on a server for the evaluation of a plurality of subject applications for migration to the cloud, implementing a method comprising the steps of:- executing, on at least one or more computers a cloud migration application discovery tool, wherein the cloud migration application discovery tool is configured by way of a first program to let user from its premise capture application inventory data on inventory wizard, each inventory data being associated with a subject application among plurality of applications to be inventoried and comprising a limited number of application attributes fields to be filled in (in the present case 38) and to store the captured application inventory data of each users in 5 isolated capture Buckets of a separate secure assessment database for each user;- analyzing, by an analysis module executed on at least one or more computers of a cloud, a plurality of user-defined objectives for application cloud migration obtained via a user interface and filtering module.

WO 2020/136427 A1

[Continued on next page]

TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

— *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*

CLOUD ASSESSMENT TOOL

TECHNICAL FIELD OF THE INVENTION

[0001] The invention relates to the field of **Cloud Assessment Tool** for enterprise applications.

STATE OF THE PRIOR ART

[0002] Due to the evolution of virtualization technologies in recent years, Cloud platform systems are more and more used to run applications. However theses platforms can be public such as Amazon's AWS®, Microsoft Azure®, but also private or hybrid. Hybrid cloud system combines private and public cloud in a tailored cloud infrastructure to ensure agility, value and sustainable performance. However public and private clouds do not share the same infrastructure and functionality(ies).

[0003] The benefits of cloud are clear, but businesses have to make critical decisions as to where they run their workloads. This may raise difficulties for not highly skilled staff in this field.

[0004] Highly skilled staff is required on set-up environments and enabling of enterprise applications.

[0005] US 2018191599 discloses a computer implemented method for the evaluation of migration of application to the cloud evaluates subject applications by executing an application discovery tool to capture application inventory data associated with the subject applicationsand to store the captured application inventory data. The method uses a set of predetermined cloud risk probability (CRISP) categories based on the user-defined objectives;
The method determine a weightage of each of the set of predetermined CRISP categories included in the application inventory data.

[0006] However this method is not provided through a web service.

[0007] Moreover this method need for each application to use cloud risk probabilities which are not well known to current user.

[0008] Finally this method does not enable user to make quick decision on batch of applications, so as to avoid populating considerable amount of attributes for discovering a no fit reply.

[0009] Enterprises continue to recognize the benefits of cloud migration, such as increased scalability and the option to access a range of services for big data, serverless computing and more. But an application migration to the public cloud is not a process to rush, there are several steps a Decision Factory (DF) consultant must take in advance and Cloud Factory (CF) must take care while moving to cloud. Also support after migrating an application off premises will change and the support team must be trained for new way of working. DF consultant must evaluate each application for its suitability for moving to cloud and how much it will cost on a cloud and whether it will continue to meet performance expectations on new platform. Enterprises may be able to take advantage of cloud native features in some cases, for some cases it may be required to refactor or redesign an application to take advantage of cloud-native features. Also, in other cases, they might determine that certain compliance requirements or dependencies justify leaving an application in the data center(Retain) and the work doesn't stop there.

[00010] In consequence, there is no single centralized end to end procedure to guide the overall application deployment across disparate infrastructures.

DISCUSSION OF THE INVENTION

[00011] The present invention therefore has the object of proposing A Cloud Assessment Tool (ACAT) which is a multi-tenant, multi-user web based application and repository to support the Decision Factory by collecting information about the customer's current application landscape and assessing it from a cloud suitability point of view, giving the possibility of overcoming at least one portion of the drawbacks of the prior art. This first goal of the invention is obtained by:

[00012] A multi-tenant, multi-user computer Cloud Assessment Tool on a server for the evaluation of a plurality of subject applications for migration to the cloud, implementing a method comprising the steps of:

- executing, on at least one or more computers a cloud migration application discovery tool, wherein the cloud migration application discovery tool is configured

by way of a first program to let user from its premise capture application inventory data on inventory wizard , each inventory data being associated with a subject application among plurality of applications to be inventoried and comprising a limited number of application attributes fields to be filled in (in the present case 38) and to store the captured application inventory data of each users in 5 isolated capture Buckets of a separate secure assessment database for each user;

- analyzing, by an analysis module executed on at least one or more computers of a cloud, a plurality of user-defined objectives for application cloud migration obtained via a user interface and filtering module .

[00013] According an other feature, the multi-tenant, multi-user computer executed Cloud Assessment Tool server which comprises a **Multi-tenant database (MySQL) cooperating with the server** and wherein each tenant's data is isolated and remains invisible to other tenants.

[00014] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool is comprising a filtering module is executed on a limited set of predetermined attributes categories for grouping by batch said applications having the same set;
and determining, via an evaluating engine, executed on at least one or more computers of a cloud, the applications in batches (waves) based on the values of the limited set of attributes fields included in the application inventory data; and
generating results in a first step corresponding to a fit or no fit decision for cloud migration and eliminating said applications in case of no fit.

[00015] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool is comprising a filtering module executed on the whole set of predetermined attributes categories and grouping by batch said applications having the same set;
determining, via an evaluating engine, executed on at least one or more computers of a cloud, the applications in batches (waves) based on the values of the whole set of attributes fields included in the application inventory data respectively for each application of the batch and establishing a recommendation for :
The best fitting target cloud platform ;

The primary and potentially second best fitting cloud transformation path ; and enabling user to use a web decision factory tool to overrule the recommendations of a cloud service assessment provider to overwrite the recommendations.

[00016] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool, wherein the buckets are concerning each a following item

1) application details
2) Business considerations
3) demographics
4) implementation details
5) workload quality profile.

[00017] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool, wherein a feature on the server is generating a secure expiring URL which is sent to the user and allow assessment tool included in the process of Decision Factory consultants to share this URL directly with the Customer's application owner requesting the user to populate the attributes.

[00018] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool wherein the use of buckets enable the evaluation engine to associate several applications with similar attribute value in a batch.

[00019] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool, wherein attributes concerning "application details" are displayed in an attribute creation wizard displaying « access control » item with for each attribute a definition and an associated scroll menu of values in which user makes its selection among the offered possibilities; a first attribute is concerning "category" and for each category attribute a plurality of value definition tools such as BI tool, and a second attribute is "type" which can be associated with a plurality of reply value forming application inventory data such as for example "client server Application" and are saved in the application details bucket.

[00020] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool, wherein attributes concerning « business consideration » are displayed in an attribute creation wizard with for each attribute a definition and an associated scroll menu of values in which user makes its selection among the offered possibilities; the 14 (fourteen) attributes are concerning the following items: business relevance; age of application; life expectancy; EQLD driven business; current service level monitored; Application support and maintenance FTE; application availability requirements; Interruption frequency; Interruption reasons; current recovery point objectives; current delivery time; data residency; data confidentiality and compliance and for each attribute a plurality of attribute value definitions adapted to the attribute ; each of the attributes definitions and values forming application inventory data associated with each attribute are saved in the business consideration bucket.

[00021] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool, wherein 4 (four) attributes concerning « demographics considerations» are displayed in an attribute creation wizard with for each attribute a definition and an associated scroll menu of values in which user makes its selection among the offered possibilities; the 4 (four) attributes are concerning: number of authenticated user; country; geographical scope; internal/external facing; and for each attribute a plurality of attribute value definitions adapted to the attribute ; each of the attributes definitions and values forming application inventory data associated with each attribute are saved in business consideration bucket.

[00022] A According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool, wherein 13 (thirteen) attributes concerning « implementation» are displayed in an attribute creation wizard with for each attribute a definition and an associated scroll menu of values in which user makes its selection among the offered possibilities; the 13 (thirteen) attributes are concerning: development responsibility; commercial-off-the-shelf COTS customization; source code available; infrastructure environment; infrastructure virtual; number of server; number of integration; enterprise authentication; platform; middleware; data stores; scalability; operating systems; hardware architecture; dependencies; and for each attribute a

plurality of attribute value definitions adapted to the attribute ; each of the attributes definitions and values forming application inventory data associated with each attribute are saved in business consideration bucket.

[00023] According an other feature, the multi-tenant, multi-user computer Cloud Assessment, wherein 3 (three) attributes concerning « workload quality profile » are displayed in an attribute creation wizard with for each attribute a definition and an associated scroll menu of values in which user makes its selection among the offered possibilities; the 3 (three) attributes definition are concerning: worlload variation; latency sensitivity ; IO intensity; and for each attribute a plurality of attribute value definitions adapted to the attribute ; each of the attributes definitions and values forming application inventory data associated with each attribute are saved in business consideration bucket.

[00024] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool, wherein analysis module consist of a Decision factory module comprising of set of analytical tools and methods used to determine the best mix of private, public, and managed cloud deployment models (for key application workloads.

[00025] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool, wherein the Cloud Factory assessment module consists of a set of transformation processes, tools and skills used to move Customer's key applications to selected target cloud platform and service model at Customer's pace.

[00026] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool wherein on selecting in the wizard menu of the inventory wizard tool the item "Application" and in the displayed list the item "List", Application → List, a list of all the applications will be displayed in which :

User can view or define list of applications along with its country, application owner, attribute completion status, activity details and actions, or

User can view or define the number of projects that the application is associated with below the application name or

User can sort applications list in ascending or descending order by clicking column headers like Name, Application Owner, Completion, Activity and Lock Tabs, or

User can lock and unlock application using lock tab, or

User can unlock applications, only if user is a **Client Admin** or **Administrator**, or

User can lock the application only if application completion status is 'COMPLETED'.

[00027] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool wherein on selecting in the wizard menu of the inventory wizard tool the item "Application" and in the displayed list the item "List" and in the list the item Actions and in the list of actions the item Attribute, Application → List →Actions→Attribute, an attributes creation wizard screen will be displayed on user computer and

User can add the data for the attributes using wizards ; wherein

When user has completed all the attributes, the respective application gets locked automatically; and wherein

On click of Save and Next virtual buttons displayed on the user screen, next screen will be displayed and selected attributes are memorized in a separate secure assessment database for each user ; or

On click of Back virtual button displayed on the user screen, user can go back to the previous wizard screen; or

On click of Cancel button displayed on the user screen, data will not be saved for current screen and applications list screen will be displayed.

[00028] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool wherein on selecting in the wizard menu of the inventory wizard tool the item "Application " and in following order "Application "→"List" →"Associate Servers", to finally select item "Associate Server" , an "Application Associate Server screen will be displayed in which

User can add or select number of Servers to be Associated with the application; and wherein

On click of Save Changes virtual button, given number of servers will be

associated with the application and Associated Servers List screen will be displayed; or

On click of Cancel virtual button, Applications List screen will be displayed.

[00029] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool, wherein on selecting in the wizard menu of the inventory wizard tool the item Project → Add, New project can be added by the user;

Step 1 of 3

User can enter name, select the type of project and description

Type of project can be Full ACAT and Rapid DF

On Click of Save and Next virtual button, Step 2 of 3 screen will be displayed.

Step 2 of 3.

User can enter cloud preferences in add project screen.

On Click of Save and Next virtual button, Step 3 of 3 screen will be displayed.

Step 3 of 3

User can select the required PaaS Platforms;

On Click of Cancel, data will not be saved and Projects List screen will be displayed.

[00030] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool method, wherein the recommendation established by evaluating engine are at least one of the following solutions : **Retire ,Retain, Rehost, Refabric, Revise, Rebuild , Replace wherein :**

Retire: This disposition requires to shut down and remove an existing application which is no longer required. Secure disposal of infrastructure hardware and disposal of data will be done in line with company security policies. This may be due to business preference;

Retain: Keep the existing application on its current platform without any change. A date may be set for a next review or for an investigation of the potential of license rationalization, cost reduction or delivery of fixes for existing business problems;

Rehost: Bring physical and virtual workloads (servers) to a hybrid (any combination of public or private) cloud or to non-cloud;

Refabric: Move containers including application packages (.NET, .Jar) to a

new platform using configuration files or minor code changes which are required due to configuration needs.

[00031] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool is establishing recommendation by evaluating engine which are at least one of the following solutions: **Revise, Rebuild, Replace, wherein:**

Revise: Optimize parts of the architecture and code to benefit from the new platform characteristics like better scalability, higher performance and so on;

Rebuild: Rebuild the application on the new platform, either by reinstalling and reconfiguring or discarding code and re-architecting the application to achieve maximum benefits from new platform characteristics like better scalability, higher performance and so on. Update of existing applications/components to newer versions.

Replace: Discard an existing application (or set of applications) and use commercial software delivered as an installable solution or as a SaaS service.

[00032] According an other feature, the multi-tenant, multi-user Cloud Assessment Tool ACAT is using the data to generate with a graph creation module a graph showing the dependency rules between applications group and servers on which applications are run.

[00033] According an other feature, the multi-tenant, multi-user computer Cloud Assessment Tool is further comprising, on the separate computer, at least one rule for a cloud analysis tool (CANT) based on the plurality of user-defined objectives for application cloud migration; and

executing, on the separate computer, the CANT to determine any non-conformities to cloud migration for each application based on the at least one rule.

[00034] According an other feature, the multi-tenant, multi-user Cloud Assessment Tool ACAT when executing the CANT further includes code for determining the time required to resolve the non-conformities to cloud migration for each application based on the at least one rule.

[00035] According an other feature, the multi-tenant, multi-user Cloud Assessment Tool ACAT when executing the CANT further includes code for correcting the non-conformities to cloud migration for each application based on the at least one rule.

[00036] According an other feature, the multi-tenant, multi-user Cloud Assessment Tool ACAT is further receiving non-functional requirements for the applications based on the application inventory data and/or any additional applications for cloud migration via the user interface.

[00037] According an other feature, the multi-tenant, multi-user Cloud Assessment Tool ACAT is further comprising capturing any commercial-off-the-shelf (COTS) applications not discovered by the first program.

[00038] According an other feature, the multi-tenant, multi-user Cloud Assessment Tool ACAT is further comprising code for storing the captured COTS applications in the assessment database

[00039] According an other feature, the multi-tenant, multi-user Cloud Assessment Tool ACAT is further comprising code for receiving at least one cloud reference architecture based at least upon the plurality of user-defined objectives for application cloud migration.

[00040] According an other feature, the multi-tenant, multi-user Cloud Assessment Tool ACAT is further comprising master data & client data which are maintained in different databases,Users, roles & permissions are part of master database and at the time of client creation, client details get stored in master database, when Using id& uid, client specific database gets created. (id-uid) and all client specific table gets created under this database

SHORT DESCRIPTION OF THE FIGURES

[00041] Other features, details and advantages of the invention will become apparent upon reading the description which follows with reference to the appended figures, which illustrate:

- Fig. 1A and 1B, illustrates an overview of the hardware and software architecture of the Cloud assessment Tool providing a cloud assessment service;
- Fig. 2, represents a table of the functions provided by ACAT server;
- Fig. 3, represents a table of 38 application attributes to be captured by user on ACAT service;
- Fig.4 represents a screen display with restricted number of attributes 13 used in RAQ process;
- Fig.5 represents a screen display with the first bucket “basic details” concerning the application named “access control” and the attributes to populate on “basic details” such as : category and type;
- Fig.6 represents a screen display with the second bucket “business consideration” concerning the application named access control and the attributes to populate on business consideration such as: relevance, age, life expectancy, EOL driver, current service level monitored, application support and maintenance, application availability requirements, interruption frequency, interruption reasons, current recovery point objective, current recovery time objective, data residency, data confidentiality,compliance requirements ;
- Fig.7 represents a screen display with the third bucket “demographics” concerning the application named access control and the attributes to populate on “demographics” such as: number of authenticated users, country, geographical scope, internal/external facing;
- Fig.8 represents a screen display with the fourth bucket “implementation” concerning the application named access control and the attributes to populate on “implementation” such as: development responsibility, COTS customization, source code available, infrastructure environment, infrastructure, Number of servers, number of integrations, enterprise

authentication, scalability, platforms, middleware, DataStore, Operating system, Hardware architecture, dependencies;

- Fig.9 represents a screen display with the fifth bucket “workload quality profile” concerning the application named access control and the attributes to populate on “workload quality profile” such as: workload variation, latency sensitivity, IO intensity;

- Fig.10 represents a screen display with an exemple of 38 attributes populated;

- Fig. 11 show a graph display for several move group of applications with a specific color for each group and the indication of the number of servers.

- Fig. 12 represents a Server Move Group Wizard;

DETAILED DESCRIPTION OF DIFFERENT EMBODIMENTS OF THE INVENTION

[00042] Many combinations may be contemplated without departing from the scope of the invention; one skilled in the art will select either one depending on economical, ergonomical, dimensional constraints or others which he/she will have to observe.

[00043] More particularly, according to an embodiment illustrated by fig. 1A and 1B.

[00044] The **Hardware configuration is constituted by a** web server which runs CentOS and Apache and is connected to the database server. ACAT uses mysql and neo4j as database services.

[00045] A Cloud Assessment Tool (ACAT) is developed internally using Open Source technology stack.

[00046] **Linux** - Linux is the lowest-level layer and provides the operating system. Linux actually runs the other components.

[00047] **Apache**- The next layer is Apache, the Web server. Apache provides the mechanics for getting a Web page to a user. Apache is a stable, mission-critical capable server.

[00048] The PHP component sits inside Apache, and Apache and PHP work together to create the dynamic pages for the ACAT application.

[00049] **MySQL** - MySQL provides the data-storage. With MySQL, client have access to a very capable database suitable for running large and complex sites. Within the Web application, all the data, content and other types of information will reside in this database in a format that can be easily queried with the SQL language.

[00050] **Neo4j** – Neo4j is open source Graph Database which is highly scalable and schema free (NoSQL). It provides a simple, powerful and flexible data model which can be changed according to applications and uses. It is very easy to retrieve its adjacent node or relationship details without Joins or Indexes because it is a graph database and all nodes are already connected.

[00051] **PHP** - PHP is a simple and efficient programming language. PHP is used to write the dynamic content, capable of accessing the data in the MySQL database and some of the features that Linux provides.

[00052] ACAT provide:

[00053] Efficiency : Accelerates the application cloud assessment process

[00054] Centralised repository : Builds a centralised repository of the client's application landscape.

[00055] Flexibility : Internally developed and hence it can be tailored to suit the assessment requirements .

[00056] Innovation : Implements industrialised approach for application landscape cloud assessment.

[00057] ACAT is a Web based multi-tenant , multi-user tool executed on an hardware and software architecture which Evaluates applications in batches (waves) based on 38 attributes

[00058] Each application is assessed by pre-defined decision rules

[00059] Result of the assessment per application is a recommendation for

- the fitting target cloud platforms
- the primary and potentially second best fitting cloud transformation paths
- and taking into account various customer preferences, captured through “Project”
- Customer Decision Factory stakeholder can overrule the recommendation and the recommendation can be manually overwritten in ACAT

[00060] Therefore the decision rules are the core element of the application

[00061] ACAT Integrates with Infrastructure discovery tool (uCMDB)

[00062] ACAT Recommends server Move Groups based on predefined selection criteria

[00063] ACAT Generates comprehensive report for application disposition, cloud suitability and move group planning

[00064] ACAT is Easy to configure and accommodate new technology/IaaS/PaaS and SaaS platforms

[00065] ACAT Features comprise master data repository /data base that maintains a comprehensive information about various platforms, databases, middleware, operating systems, PaaS platforms and their supported IaaS platforms, cloud profiles for GCP, AWS, Azure and Atos Cloud (CIS, DPC, TAI).

[00066] ACAT is Designed for multi-tenancy – isolate customer's data in a separate secure database.

[00067] In ACAT, rules are defined for AWS, AZURE, GCP, DPC cloud.

[00068] According ACAT Features roles and permissions – Only authorized decision factory consultants have access to a customer's data.

[00069] . The attributes of application landscape can be populated:
either in an excel sheet and imported into ACAT, or
they can be captured through a wizard based form directly in ACAT or
via CSV upload.

[00070] ACAT offers the functionalities described in table figure2: such as the following :

Login
Select Client
Create New Client Request
Dashboard
User Settings
Business Functions
Applications
Projects
Servers
Move group Planning
Reports

[00071] After successful Login, the Select Client screen will be displayed.

[00072] On Client →Assign User, the Assign user screen will be displayed.

[00073] Assign user screen contains list of users.

[00074] User can assign roles to other users, only if the user is **Client Admin** or **Administrator**.

[00075] Using select role tab, authorized user can assign "None", "Client Admin" or "Client Consultant" role to the user.Logged In user cannot update

itself.

[00076] User can select Client from the list and can set the client as default or User can request for a new Client using "**CreateNew Client Request**" link.

- If default client is set by user, he will be redirect to the dashboard screen after login.
- If default client is not set by user, he will be redirect to the Select client screen after login.
- On Click of "**Create New Client Request**" link, Create New Client Request Screen will be displayed.
- On Click of Logout link, User will be logged out from application.

[00077] User can also view Select Client Screen, from Dashboard->Settings->Switch Client.

[00078] After the New Client Request is sent by the user, Admin approves the request by adding the required details.

[00079] After successful set up of new client request, a new client will be created, and user can access it.

[00080] Admin can see and approve the new client requests from Admin ->New Client Requests.

[00081] Admin can also delete the Request, if he doesn't want to approve the Client.

- On click of Setup, Client Setup page is displayed, and the Admin fills the required details.
- On click of Save Changes, the new Client will be approved.
- On click of Cancel, the details will not be saved, and Client Request page will be displayed.

[00082] 38 application attributes captured can be categorized in 5 sections to include the basic application details, business considerations, demographics, implementation details and workload quality profile of the application

- On Application→ Import, new Applications can be added in bulk.
- User can download the template from **Download Template** link.
- Import Application screen allows user to browse the appropriate excel sheet to add applications in bulk.
    - Application Name is a mandatory column.
    - If UniqueID is not provided, it is set same as Application Name.
    - If excel sheet contain multiple records with same UniqueID, previous record will be updated.
    - If Application Name already exists, application will not be added.
    - Application Owner Name should contain only alphabets and spaces.
    - If Invalid Email is provided, Email will not be stored.
- On click of Upload:
    - If the application details are valid, then all the records from the excel sheet will be stored and Applications List screen will be displayed.
    - If any of the application details are not valid, then that application will not be stored and Applications List screen will be displayed.
- User can view Reasons for Failure of the Applications, in **View Imported Applications** Tab.

[00083] On click of Cancel, Applications List screen will be displayed.

[00084] On Application → List →Actions→Attribute Wizard Screen, attributes wizard screen will be displayed.

[00085] User can add the data for the attributes using wizards.

[00086] When user completes all the attributes, the respective application gets locked automatically.

[00087] User will not be able to see the Application-attribute Wizard Screen option in the actions dropdown:

- If the application islocked,

- If the application isassociated with any project(s).

[00088] Application completion status can be 'NOT STARTED','IN PROGRESS' or 'COMPLETED'.

[00089] Once the application is locked and associated with any of the project(s), and if the user wants to change the attribute values, then user needs to Disassociate the application from the associated project(s)and start filling the attributes again.

[00090] User can unlock the application, only if user is a **Client Admin** or **Administrator**.

[00091] On click of Save and next, next screen will be displayed.

[00092] On click of Back, user can go back to the previous wizard screen.

[00093] On click of Cancel, data will not be saved for current screen and applications list screen will be displayed.

[00094] On Application→ Import RAQ, new rapid Applications can be added in bulk.

- User can download the template from "Download Template" link.
- Import rapid application screen allows user to browse the appropriate excel sheet to add applications in bulk.
  - Application Name is a mandatory column.
  - If UniqueID is not provided, it is set same as Application Name.
  - If excel sheet contain multiple records with same UniqueID, previous record will be updated.
  - If Application Name already exists, application will not be added.
- On click of Upload:
  - If the application details are valid, then all the records from the excel sheet will be stored and Applications List screen will be displayed.
  - If any of the application details are not valid, then that application will not be stored andApplications List screen will be displayed.

[00095] User can view Reasons for Failure of the Applications, in **View Imported Rapid Applications**Tab.

[00096] **Excel Sheet template file may be used**: -

- The template contains 13 attribute fields as shown on table on figure 4 and all the fields are mandatory.
- User can add multiple comma sperated values for the following attribute using Technical Reference sheet from the template file:
  - Platforms with versions.
  - Middlewares.
  - Databases with versions.
  - Operating Systems.

[00097] On click of Application →List →Mail URLs, flash message will be displayed as 'URLs are mailed' and URLs are mailed to respective Application Owner's email id.

[00098] URLs are valid for 24 hours. If in case, the Owner doesn't receive the Email for URL, we can resend the URLs upto 3 times within 24 hours for a single Application.

[00099] Beyond maximum limit, Application Owner needs to contact Administrator to request the URL.

[000100] Via Mailed URLs, application owner can Save or Edit application attribute without logging-In to ACAT.

[000101] Once owner fills the application attributes on first screen, further screens will be available on clicking "Save and Next".

[000102] On selection of client, the dashboard is the first view of data collected for the application landscape of the client.

[000103] Project is the collection of applications created by associating applications with the project. This group of application can be of related applications for planning of cloud migration project by project.

[000104] On Dashboard, user can view:

- Recent project accessed,
- Total number of projects,
- Total number of applications,
- Recent application accessed,
- List of 5 recently accessed applications

[000105] The left navigation panel of dashboard contains :

- Clients -
  - Edit Users
  - Assign Users
  - Client Information
- Business Functions –
  - Create business functions
  - List business functions
- Application –
  - Import applications
  - View Imported applications
  - Export
  - Add Applications
  - List Applications
- Servers –
  - Import Servers
  - List Servers
- Project –
  - Add Projects
  - List Projects

[000106] **Multi-tenant database (MySQL):** The term "software multitenancy" refers to a software architecture in which a single instance of software runs on a server and serves multiple tenants. A tenant is a group of users who share a common access with specific privileges to the software instance. Multi-Tenants database architecture is very useful when one instance of database is serving

multiple clients. Each tenant's data is isolated and remains invisible to other tenants.

[000107] In ACAT, master data & client data is maintained in different databases. Users, roles & permissions are part of master database. At the time of client creation, client details get stored in master database. Using id& uid, client specific database gets created. (id-uid). All client specific table gets created under this database.

[000108] **Graph database (Neo4j):**Neo4j is a graph database management system. In Neo4j, everything is stored in the form of either an edge, a node, or an attribute. Each node and edge can have any number of attributes. Both the nodes and edges can be labelled. Labels can be used to narrow searches.

[000109] Nodes -

[000110] Nodes are the main data elements

[000111] They are connected to other nodes via relationships

[000112] Nodes can have one or more properties (i.e., attributes stored as key/value pairs)

[000113] Nodes have one or more labels that describes its role in the graph.

[000114] Relationships -

[000115] Relationships connect two nodes

[000116] Relationships are directional

[000117] Nodes can have multiple, even recursive relationships

[000118] Relationships can have one or more properties (i.e., attributes stored as key/value pairs).

[000119] Properties –

[000120] Properties are named values where the name (or key) is a string

[000121] Properties can be indexed and constrained

[000122] Composite indexes can be created from multiple properties

Labels -

[000123] Labels are used to group nodes into sets

[000124] A node may have multiple labels

[000125] Labels are indexed to accelerate finding nodes in the graph

[000126] Native label indexes are optimized for speed

Advantages of Neo4j Graph database –

[000127] Data types and sources can be added or changed at any time, leading to dramatically shorter development times and true agile iteration.

[000128] Graph processing ensures zero latency and real-time performance, regardless of the number or depth of relationships.

[000129] Retains ACID transactions for fully consistent and reliable data around the clock –

[000130] Data and relationships are stored natively together with performance improving as complexity and scale grow. This leads to server consolidation and incredibly efficient use of hardware.

[000131]

[000132] Server Move Groups are proposed based on the following selection criteria:

Data center
Project & transformation path
Dependencies between the servers
Operating Systems
Maximum Size of a Move Group

[000133] Recommended Move Group can be manually overwritten

[000134] Java based scripts are residing in neo4j database

[000135] ACAT provide a Server Move Group Report and server move group schedule can be planified..

○

[000136] The Users are Granted access by the ACAT team.

[000137] User can have one of the two Roles to access each client.
Client Admin.
Client Consultant

[000138] If User is a **Client Admin** then, User can -

- Add, Edit, Import, Export, List and Delete Applications.
- Add, Edit, Lock and Unlock Application Attributes.
- Add Notes for the Applications.
- View application Version details.
- Import, Associate, List and Delete Servers.
- Add, Edit, List and Delete Projects.
- Associate Applications with Project, List Associated Applications.
- View and Download Summary Report.
- Download Pdf Zip Report.
- Add, Edit, List, **Delete** IaaS, PaaS and SaaS.
- Add, Edit, List, Delete Compliance, Database, Middleware, Operating System.

[000139] If User is a **Client Consultant** then, User can -

- Add, Edit, Import, Export and List Applications.
- Add, Edit, Lock Application Attributes.
- Add Notes for the Applications.
- View application Version details.
- Import, Associate and List Servers.
- Add, Edit, List and Delete Projects.

- Associate Applications with Project, List Associated Applications.
- View and Download Summary Report.
- Download Pdf Zip Report
- List IaaS, PaaS and SaaSList Compliance, Database, Middleware, Operating System.

[000140] The user who requests new client, is given **Client Admin** permission, by Default.

[000141] There are two ways of analysis in ACAT:

Rapid Application Qualification (RAQ) -

Decision Factory (DF) -

[000142] RAQ is a quick analysis of applications based on fewer set of attributes. This helps in filtering the Applications if there is a larger application portfolio.

[000143] Based on the RAQ analysis, some application can be removed with Retire disposition from the application list for Full Decision Factory.

[000144] ACAT can perform Rapid Application Cloud Qualification (RAQ) to determine which applications, based on the minimum level of data captured (13 attributes) according attribute list of table figure 4, are suitable candidates to focus resources and efforts to move to the cloud and on which basis. The aim is to:

- **reduce risk** – by assigning the right resources from both parties at the right time to conduct efficient data capture and accurate, effective analysis
- **create value** – by employing a simplified standard methodology and capturing minimal pertinent data thus reducing people's time and budget
- **create clarity and consensus** – by delivering:
  - fact-based based on minimal required information analysis
  - gaining agreement and consensus from all parties throughout each stage

- determining the focus and approach for transformational planning

[000145] Rapid Application Cloud Qualification delivers cloud transformation recommendations and cloud suitability assessment. The key reasons of the approach are:

- ► Rapid Assessment of application workloads and recommended cloud migration path.
- ► Industrialized service model to estimate transformation costs and efforts based on the key cost drivers e.g. technology, customization level, complexity, stability, etc.
- ► Applications can be excluded from the scope of further analysis based on the certain criteria and assumptions for example:
  - The applications which have reached end of life
  - Based on the Enterprise Architecture, if there is no investment planned on specific applications and it is either be replaced or retired soon.
  - Applications already are SaaS
  - SAP Applications need to be treated separately during the DF

[000146] ACAT can also provide 38 attributes according list of table figure 3 to enable a deeper analysis.

[000147] Decision Factory (DF) is a deep analysis tool of applications considering larger set of attributes.

[000148] The decision logic is dynamic, and continuous changes are applied to decision logic with learnings from DF consultants.

[000149] The current version is stored in the client table when a client is created. The same version is used for analysis when a project is created.

[000150]

[000151] ACAT can also create Move groups based on infrastructure information. Data from Infrastructure discovery tools (uCMDB/ServiceNow/PlatespinRecon) is

analysed by ACAT to recommend server Move Groups based on predefined selection criteria.

Server Move Groups are proposed based on the following selection criteria.

Data center
Project & transformation path
Dependencies between the servers
Operating Systems
Maximum Size of a Move Group

[000152] It provides a graphical view of the move groups

[000153] On Movegroup→Add, New movegroup can be added by the user.

- Step 1 of 5
  - User can enter name, select project type, select DF project and description.
  - Project type will be either Application or Infrastructure.
  - If Application type is selected, user will be asked to select a DF project.
  - Type of project will be the list of DF projects that are added in ACAT.
  - If Infrastructure is selected as the movegroup type, the select DF project field will be disabled.
  - On Click of Save and Next, Step 2 of 5 screen will be displayed.
- Step 2 of 5.
  - User can enter data centers from the available data centers.
  - User also needs to select a target landing zone from the list.
  - On Click of Save and Next, Step 3 of 5 screen will be displayed.
- Step 3 of 5
  - User can select Server environment in which user wants to create a move group.
  - Server environment can be Production, UAT, Test or Development.
  - On selection of server environment, user will be asked to provide a server environment and move group size.
  - User can select Operating System and Server role for server.

- On click of save and next, Step 4 of 5 will be displayed.

- Step 4 of 5
  - User can select the servers from the list.
  - If a user has selected application as the move group type from screen 1, then only those application associated to the selected DF projects and the corresponding servers associated to those applications will be displayed.
  - On click of save and next, Step 5 of 5 will be displayed.
- Step 5 of 5
  - User can set a move group size in GB using this screen.
- On Click of Cancel, data will not be saved, and movegroup List screen will be displayed.
- There is an option of going back to previous step on all the screens.
- On click of save and next, movegroup list will be displayed.

[000154] It will be easily understood upon reading the present application that the particularities of the present invention, as generally described and illustrated in the figures, may be arranged and designed according to a great variety of different configurations. Thus, the description of the present invention and the related figures are not provided for limiting the scope of the invention but simply illustrating selected embodiments.

[000155] One skilled in the art will understand that the technical features of a given embodiment may in fact be combined with features of another embodiment unless the opposite is explicitly mentioned or if it is obvious that these features are incompatible. Further, the technical features described in a given embodiment may be isolated from the other features of this embodiment unless the opposite is explicitly mentioned.

[000156] It should be obvious for persons skilled in the art that the present invention allows embodiments under many other specific forms without departing from the field defined by the scope of the appended claims, these embodiments

should be considered as an illustration and the invention should not be limited to the details given above.

CLAIMS

1. A multi-tenant, multi-user computer executed Cloud Assessment Tool on a server for the evaluation of a plurality of subject applications for migration to the cloud, implementing a method comprising the steps of:

- executing, on at least one or more computers a cloud migration application discovery tool, wherein the cloud migration application discovery tool is configured by way of a first program to let user from its premise capture application inventory data on inventory wizard , each inventory data being associated with a subject application among plurality of applications to be inventoried and comprising a limited number of application attributes fields to be filled in (in the present case 38) and to store the captured application inventory data of each users in 5 isolated capture Buckets of a separate secure assessment database for each user;

- analyzing, by an analysis module executed on at least one or more computers of a cloud, a plurality of user-defined objectives for application cloud migration obtained via a user interface and filtering module .

2. A multi-tenant, multi-user computer executed Cloud Assessment Tool of claim 1 wherein a **Multi-tenant database (MySQL) is cooperating in the server** and each tenant's data is isolated and remains invisible to other tenants.

3. A multi-tenant, multi-user computer executed Cloud Assessment Tool of claim 1 or 2 wherein the filtering module is executed on a limited set of predetermined attributes categories and grouping by batch said applications having the same set;
determining, via an evaluating engine, executed on at least one or more computers of a cloud,the applications in batches (waves) based on the values of the limited set of attributes fields included in the application inventory data; and
generating results in a first step corresponding to a fit or no fit decision and eliminating said applications in case of no fit.

4. A multi-tenant, multi-user computer executed Cloud Assessment Tool of claim 1 to 3 wherein the filtering is executed on the whole set of predetermined attributes categories and grouping by batch said applications having the same set;
determining, via an evaluating engine, executed on at least one or more computers of a cloud, the applications in batches (waves) based on the values of the whole set of attributes fields included in the application inventory data respectively for each application of the batch and establishing a recommendation for :
The best fitting target cloud platform ;
The primary and potentially second best fitting cloud transformation path ;
and enabling user to use a web decision factory tool to overrule the recommendations of a cloud service assessment provider to overwrite the recommendations.

5. A multi-tenant, multi-user computer executed Cloud Assessment Tool of any one claim 1 to 4, wherein the buckets are concerning each a following item
1) application details
2) Business considerations
3) demographics
4) implementation details
5) workload quality profile.

6. A multi-tenant, multi-user computer executed Cloud Assessment Tool of any one of claim 1 to 5, wherein a feature on the server is generating a secure expiring URL which is sent to the user and allow assessment tool included in the process of Decision Factory consultants to share this URL directly with the Customer's application owner requesting the user to populate the attributes.

7. A multi-tenant, multi-user computer executed Cloud Assessment Tool 1 or 6 wherein the use of buckets enable the evaluation engine to associate several

applications with similar attribute value in a batch.

8. A multi-tenant, multi-user computer executed Cloud Assessment Tool of any one of claims 1 to 7, wherein attributes concerning "application details" are displayed in an attribute creation wizard displaying « access control » item with for each attribute a definition and an associated scroll menu of values in which user makes its selection among the offered possibilities; a first attribute is concerning "category" and for each category attribute a plurality of value definition tools such as BI tool, and a second attribute is "type" which can be associated with a plurality of reply value forming application inventory data such as for example "client server Application" and are saved in the application details bucket.

9. A multi-tenant, multi-user computer executed Cloud Assessment Tool. of any one of claims 1 to 8, wherein attributes concerning « business consideration » are displayed in an attribute creation wizard with for each attribute a definition and an associated scroll menu of values in which user makes its selection among the offered possibilities; the 14th attributes are concerning the following items: business relevance; age of application; life expectancy; EQLD driven business; current service level monitored; Application support and maintenance FTE; application availability requirements; Interruption frequency; Interruption reasons; current recovery point objectives; current delivery time; data residency; data confidentiality and compliance and for each attribute a plurality of attribute value definitions adapted to the attribute ; each of the attributes definitions and values forming application inventory data associated with each attribute are saved in the business consideration bucket.

10. A multi-tenant, multi-user computer executed Cloud Assessment Tool of any one of claims 1 to 9, wherein 4 attributes concerning « demographics considerations» are displayed in an attribute creation wizard with for each attribute a definition and an associated scroll menu of values in which user makes its selection among the offered possibilities; the 4 attributes are

concerning: number of authenticated user; country; geographical scope; internal/external facing; and for each attribute a plurality of attribute value definitions adapted to the attribute ; each of the attributes definitions and values forming application inventory data associated with each attribute are saved in business consideration bucket.

11. A multi-tenant, multi-user computer executed Cloud Assessment Tool of any one of claims 1 to10, wherein 13 attributes concerning « implementation» are displayed in an attribute creation wizard with for each attribute a definition and an associated scroll menu of values in which user makes its selection among the offered possibilities; the13 attributes are concerning: development responsibility; commercial-off-the-shelf COTS customization; source code available; infrastructure environment; infrastructure virtual; number of server; number of integration; enterprise authentication; platform; middleware; data stores; scalability; operating systems; hardware architecture; dependencies; and for each attribute a plurality of attribute value definitions adapted to the attribute ; each of the attributes definitions and values forming application inventory data associated with each attribute are saved in business consideration bucket.

12. A multi-tenant, multi-user computer executed Cloud Assessment Tool of any one of claims 1 to 11, wherein 3 attributes concerning « workload quality profile » are displayed in an attribute creation wizard with for each attribute a definition and an associated scroll menu of values in which user makes its selection among the offered possibilities; the 3 attributes definition are concerning: worlload variation; latency sensitivity ; IO intensity; and for each attribute a plurality of attribute value definitions adapted to the attribute ; each of the attributes definitions and values forming application inventory data associated with each attribute are saved in business consideration bucket.

13. A multi-tenant, multi-user computer executed Cloud Assessment Tool of any one of claims 1 to 12, wherein analysis module consist of a Decision factory module comprising of set of analytical tools and methods used to determine the best mix of private, public, and managed cloud deployment models (for key application workloads.

14. A multi-tenant, multi-user computer executed Cloud Assessment Tool of any one of claims 1 to 13, wherein the Cloud Factory assessment module consists of a set of transformation processes, tools and skills used to move Customer's key applications to selected target cloud platform and service model at Customer's pace.

15. A multi-tenant, multi-user computer executed Cloud Assessment Tool of any one of claims 1 to 14 wherein on selecting in the wizard menu of the inventory wizard tool the item "Application" and in the displayed list the item "List", Application → List, a list of all the applications will be displayed in which :

User can view or define list of applications along with its country, application owner, attribute completion status, activity details and actions, or

User can view or define the number of projects that the application is associated with below the application name or

User can sort applications list in ascending or descending order by clicking column headers like Name, Application Owner, Completion, Activity and Lock Tabs, or

User can lock and unlock application using lock tab, or

User can unlock applications, only if user is a **Client Admin** or **Administrator**, or

User can lock the application only if application completion status is 'COMPLETED'.

16. A multi-tenant, multi-user computer executed Cloud Assessment Tool of claim 15, wherein on selecting in the wizard menu of the inventory wizard tool the item "Application" and in the displayed list the item "List"and in the list the

item Actions and in the list of actions the item Attribute, Application → List →Actions→Attribute, an attributes creation wizard screen will be displayed on user computer and

User can add the data for the attributes using wizards ; wherein

When user has completed all the attributes, the respective application gets locked automatically; and wherein

On click of Save and Next virtual buttons displayed on the user screen, next screen will be displayed and selected attributes are memorized in a separate secure assessment database for each user ; or

On click of Back virtual button displayed on the user screen, user can go back to the previous wizard screen; or

On click of Cancel button displayed on the user screen, data will not be saved for current screen and applications list screen will be displayed.

17. A multi-tenant, multi-user computer executed Cloud Assessment Tool of any one of claims 1 to 16, wherein on selecting in the wizard menu of the inventory wizard tool the item "Application " and in following order "Application "→"List" →"Associate Servers", to finally select item "Associate Server" , an "Application Associate Server screen will be displayed in which

User can add or select number of Servers to be Associated with the application;and wherein

On click of Save Changes virtual button, given number of servers will be associated with the application and Associated Servers List screen will be displayed; or

On click of Cancel virtual button, Applications List screen will be displayed.

18. A multi-tenant, multi-user computer executed Cloud Assessment Tool of any one of claims 1 to 17, wherein on selecting in the wizard menu of the

inventory wizard tool the item Project → Add, New project can be added by the user.

- Step 1 of 3
  - User can enter name, select the type of project and description
  - Type of project can be Full ACAT and Rapid DF
  - On Click of Save and Next virtual button, Step 2 of 3 screen will be displayed.
- Step 2 of 3.
  - User can enter cloud preferences in add project screen.
  - On Click of Save and Next virtual button, Step 3 of 3 screen will be displayed.
- Step 3 of 3
  - User can select the required PaaS Platforms.
- On Click of Cancel, data will not be saved and Projects List screen will be displayed.

19. A multi-tenant, multi-user computer executed Cloud Assessment Tool of any claim 1 to 18, wherein the recommendation established by evaluating engine are at least one of the following solutions : **Retire ,Retain, Rehost, Refabric, Revise, Rebuild , Replace wherein :**

Retire

This disposition requires to shut down and remove an existing application which is no longer required. Secure disposal of infrastructure hardware and disposal of data will be done in line with company security policies. This may be due to business preference.

Retain

Keep the existing application on its current platform without any change. A date may be set for a next review or for an investigation of the potential of license rationalization, cost reduction or delivery of fixes for existing business problems.

Rehost

Bring physical and virtual workloads (servers) to a hybrid (any combination of public or private) cloud or to non-cloud

Refabric

Move containers including application packages (.NET, .Jar) to a new platform using configuration files or minor code changes which are required due to configuration needs.

20. A multi-tenant, multi-user Cloud Assessment Tool ACAT of any claim 1 to 19, wherein the recommendation established by evaluating engine are at least one of the following solutions : **Revise, Rebuild, Replace, wherein:**

Revise

Optimize parts of the architecture and code to benefit from the new platform characteristics like better scalability, higher performance and so on.

Rebuild

Rebuild the application on the new platform, either by reinstalling and reconfiguring or discarding code and re-architecting the application to achieve maximum benefits from new platform characteristics like better scalability, higher performance and so on. Update of existing applications/components to newer versions.

Replace

Discard an existing application (or set of applications) and use commercial software delivered as an installable solution or as a SaaS service. An objective could also be to achieve a higher standardization of services.

21. A multi-tenant, multi-user computer executed Cloud Assessment Tool ACAT of any claims 1 to 20 using the data to generate with a graph creation module a graph showing the dependency rules between applications group and servers on which applications are run.

22. A multi-tenant, multi-user computer executed Cloud Assessment Tool ACAT of any claims 1 to 21 further comprising, on the separate computer, at least one rule for a cloud analysis tool (CANT) based on the plurality of user-defined objectives for application cloud migration; and executing, on the separate computer, the CANT to determine any non-conformities to cloud migration for each application based on the at least one rule.

23. A multi-tenant, multi-user computer executed Cloud Assessment Tool ACATof any claims 1 to 22, wherein the executing of the CANT further includes code for determining the time required to resolve the non-conformities to cloud migration for each application based on the at least one rule.

24. A multi-tenant, multi-user computer executed Cloud Assessment Tool of of any claims 1 to 23, wherein the executing of the CCAT further includes code for correcting the non-conformities to cloud migration for each application based on the at least one rule.

25. A multi-tenant, multi-user computer executed Cloud Assessment Tool of any claims 1 to 24, further receiving non-functional requirements for the applications based on the application inventory data and/or any additional applications for cloud migration via the user interface.

26. A multi-tenant, multi-user computer executed Cloud Assessment Tool of any claims 1 to 25, further comprising capturing any commercial-off-the-shelf (COTS) applications not discovered by the first program.

27. A multi-tenant, multi-user computer executed Cloud Assessment Tool of claim 26, further comprising code for storing the captured COTS applications in the assessment database.

28. A multi-tenant, multi-user computer executed Cloud Assessment Tool of any claims 1 to 27, further comprising code for receiving at least one cloud reference architecture based at least upon the plurality of user-defined objectives for application cloud migration.

29. A the multi-tenant, multi-user Cloud Assessment Tool ACAT of claim 2 is further comprising master data & client data which are maintained in different databases, Users, roles & permissions are part of master database and at the time of client creation, client details get stored in master database, when Using id& uid, client specific database gets created (id-uid) and all client specific table gets created under this database

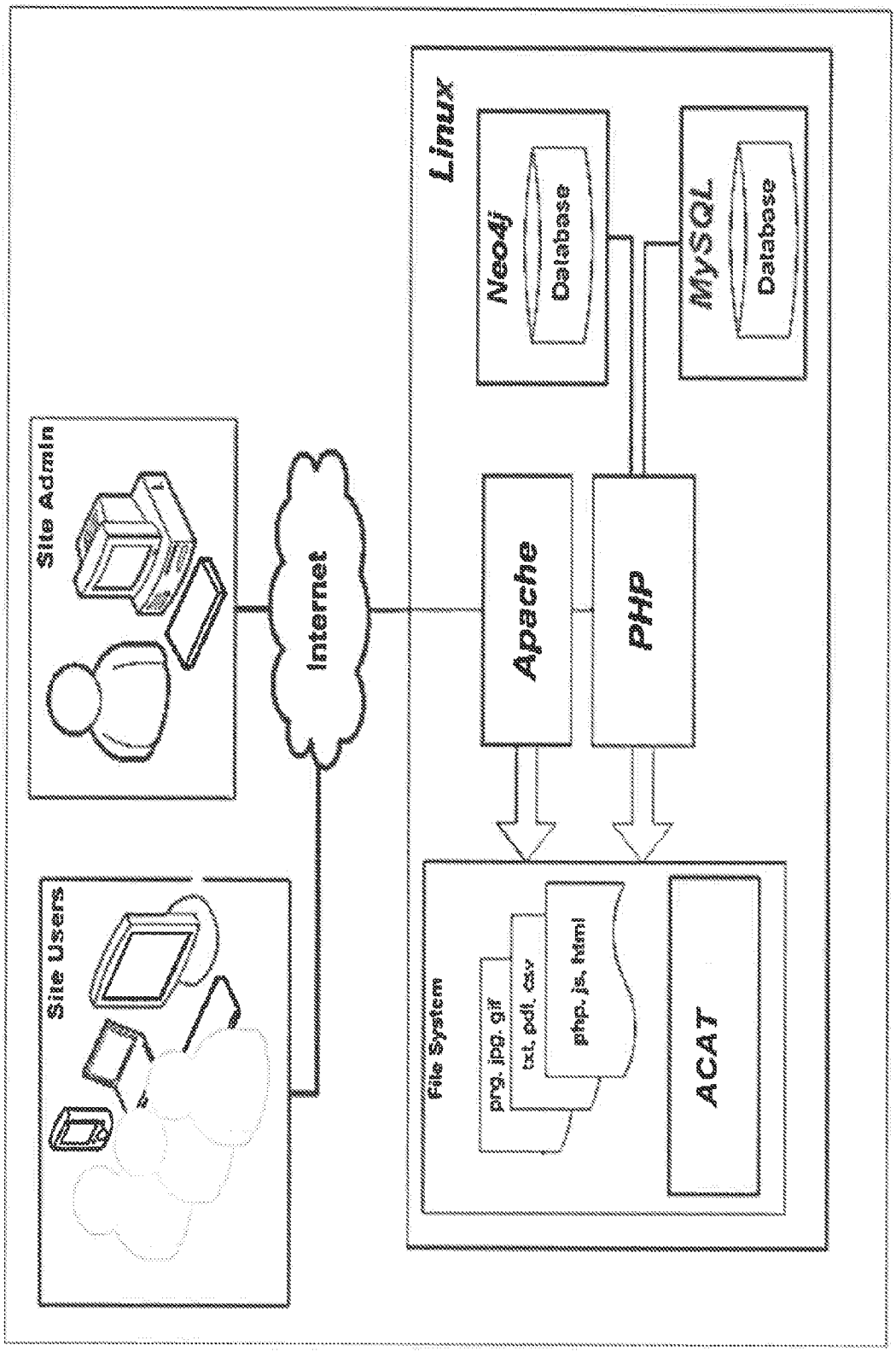

Acat
Architecture for Cloud Assessment Tool
Site Users
Site Admin
Internet
Linux
Apache
PHP
Neo4j
Database
MySQL
Database
File System
prg, jpg, gif
txt, pdf, csv
php, js, html
ACAT

Figure 1A

Figure 1B

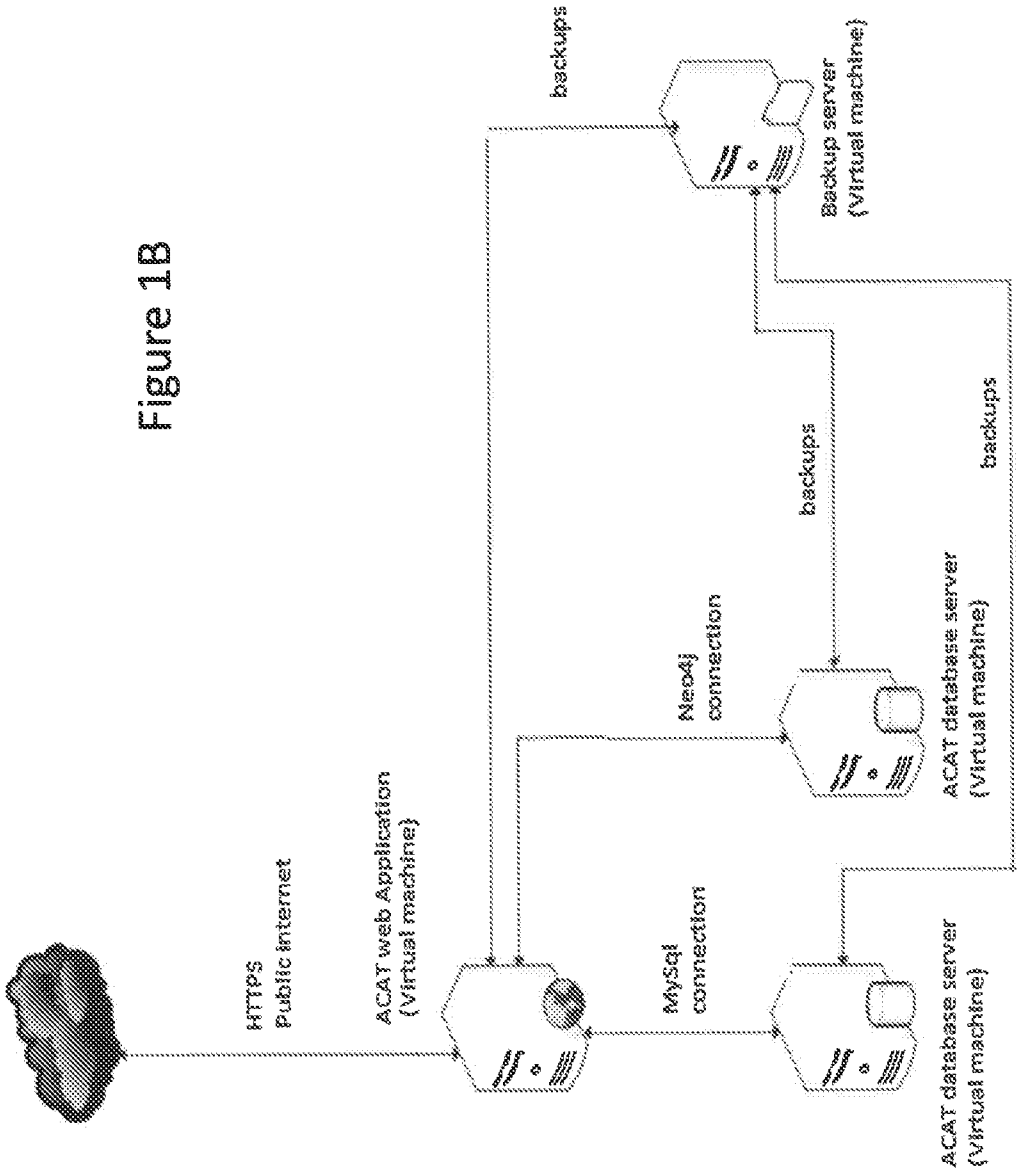

HTTPS
Public Internet
ACAT web Application
(Virtual machine)
MySql
connection
Neo4j
connection
backups
backups
backups
Backup server
(Virtual machine)
ACAT database server
(Virtual machine)
ACAT database server
(Virtual machine)

Table Figure 2

Acat

Functions	Description	
Login	◆ User can Log into ACAT using this screen.	
Select Client	◆ User can Select the Client or Create a new Client.	
Create New Client Request	◆ User can add a newclientrequest using this screen.	
Dashboard	◆ User can view total number of projects, application and recently accessed project and application.	
User Settings	Appendix A.-	Change Password: User can change his password.
	Appendix B.-	Switch Client: User can switch between clients.
	Appendix C.-	Logout from ACAT
Business Functions	Appendix D.-	Create Business Function
	Appendix E.-	Edit Business Function
	Appendix F.-	List Business Function
Applications	Appendix G.-	Import Application
	Appendix H.-	List imported applications
	Appendix I.-	Import Applications for RAQ
	Appendix J.-	List imported rapid applications
	Appendix K.-	Export applications
	Appendix L.-	Add and list applications
Projects	Appendix M.-	Add and list Projects
Servers	Appendix N.-	Import and list Servers
	Appendix O.-	Import dependencies
Move group Planning	Appendix P.-	Add and list Datacenters
	Appendix Q.-	Add and list Target landing zones
	Appendix R.-	Add and list movegroups
	Appendix S.-	Display Wave Planning
	Appendix T.-	Create Move group Schedule
Reports	Appendix U.-	Application Disposition Report
	Appendix V.-	Application Summary Report
	Appendix W.-	Move Group Summary Report

38 Application Attributes Captured

Acat

Table figure 3

BASIC DETAILS	BUSINESS CONSIDERATIONS	DEMOGRAPHICS	IMPLEMENTATION	WORKLOAD QUALITY PROFILE
Category	Business Relevance	Number of Authenticated Users	Development Responsibility	Workload Variation
Type	Age	Country	COTS Customization	Latency Sensitivity
	Life Expectancy	Geographical Scope	Source Code Available	IO Intensity
	EOL Driver	Internal/External Facing	Infrastructure Environment	
	Current Service Level Monitored		Infrastructure	
	Application Support and Maintenance FTE		No of Servers	
	Application Availability Requirements		No of Integrations	
	Interruption Frequency		Enterprise Authentication	
	Interruption Reasons		Scalability	
	Current Recovery Point Objective		Platforms & Version	
	Current Recovery Time Objective		Middleware & Version	
	Data Residency		DataStores & Version	
	Data Confidentiality		Operating Systems & Version	
	Compliance Requirement		Hardware Architecture	
			Dependencies	

Table figure 4 Acat

Following attributes are considered for RAQ -

Details	Business Consideration	Implementation
Type	Age	Data Confidentiality
Development Responsibility	Life Expectancy	Infrastructure Environment
Source Code Available		Infrastructure
		Platforms
		Middleware
		Operating Systems
		Databases
		Hardware

Figure 5

Atos
Signer / Applications / Access Control / Attributes
Edit application attributes
Name
Access Control
Basic Details
Business Consideration
Demographics
Implementation
Workload Quality Profile
Category
BI Tool
Type
Client-Server Application
Cancel
© 2018 Atos v2.0

Figure 6

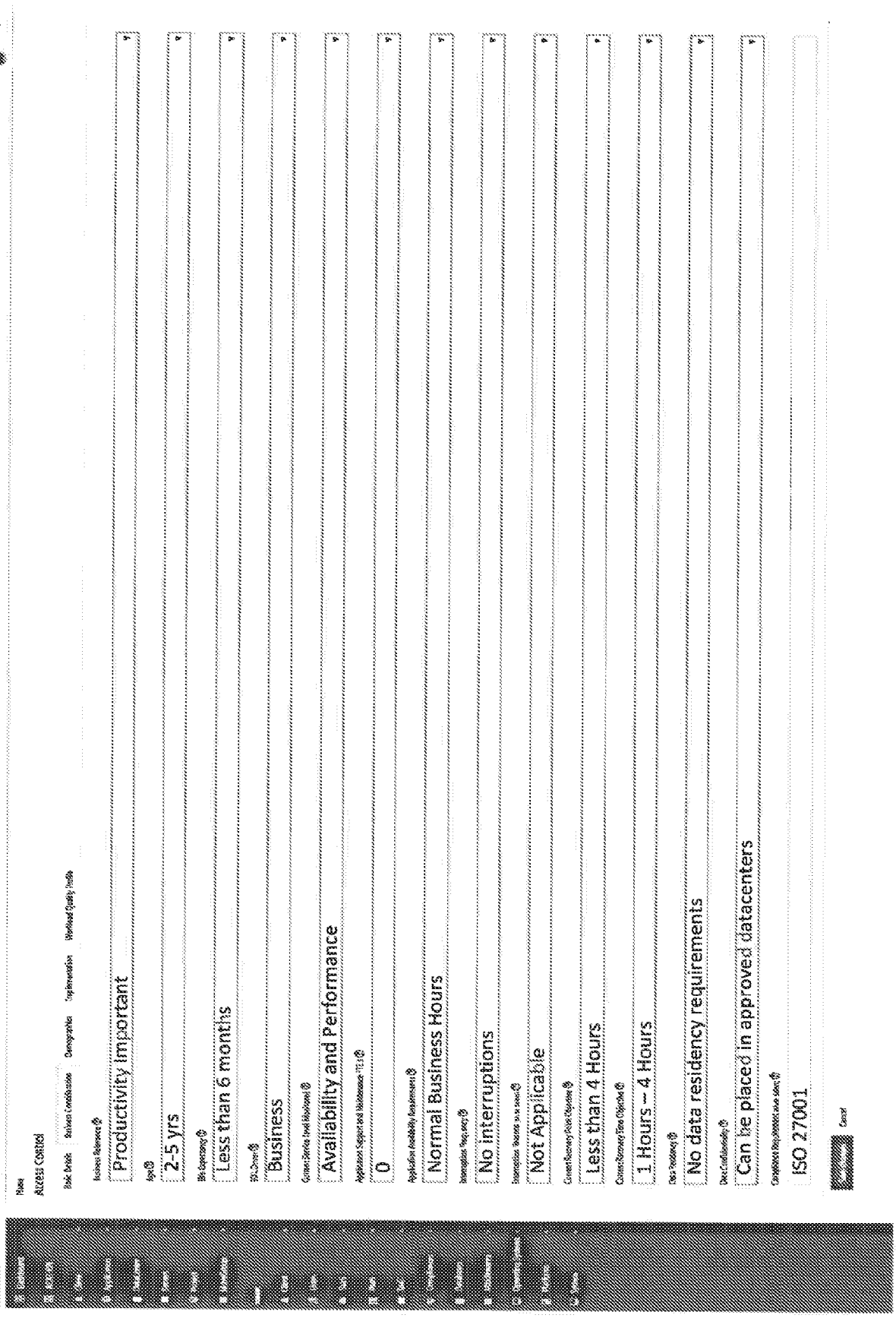
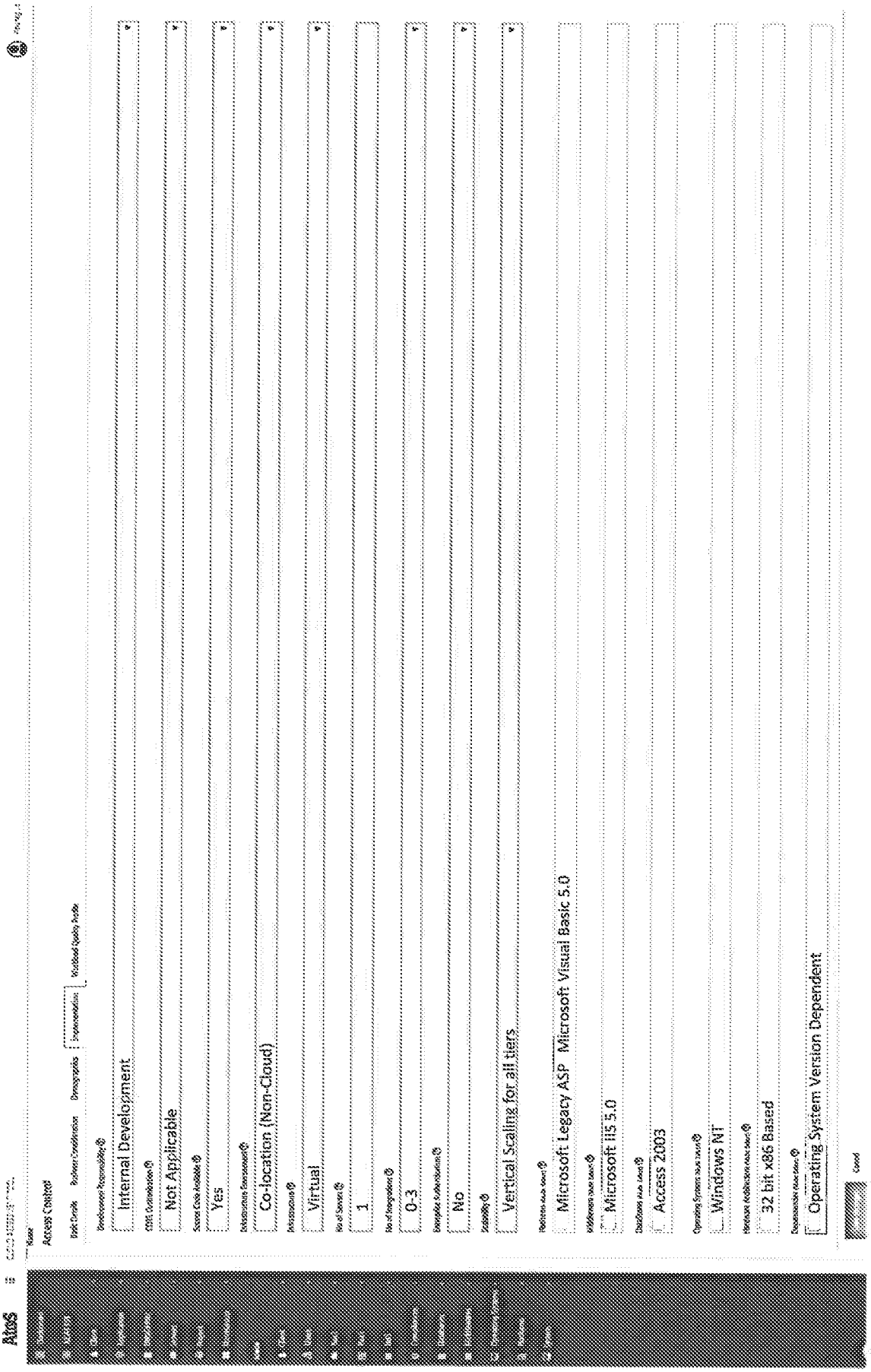

Atos
Plans
ACCESS CONTROL
Productivity important
2-5 yrs
Less than 6 months
Business
Availability and Performance
0
Normal Business Hours
No interruptions
Not Applicable
Less than 4 Hours
1 Hours – 4 Hours
No data residency requirements
Can be placed in approved datacenters
ISO 27001
Cancel

Figure 7

Atos
CLOUD ASSESSMENT TOOL
Anurag Joshi
Dashboard
Assessment
Client
Application
Database
Servers
Storage
Networking
Admin
Client
Users
Soft
Risk
Data
Compliance
Policies
Workflows
Operating System
Name
Access Control
Basic Details
Business Consideration
Demographics
Implementation
Workload Quality Profile
Number of Authenticated Users
Less than 1000
Country
United Kingdom
Geographical Scope
International
Internal/External Facing
Not Applicable
Cancel

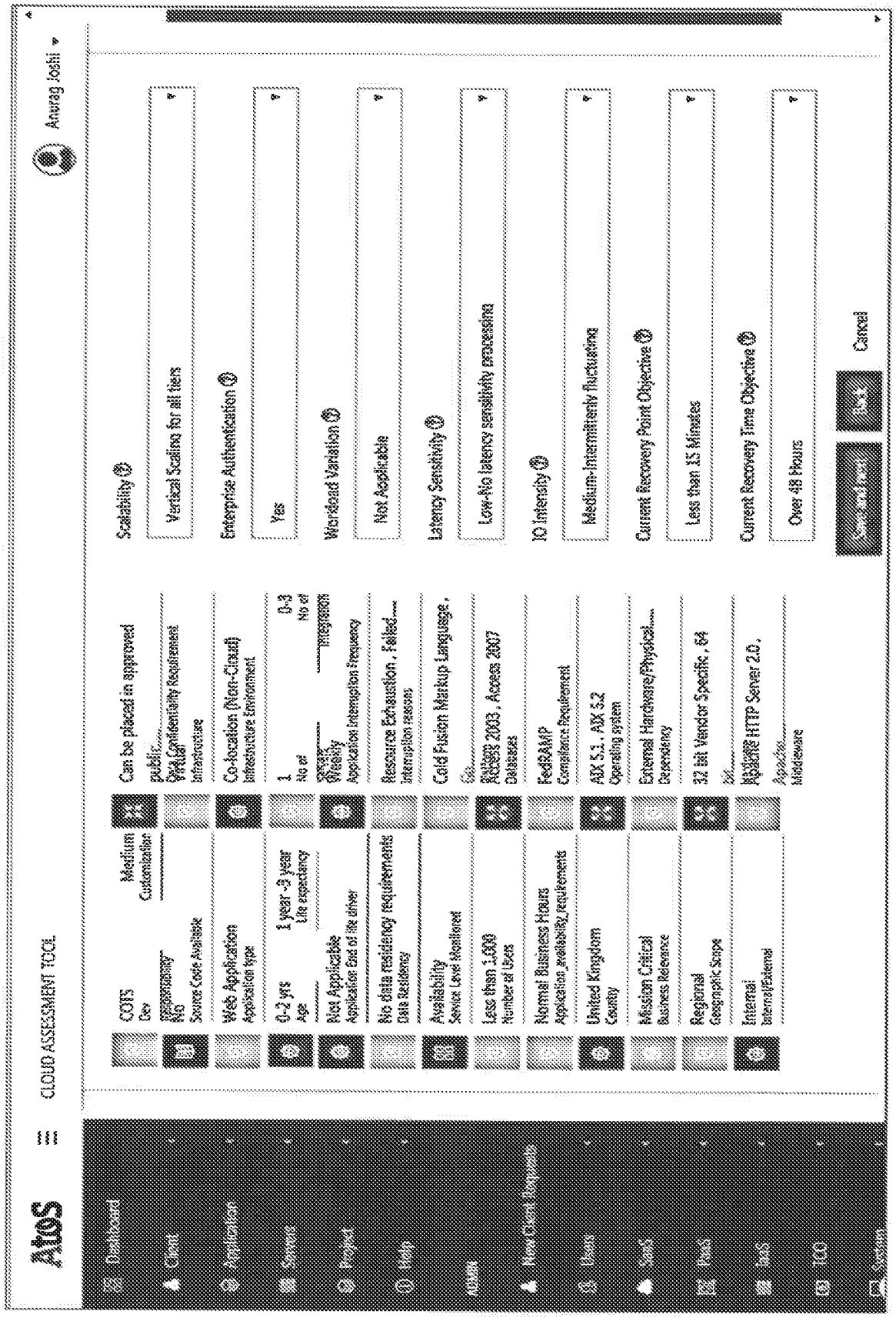
Figure 8


Atos
Access Control
Internal Development
Not Applicable
Yes
Co-location (Non-Cloud)
Virtual
1
0-3
No
Vertical Scaling for all tiers
Microsoft Legacy ASP Microsoft Visual Basic 5.0
Microsoft IIS 5.0
Access 2003
Windows NT
32 bit x86 Based
Operating System Version Dependent

Atos
Name
Access Control
Task Details
Business Consideration
Demographics
Implementation
Workload Quality Profile
Workload Variation
Predictable fluctuating by time and/or volume
Latency Sensitivity
Not Applicable
IO Intensity
Low-Low or few periods of increased I/O rate
Cancel

Figure 9

Figure 10


Atos
CLOUD ASSESSMENT TOOL
Anurag Joshi
Dashboard
Client
Application
Servers
Project
Users
Now Client Requests
Users
Saas
Paas
IaaS
TCO
Custom
COTS
Dev
Medium
Customization
Responsibility
No
Source Code Available
Web Application
Application type
0-2 yrs
Age
1 year -3 year
Life expectancy
Not Applicable
Application End of life driver
No data residency requirements
Data Residency
Availability
Service Level Monitored
Less than 1,000
Number of Users
Normal Business Hours
Application_availability_requirements
United Kingdom
Country
Mission Critical
Business Relevance
Regional
Geographic Scope
Internal
Internal/External
Can be placed in approved
public
Data Confidentiality Requirement
Private
Infrastructure
Co-location (Non-Cloud)
Infrastructure Environment
1
No of
0-3
No of
Integration
Weekly
Application Interruption Frequency
Resource Exhaustion , Failed
Interruption reasons
Cold Fusion Markup Language ,
Etc.
Access 2003 , Access 2007
Databases
FedRAMP
Compliance Requirement
AIX 5.1 , AIX 5.2
Operating system
External Hardware/Physical
Dependency
32 bit Vendor Specific , 64
Bit
Apache HTTP Server 2.0 ,
Apache
Middleware
Scalability
Vertical Scaling for all tiers
Enterprise Authentication
Yes
Workload Variation
Not Applicable
Latency Sensitivity
Low-No latency sensitivity processing
IO Intensity
Medium-Intermittently fluctuating
Current Recovery Point Objective
Less than 15 Minutes
Current Recovery Time Objective
Over 48 Hours
Cancel

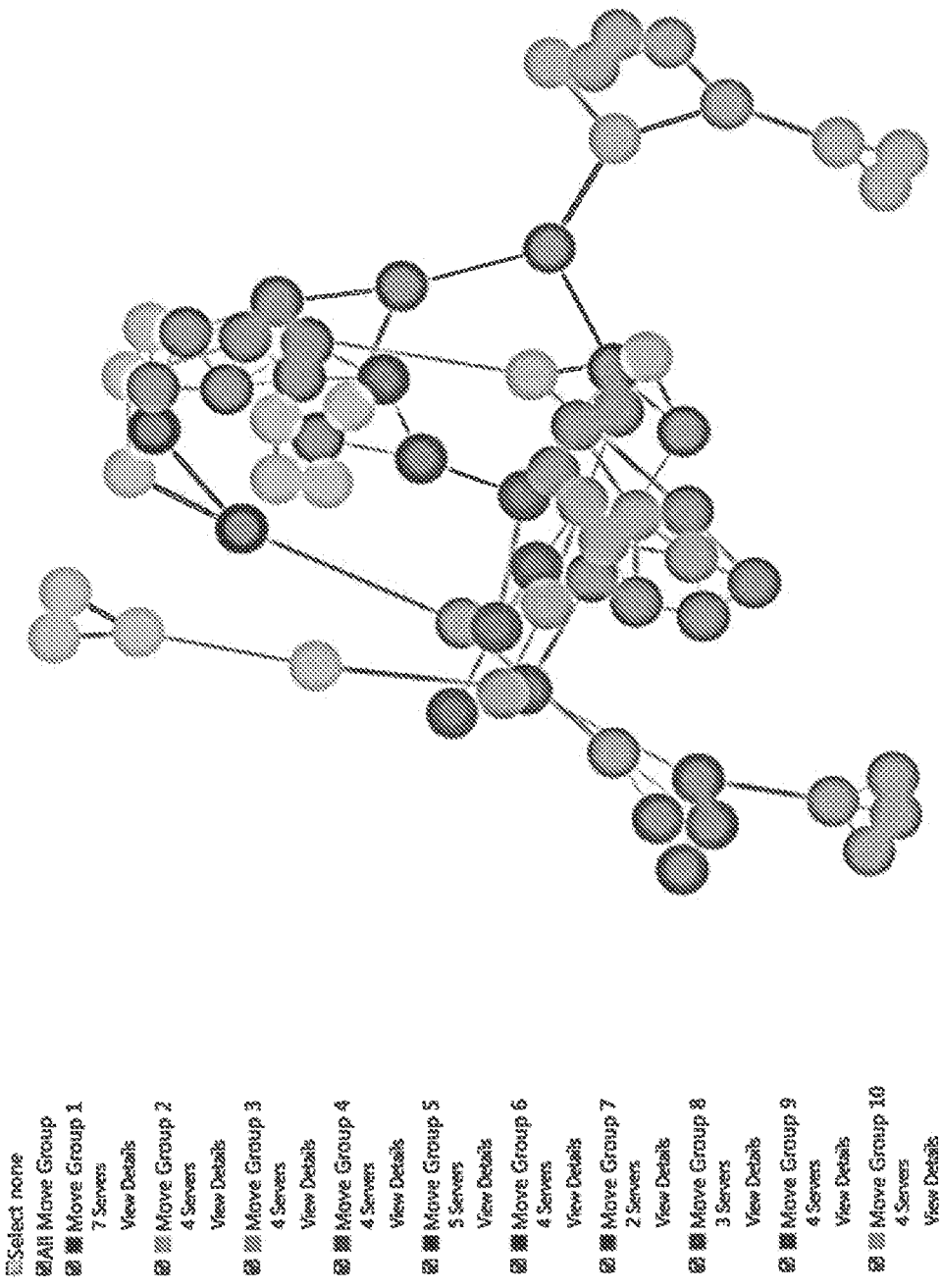
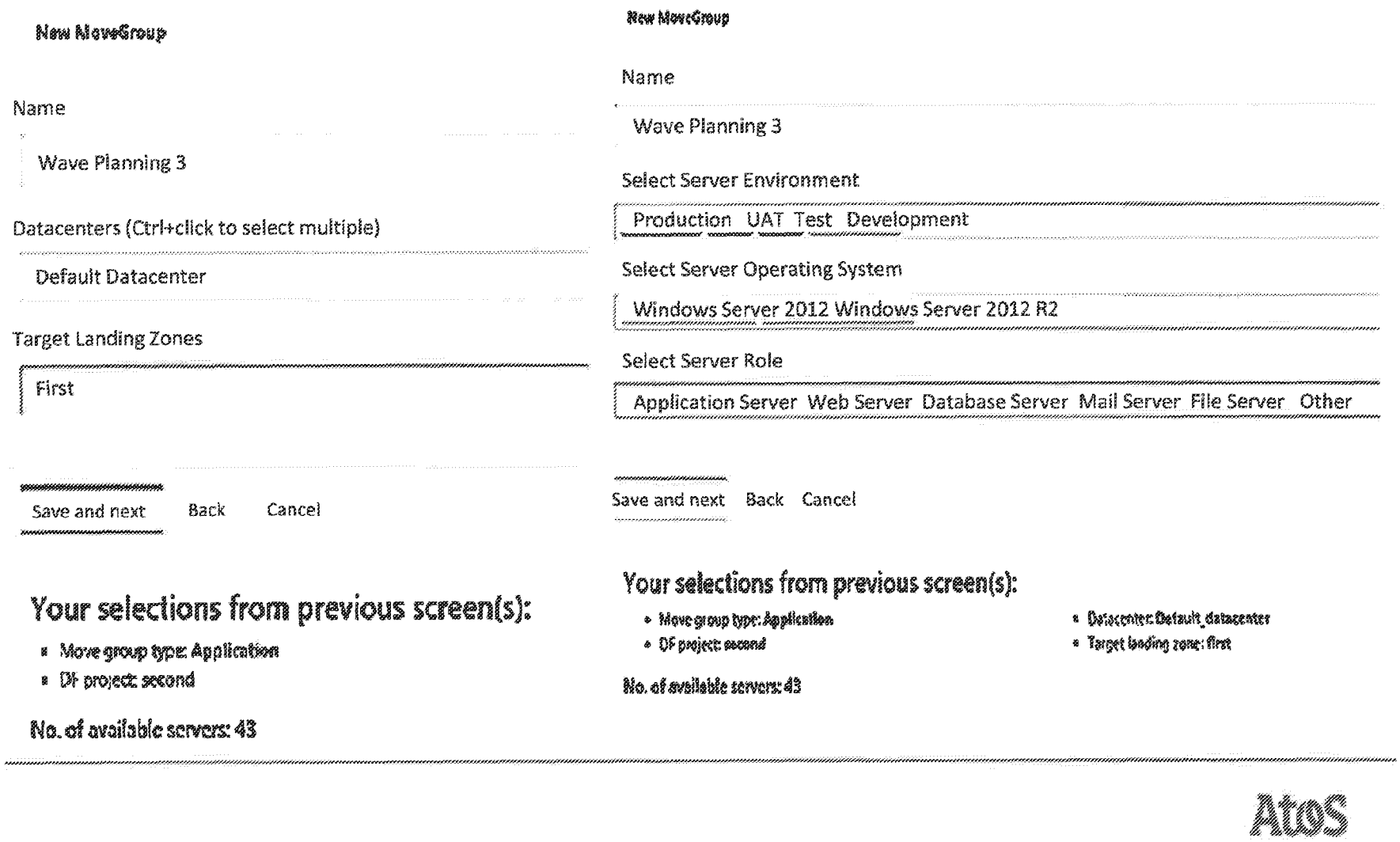

Select none
All Move Group
Move Group 1
7 Servers
View Details
Move Group 2
4 Servers
View Details
Move Group 3
4 Servers
View Details
Move Group 4
4 Servers
View Details
Move Group 5
5 Servers
View Details
Move Group 6
4 Servers
View Details
Move Group 7
2 Servers
View Details
Move Group 8
3 Servers
View Details
Move Group 9
4 Servers
View Details
Move Group 10
4 Servers
View Details

Figure 11

ACAT

Server Move Group Wizard

Figure 12



INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2018/060697

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06F9/50 G06F21/52 G06F9/48
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2018/191599 A1 (BALASUBRAMANIAN ASHOK [IN] ET AL) 5 July 2018 (2018-07-05) cited in the application	1,5,7
Y	paragraphs [0007], [0046] - paragraphs [0047], [0092]	2-4,6,29

Y	US 2012/173581 A1 (HARTIG MARTIN [DE] ET AL) 5 July 2012 (2012-07-05) paragraph [0005]	2,29

Y	EP 2 673 704 A1 (HEWLETT PACKARD DEVELOPMENT CO [US]) 18 December 2013 (2013-12-18) paragraph [0022] - paragraph [0025]	3,4

Y	US 6 564 257 B1 (EMENS MICHAEL LAWRENCE [US] ET AL) 13 May 2003 (2003-05-13) column 1, line 55 - line 67	6

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
31 October 2019	13/11/2019

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Mühlenbrock, Martin

3

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2018/060697

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

2-7, 29(completely); 1(partially)

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☒ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 2, 29(completely); 1(partially)

   "a multi-tenant database is cooperating in the server and each tenant's data is isolated and remains invisible to other tenants" (improving data separation and safety)

   ---

2. claims: 3, 4, 7(completely); 1(partially)

   "determining the applications in batches based on the values of the set of attributes fields included in the application inventory data and establishing a recommendation for the best fitting target cloud platform" (rendering application recommendation processing more efficient)

   ---

3. claims: 5, 6(completely); 1(partially)

   generating a secure expiring URL which is sent to the user and allow to share this URL with the application owner requesting the user to populate the attributes (securing data provision)

   ---

4. claims: 8-12(completely); 1(partially)

   attributes are displayed in an attribute creation wizard with an associated scroll menu of values in which user makes its selection among the offered possibilities (enabling user selection)

   ---

5. claims: 13, 14(completely); 1(partially)

   determining the best mix of private, public, and managed cloud deployment models and for key application workloads moving key applications to selected target cloud platform (improving application processing)

   ---

6. claims: 15-18(completely); 1(partially)

   "a list of all the applications will be displayed in which can perform various operations" (increasing application performance specification)

   ---

7. claims: 19, 20(completely); 1(partially)

   "the recommendation established are of the solutions retire, retain, rehost, refabric, revise, rebuild, replace" (improving application adaptation)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

---

8. claims: 21-28(completely); 1(partially)

"using the data to generate with a graph creation module a graph showing the dependency rules between applications group and servers on which applications are run" (evaluating application dependencies)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2018/060697

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2018191599 A1	05-07-2018	NONE	
US 2012173581 A1	05-07-2012	NONE	
EP 2673704 A1	18-12-2013	CN 103443762 A	11-12-2013
		EP 2673704 A1	18-12-2013
		JP 5766346 B2	19-08-2015
		JP 2014513344 A	29-05-2014
		US 2014223430 A1	07-08-2014
		WO 2012138339 A1	11-10-2012
US 6564257 B1	13-05-2003	NONE	