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(57) Abstract: A table control user interface for monitoring and managing progressive workflows is provided. A progressive workflow may be monitored and managed by a progressive workflow reporting and control module. Information on the status of a progressive workflow may be passed to the progressive workflow reporting and control module, and an interactive table control may be generated for display to and interaction with a user. In each cell of the table control, status information may be provided on a corresponding phase of the monitored and managed progressive workflow. A number of controls may be provided in each cell where each of the controls is associated with different properties and events associated with the corresponding phase. Some of the controls may be in the form of selectable functionalities for allowing interaction with and management of the progressive workflow.

FIG. 1

Table Control Interface Layer

Table Control Build Module

Progressive Workflow Reporting and Control Module

Workflow (Bulk) Module

Workflow (Bulk) Module

Server 1

Server 2

Server 3

Server 4

10
112
115
125
130
135
140
145
150
155
160
Figure 1
TABLE CONTROL FOR PROGRESSIVE WORKFLOW MANAGEMENT

BACKGROUND

[0001] Project and systems developers, deployment personnel and managers are often engaged in developing various systems from computing software and hardware, to telecommunications systems to building constructions, and the like. Many of such projects are characterized as progressive workflows because the projects are developed and deployed in stages or phrases where each stage or phase often builds on or extends from previous stages or phases. For example, in the area of software or computing systems development, a given software system may be developed and deployed in a number of phases that progressively build on each other. For example, an initial number of software builds may be deployed and tested on a small number of computers, followed by successively more complex builds (with additional functionality) until a production build is completed after which the software system may go into production use. Unfortunately, because deployment of different phases of such a system are progressive in nature, it is very difficult to track and manage development and deployment, particularly if deployment involves thousands or more involved systems, for example, thousands or more computing systems on which a developed software system may be deployed.

[0002] There is a need for methods and systems for tracking and managing progressive workflows. It is with respect to these and other considerations that the present invention has been made.
SUMMARY OF THE INVENTION

[0003] This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the detailed description. This summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended as an aid in determining the scope of the claimed subject matter.

[0004] The above and other problems are solved by a table control for monitoring and managing progressive workflows. According to aspects of the invention, a progressive workflow may be monitored and managed by a progressive workflow reporting and control module. Information on the status of a progressive workflow, for example, a software development and deployment workflow, may be passed to the progressive workflow reporting and control module, and an interactive table control may be generated for display to and interaction with a user. In each cell of a plurality of cells comprising the table control, status information may be provided on a corresponding phase of the development and deployment of the monitored and managed progressive workflow. In addition, a number of controls may be provided in each cell where each of the controls is associated with different properties and events associated with the corresponding phase. Some of the controls may be in the form of selectable functionalities for allowing interaction with and management of the progressive workflow.

[0005] The details of one or more aspects of the invention are set forth in the accompanying drawings and description below. Other features and advantages will be apparent from a reading of the following detailed description and a review of the associated drawings. It is to be understood that the following detailed description is explanatory only and is not restrictive of the invention as claimed.
BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The accompanying drawings, which are incorporated in and constitute a part of this disclosure, illustrate various aspects of the present invention.

[0007] Fig. 1 is a simplified block diagram of one example of a system architecture for progressive workflow monitoring and management.

[0008] Fig. 2A is an illustration of a simplified instance of a table control for progressive workflow monitoring and management.

[0009] Fig. 2B is an illustration of an instance of an in-use table control for progressive workflow monitoring and management.

[0010] Fig. 3 is a flowchart of an example method for providing and interacting with a table control for progressive workflow monitoring and management.

[0011] Fig. 4 is a block diagram illustrating example physical components of a computing device with which aspects of the present invention may be practiced.

[0012] Figs. 5A and 5B are simplified block diagrams of a mobile computing device with which aspects of the present invention may be practiced.

[0013] Fig. 6 is a simplified block diagram of a distributed computing system in which aspects of the present invention may be practiced.
DETAILED DESCRIPTION

[0014] The following detailed description refers to the accompanying drawings. Wherever possible, the same reference numbers are used in the drawings and the following description to refer to the same or similar elements. While aspects of the invention may be described, modifications, adaptations, and other implementations are possible. For example, substitutions, additions, or modifications may be made to the elements illustrated in the drawings, and the methods described herein may be modified by substituting, reordering, or adding stages to the disclosed methods. Accordingly, the following detailed description does not limit the invention, but instead, the proper scope of the invention is defined by the appended claims.

[0015] As briefly described above, aspects of the present invention are directed to monitoring and managing a progressive workflow via an interactive table control user interface. For purposes of illustration, aspects of the present invention are described below with reference to the development and deployment of a computer software system. However, as should be appreciated, aspects of the present invention are equally applicable to the monitoring and reporting of information associated with a progressive workflow of any kind where information on development and deployment of features of the progressive workflow are provided to a progressive workflow reporting and control module with which a table control is generated for allowing a user to receive information on and to interact with components of the progressive workflow. That is, any progressive workflow that is characterized by a phased development and deployment of systems from which status information may be obtained and to which automated control may be applied may be monitored and managed via a table control for monitoring and managing progressive workflows, as described herein.
Fig. 1 is a simplified block diagram of one example of a system architecture for progressive workflow monitoring and management. On the right side of Fig. 1, a system 115 is illustrated in which an example software system development and deployment is performed and managed via a table control for monitoring and managing progressive workflows. The system 115 may be illustrative of a large data center in which a number of computing systems are housed and maintained and through which large amounts of data are passed for storage and processing. For example, the system 115 may be illustrative of a large software, data management or telecommunications system services provider and in which various software and hardware systems are developed and deployed for providing various services to customers and subscribers.

Referring still to Fig. 1, a collection of computing servers 150, 155, 160 are illustrative of one or more servers or clusters of servers on which data may be stored and maintained and on which an example software system may be developed and deployed. In association with each example server 150-160 are workflow modules 135, 140, 145 respectively. According to aspects of the invention, the workflow modules 135, 140, 145 are illustrative of workflow build modules through which designers, developers, and implementers design, build and deploy a progressive workflow system, for example, a progressively developed and deployed software system. For example, each of the workflow modules 135, 140, 145 may be illustrative of one or more interconnected and/or networked computing systems with which the example software system is designed, developed and deployed.

The progressive workflow reporting and control module 130 is illustrative of a software module or system operative to receive status information from the workflow modules 135, 140, 145 and for developing an interactive table control for monitoring and managing a progressive workflow, as described herein. In addition to receiving and reporting
status information from the workflow build modules 135, 140, 145 via an interactive table control, the progressive workflow reporting and control module is operative to receive user input through a table control for passing the received input back to the workflow modules 135, 140, 145 for effecting changes to the development and deployment of the progressive workflow in operation.

[0019] The table control build module 125 is illustrative of a software module or system operative to build an interactive table control for monitoring and managing a progressive workflow at the direction of the progressive workflow reporting and control module 130. That is, the table control build module 125 is a software module or system operative to generate and deploy a table control user interface with which a user may receive status information from the progressive workflow reporting and control module and through which the user may interact with the progressive workflow reporting and control module for passing user input back to the workflow modules 135, 140, 145.

[0020] The table control interface layer 120 is illustrative of a software module or system operative to pass the generated table control user interface from the system 115 to a computing device 105 for displaying the generated table control user interface 110 on a display surface of the computing device 105. Once the table control user interface 110 is displayed on the computing device 105, a user may then interact with the table control user interface via the table control interface layer 120 for receiving information from the progressive workflow reporting and control module and for passing user inputs via the table control user interface 110 through the progressive workflow reporting and control module back to the workflow modules 135, 140, 145 for effecting changes to the design, development and deployment of the progressive workflow in operation.

[0021] According to aspects of the present invention, the client computing device 105 may communicate with the system 115 via a distributed computing network 112. The client
computing device 105 may include any suitable computing device such as a desktop computer, laptop computer, tablet-style computer, handheld computing device, mobile computing device, gaming device, and the like. According to an aspect of the invention, the network 112 may include, but is not limited to, a cellular network (e.g., wireless telephone network), a point-to-point dialup connection, a satellite network, the Internet, a local area network (LAN), a wide area network (WAN), a Wi-Fi network, an ad hoc network, or a combination thereof. The network may include one or more connected networks (e.g., a multi-network environment) including public networks, such as the Internet, and/or private networks such as a secure enterprise private network. Access to the network 112 may be provided via one or more wired or wireless access networks as is understood by those skilled in the art.

[0022] Fig. 2A is an illustration of a simplified instance of a table control for progressive workflow monitoring and management. Referring to Fig. 2A, the table control user interface 110 is illustrated with which information about various development and deployment phases of a progressive workflow may be reported and displayed and through which a user may interact with development and deployment systems, for example, the workflow modules 135, 140, 145, as described above with reference to Fig. 1. As will be described below, the table control user interface is a grid-like user interface wherein cells of the user interface may include information about phases of a progressive workflow and controls that are associated with various properties and events that support monitoring and management of phases of the progressive workflow.

[0023] Referring to the table control user interface 110, a number of columns 202, 204, 206, 208, 210, 212 are provided in which information about different phases or stages of a progressive workflow may be provided. Rows 203, 205, 207 are illustrative of rows of data in which information about a particular workflow, for example, a system or project being
developed, are provided such that cells created by the intersection of columns and rows may be used for displaying information about and allowing interaction with a particular phase of a particular progressive workflow (project or system). For example, column 202 may include project or workflow identification information, column 204 may include status information and user input controls for a first progressive workflow phase, column 206 may include status information and user input controls for a second workflow phase, and so on.

[0024] For example, first cell in row 203 includes identification information for a given workflow "620" which may be an identification of a given project, for example, a software application being developed and deployed, a computing system being developed and produced, an architectural system being designed and built, and the like. A second cell 209 is illustrative of a cell in which information may be provided and user input may be received for a first phase of the example progressive workflow.

[0025] Row 205 illustrates a row for an identified product, feature, component, or other aspect of the progressive workflow identified by the identifier "646." A dropdown expander control 216 is illustrated for expanding the row to provide additional rows of information for subcomponents, sub-features, and the like comprising the main feature. For example, the components "646.4," "646.0," "646.1," "646.2," and "646.3" are components, features or aspects of the primary component "646" where each component, feature or aspect may receive development and deployment information via the progressive workflow reporting and control module 130, described above with reference to Fig. 1.

[0026] Referring still to Fig. 2A, according to embodiments, various types of status information may be provided in the cells of the table control user interface 110. In addition to phase identifiers, for example, the product or system version identifier "620.24" provided in the cell 209, additional information may be provided including start dates and end dates data 222 of phase deployment, deployment status information, deployment success and/or
failure information, and the like. For example, referring to cell 211, a product or system version identifier of "620.20" is provided. At the tops of each column, a phase identifier, for example, "Build" or "Ring 0," "Ring 3," or the like is provided for identifying the development and implementation phase associated with each column in the user interface 110. A start time of "02/20" and an end time of "02/22" are provided for indicating a start time for deployment of the identified phase and an end time for deployment of the identified phase.

[0027] In addition, a color-coded progress bar 213 is illustrated above cell 211 for indicating a success and/or failure associated with the development and/or deployment of the identified progressive workflow phase. According to aspects of the present invention, color-coded progress bars 213, 220, 230, 234 may be provided according to different user-defined colors and widths for providing quick reference information for users of the table control user interface 110. For example, a green color-coded progress bar may quickly indicate that, at the designated end time, the identified phase was successfully deployed. A red color-coded progress bar may indicate that the deployment of the identified phase failed. Other color-coded progress bars, for example, yellow or amber, may indicated that an in-progress deployment is experiencing problems, and the like. That is, any number of different color combinations may be used for color-coded progress bars for indicating quick reference information to a user of the table control user interface 110.

[0028] Referring to cell 215, a scope indicator 224 is illustrated for providing information as to the rate and status of deployment of the associated progress workflow phase. That is, the scope indicator 224 may serve as a gauge for showing completion status and rate of completion of a given progressive workflow deployment phase. For example, if the scope indicator 224 indicates a gauge level of 50%, then deployment of the associated phase may be understood by a user as being 50% toward completion. Thus, a quick reference
of the scope indicator 224 may provide a user of the table control user interface immediate information as to the completion status of a phase in question.

[0029] As should be appreciated, when the scope indicator 224 reaches a completion indication, a color-coded progress bar may be deployed over the cell 215 for showing the nature of the phase completion. That is, even though the phase may have reached a completion point, deployment of the progressive workflow phase may have been a failure for any of a number of reasons, and thus, a color-coded progress bar indicating deployment failure may be provided. Otherwise, if at the completion of the phase illustrated in cell 215, deployment of the progressive workflow phase is considered to have been successful, then a color-coded progress bar indicating success, for example, a green bar, may be deployed over the illustrated phase cell.

[0030] Referring still to cell 215, an activation/deactivation button or control 226 is illustrated with which deployment of a given phase may be terminated and/or restarted by a user. That is, during a given progressive workflow phase, a selection of a button/control 226 may cause a termination of the operation of the phase, and a subsequent selection of the button/control 226 may restart the deployment. As should be appreciated, a user may desire to stop a deployment for any number of reasons, for example, for effecting repairs or other changes to the systems being deployed, followed by a restarting of the operation, as desired.

[0031] As should be appreciated, user selection of a functionality provided in a given cell of the table control user interface 110 may provide for signaling back through the network 112 through the table control interface layer 120 to the progressive workflow reporting and control module 130 where the signaling may be interpreted, and where associated commands may be passed to the workflow module 135, 140, 145 associated with the progressive workflow deployment phase for which information is provided in the selected cell.
Referring to cell 217, an indication 228 of "50% Handbrake" is displayed in the cell, and a failure color-coded progress bar 230 is displayed above the cell 217. According to an aspect of the invention, the indicator 228 of "50% Handbrake" is an indication that the deployment phase identified in the cell 217 was manually stopped when the phase was 50% complete, and the color-coded progress bar 230 indicating failure is displayed above the cell 217 to allow a user of the table control user interface to quickly realize that deployment of the identified phase failed (in this case owing to a manual termination of the deployment).

Fig. 2B is an illustration of another instance of a table control user interface for progressive workflow monitoring and management. The table control user interface 110 illustrated in Fig. 2B shows example information for the example development and deployment of different phases of different rollouts of an example software application. For example, under column 202, rollout identifier 232 "15.00.0933" represents a most recent product rollout owing to its position at the top of the user interface 110. The next product identifier of "15.00.0932" represents a next older rollout of the product, and so on. A scrollbar 258 is illustrative of a scrollbar that allows a user to scroll upward or downward for seeing information associated with progressively older or newer product rollouts. That is, if the scrollbar 258 is moved to the bottom of the scrollbar control, the bottom row of information will be associated with the oldest of the product rollouts.

For example, the newest product rollout may be identified in the top row of information, and each cell from left to right may provide information as to the progress of deployment of each succeeding phase of the product rollout. As should be anticipated, if the user interface 110 is scrolled to the bottom of the progressive workflow report, older rollouts may show deployment of all phases from an initial design phase to a production phase where the initial design or build phase information is provided under column 204 and where the
production phase information is provided under column 212, and wherein information for various intermediary phases are provided in columns 206, 208, 210.

[0035] As described above with reference to Fig. 2A, information may be provided in each cell of the user interface 110 for informing a user as to the progress of a phase associated with a given cell. For example, referring to cell 236, for product rollout "15.00.0933," a phase indicator of "933.00" is illustrative of a first deployment phase. A start time and end time of "04/08-04/09" indicates the start time and end time of the deployment. A progress indicator of "100.0%" and a completion indicator of "Passed" indicate that the phase deployment is completely finished and that the phase deployment concluded. In addition, a color-coded progress bar 220 is illustrated above the cell as a further indicator as to the success and/or failure of the phase reported-on in the cell.

[0036] In contrast, referring to cell 233 for the same product rollout, a deployment indicator of "Failed" indicates that the reported-on deployment phase was not successful. An indicator of "FE:0.0%" indicates that some portion of the deployment was directed to the front end components of the product rollout and that 0% of the deployment to the front end components was successful. Similarly, an indicator of "BE:0.0%" is an indicator that 0% of deployment to back end components for the product rollout were successful. In addition, a color-coded progress bar 230 displayed above the cell indicates to a viewing user that the deployment phase was unsuccessful.

[0037] Referring to cell 244, another progress indicator 242 of "Dep. InProgress" indicates that the reported-on phase is in progress. Thus, no color-coded progress bar is indicated pending an outcome of the deployment phase. Referring to cell 238, an additional progress indicator 240 of "Upcoming Build" is indicated and a phase schedule of "ETA 04/08" is indicated for providing an estimated time at which the deployment phase will either begin or be completed.
As should be appreciated, the various controls, properties and information indicators described above are for purposes of example and illustration only and are not limiting of the many other types of controls, properties and information indicators that may be used depending on the type of progressive workflow being monitored and managed. That is, for another type of progressive workflow, for example, the building of component or structure, different types of information may be provided for each phase.

Referring still to Fig. 2B, on the right side of the user interface 110, an information pane or progress pane 250 is illustrated in which may be provided additional information for a given selected phase. For example, upon selection of any cell contained in the user interface 110, detailed information for the progressive workflow phase for which information is provided in the selected cell will be displayed in the information pane or progress 250. For example, selection of the cell 236 may cause population of the information or progress pane 250 with detailed information about the associated deployment phase. For example, a product version identifier "15.00.0933.00" is provided at the top of the information pane or progress 250. Detailed start time and end time 252 is provided, and progress information of "Passed" 254 is provided.

An annotations field 256 is provided in which information may be provided to the user, or in which information may be entered by the user. For example, a previous user of the user interface 110 may have entered information into the annotations field 256 to alert subsequent users of some issue encountered during the associated deployment phase. A present user may add additional annotations to the annotations field 256 for yet additional users to review. According to aspects of the present invention, annotations entered into the annotations field 256 may be passed back through the progressive workflow reporting and control module 130 for storage in association with the workflow module 135 for the progressive workflow at issue. A slider control 260 is illustrated beneath the information
pane 250 for selectively navigating from left to right through the information pane 250 for allowing the user to review additional information contained in the information pane 250.

[0041] Having described a system architecture and example components of aspects of the present invention with respect to Figs. 1, 2A and 2B above, Fig. 3 is a flowchart of an example method for providing and interacting with a table control user interface for progressive workflow monitoring and management. The routine 300 begins at start operation 305 and proceeds to operation 310 where a progressive workflow begins at a server 150, 155, 160 via a workflow module 135, 140, 145, as described above with reference to Fig. 1. As described above, and as should be appreciated, a progressive workflow that may have begun for which status information may be provided via a table control user interface 110 may be any project or deployment of any kind that is progressive in nature for which results may be reported in the user interface 110 and with which may be interacted via the user interface 110.

[0042] At operation 315, various status items associated with the progressive workflow may be reported from the workflow modules 135, 140, 145 to the progressive workflow reporting and control module 130. As described above with reference to Figs. 2A and 2B, such status information may include status of deployments of various phases of the workflow, success and/or failure results of various workflow deployments, and the like.

[0043] At operation 320, the progressive workflow reporting and control module causes the table control build module 125 to build and display the table control user interface 110 and, in turn, causes the population of the table control user interface 110 with information for each reported-on workflow including information on any phases of each reported-on workflow and on the progress of those phases. At operation 325, updated workflow status is received from the workflow modules 135, 140, 145 through the progressive workflow reporting and control module 130, and at operation 330, the display of information in the
cells of the user interface 110 is updated accordingly. For example, if the status of a particular phase of a given workflow changes from being in progress to being complete then a status indicator in the associated cell may change from a status of "In Progress" to a status of "Passed."

At operation 335, in addition to other status information, for any workflow phase that is in progress, percent completion data for the phase may be displayed in the associated user interface cell. In addition, a scope indicator 224 may also be displayed at operation 340 for providing additional information as to the progress of completion of a phase reported on in the associated cell. At operation 345, additional functionality buttons or controls, for example, the activation/deactivation control 226 may be displayed in any cell associated with an in-progress phase that may require stopping or re-starting by a user. At operation 350, additional information, including a display of user-defined color-coded progress bars for enhancing reporting of phase progress may be displayed as required depending on the status of a given phase as reported-on in an associated cell.

At operation 355, a selection of a given selectable function in a given table cell user interface cell may be received. For example, selection of a given cell may cause a launching of the information pane 250 for providing detailed information as to the progressive workflow completion status associated with the selected cell. For another example, selection of an activation/deactivation button or control 226 may cause a starting or re-starting of the associated phase. As should be appreciated, selection of any cell contained in the user interface 110 may cause signaling back through the network 112 through the table control interface layer 120 for ultimately passing the function selection to the progressive workflow reporting and control module where it may be interpreted such that an appropriate command may be passed to the workflow module 135, 140, 145 for effecting changes associated with the function selection to the associated progressive workflow.
At operation 360, in response to the receipt of one or more commands at the workflow modules 135, 140, 150, for example, a stop command, an appropriate change or instruction may be passed to the associated progressive workflow. For example, if a stop command is received at a given workflow module 135, 140, 145, then any workflow in progress associated with the received command will be stopped until it is subsequently restarted.

At operation 365, any resulting workflow status changes are reported back through the progressive workflow reporting and control module for display in the associated cell in the table control user interface 110. For example, if a command to stop a given progressive workflow phase was received, then the table control user interface 110 may be updated so that the cell associated with the stopped workflow phase will be updated with a status indicator to show that the phase is no longer in progress. If a user subsequently selects the updated cell, information about the phase including information about the cessation of processing of the phase may be provided in the information pane 250. The routine 300 ends at operation 395.

While the invention has been described in the general context of program modules that execute in conjunction with an application program that runs on an operating system on a computer, those skilled in the art will recognize that the invention may also be implemented in combination with other program modules. Generally, program modules include routines, programs, components, data structures, and other types of structures that perform particular tasks or implement particular abstract data types.

The embodiments and functionalities described herein may operate via a multitude of computing systems including, without limitation, desktop computer systems, wired and wireless computing systems, mobile computing systems (e.g., mobile telephones, netbooks, tablet or slate type computers, notebook computers, and laptop computers), hand-
held devices, multiprocessor systems, microprocessor-based or programmable consumer
electronics, minicomputers, and mainframe computers.

[0050] In addition, the embodiments and functionalities described herein may operate
over distributed systems (e.g., cloud-based computing systems), where application
functionality, memory, data storage and retrieval and various processing functions may be
operated remotely from each other over a distributed computing network, such as the Internet
or an intranet. User interfaces and information of various types may be displayed via on-
board computing device displays or via remote display units associated with one or more
computing devices. For example user interfaces and information of various types may be
displayed and interacted with on a wall surface onto which user interfaces and information of
various types are projected. Interaction with the multitude of computing systems with which
embodiments of the invention may be practiced include, keystroke entry, touch screen entry,
voice or other audio entry, gesture entry where an associated computing device is equipped
with detection (e.g., camera) functionality for capturing and interpreting user gestures for
controlling the functionality of the computing device, and the like.

[0051] Figures 4-6 and the associated descriptions provide a discussion of a variety of
operating environments in which embodiments of the invention may be practiced. However,
the devices and systems illustrated and discussed with respect to Figures 4-6 are for purposes
of example and illustration and are not limiting of a vast number of computing device
configurations that may be utilized for practicing embodiments of the invention, described
herein.

[0052] Figure 4 is a block diagram illustrating physical components (i.e., hardware) of a
computing device 400 with which embodiments of the invention may be practiced. The
computing device components described below may be suitable for the computing devices
105, 115, 150, 155, 160 described above. In a basic configuration, the computing device 400
may include at least one processing unit 402 and a system memory 404. Depending on the configuration and type of computing device, the system memory 404 may comprise, but is not limited to, volatile storage (e.g., random access memory), non-volatile storage (e.g., read-only memory), flash memory, or any combination of such memories. The system memory 404 may include an operating system 405 and one or more program modules 406 suitable for running software applications 450. The operating system 405, for example, may be suitable for controlling the operation of the computing device 400. Furthermore, embodiments of the invention may be practiced in conjunction with a graphics library, other operating systems, or any other application program and is not limited to any particular application or system. This basic configuration is illustrated in Figure 4 by those components within a dashed line 408.

The computing device 400 may have additional features or functionality. For example, the computing device 400 may also include additional data storage devices (removable and/or non-removable) such as, for example, magnetic disks, optical disks, or tape. Such additional storage is illustrated in Figure 4 by a removable storage device 409 and a non-removable storage device 410.

[0053] As stated above, a number of program modules and data files may be stored in the system memory 404. While executing on the processing unit 402, the program modules 406 may perform processes including, but not limited to, one or more of the stages of the routine 300 illustrated in Figure 3. Other program modules that may be used in accordance with embodiments of the present invention and may include applications such as electronic mail and contacts applications, word processing applications, spreadsheet applications, database applications, slide presentation applications, drawing or computer-aided application programs, etc.

[0054] Furthermore, embodiments of the invention may be practiced in an electrical circuit comprising discrete electronic elements, packaged or integrated electronic chips
containing logic gates, a circuit utilizing a microprocessor, or on a single chip containing electronic elements or microprocessors. For example, embodiments of the invention may be practiced via a system-on-a-chip (SOC) where each or many of the components illustrated in Figure 4 may be integrated onto a single integrated circuit. Such an SOC device may include one or more processing units, graphics units, communications units, system virtualization units and various application functionality all of which are integrated (or "burned") onto the chip substrate as a single integrated circuit. When operating via an SOC, the functionality, described herein, with respect to providing an activity stream across multiple workloads may be operated via application-specific logic integrated with other components of the computing device 400 on the single integrated circuit (chip). Embodiments of the invention may also be practiced using other technologies capable of performing logical operations such as, for example, AND, OR, and NOT, including but not limited to mechanical, optical, fluidic, and quantum technologies. In addition, embodiments of the invention may be practiced within a general purpose computer or in any other circuits or systems.

[0055] The computing device 400 may also have one or more input device(s) 412 such as a keyboard, a mouse, a pen, a sound input device, a touch input device, etc. The output device(s) 414 such as a display, speakers, a printer, etc. may also be included. The aforementioned devices are examples and others may be used. The computing device 400 may include one or more communication connections 416 allowing communications with other computing devices 418. Examples of suitable communication connections 416 include, but are not limited to, RF transmitter, receiver, and/or transceiver circuitry; universal serial bus (USB), parallel, and/or serial ports.

[0056] The term computer readable media as used herein may include computer storage media. Computer storage media may include volatile and nonvolatile, removable and non-removable media implemented in any method or technology for storage of information, such
as computer readable instructions, data structures, or program modules. The system memory 404, the removable storage device 409, and the non-removable storage device 410 are all computer storage media examples (i.e., memory storage.) Computer storage media may include RAM, ROM, electrically erasable read-only memory (EEPROM), flash memory or other memory technology, CD-ROM, digital versatile disks (DVD) or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other article of manufacture which can be used to store information and which can be accessed by the computing device 400. Any such computer storage media may be part of the computing device 400. Computer storage media does not include a carrier wave or other propagated or modulated data signal.

Communication media may be embodied by computer readable instructions, data structures, program modules, or other data in a modulated data signal, such as a carrier wave or other transport mechanism, and includes any information delivery media. The term "modulated data signal" may describe a signal that has one or more characteristics set or changed in such a manner as to encode information in the signal. By way of example, and not limitation, communication media may include wired media such as a wired network or direct-wired connection, and wireless media such as acoustic, radio frequency (RF), infrared, and other wireless media.

Figures 5A and 5B illustrate a mobile computing device 500, for example, a mobile telephone, a smart phone, a tablet personal computer, a laptop computer, and the like, with which embodiments of the invention may be practiced. With reference to Figure 5A, one embodiment of a mobile computing device 500 for implementing the embodiments is illustrated. In a basic configuration, the mobile computing device 500 is a handheld computer having both input elements and output elements. The mobile computing device 500 typically includes a display 505 and one or more input buttons 510 that allow the user to enter
information into the mobile computing device 500. The display 505 of the mobile computing device 500 may also function as an input device (e.g., a touch screen display). If included, an optional side input element 515 allows further user input. The side input element 515 may be a rotary switch, a button, or any other type of manual input element. In alternative embodiments, mobile computing device 500 may incorporate more or less input elements. For example, the display 505 may not be a touch screen in some embodiments. In yet another alternative embodiment, the mobile computing device 500 is a portable phone system, such as a cellular phone. The mobile computing device 500 may also include an optional keypad 535. Optional keypad 535 may be a physical keypad or a "soft" keypad generated on the touch screen display. In various embodiments, the output elements include the display 505 for showing a graphical user interface (GUI), a visual indicator 520 (e.g., a light emitting diode), and/or an audio transducer 525 (e.g., a speaker). In some embodiments, the mobile computing device 500 incorporates a vibration transducer for providing the user with tactile feedback. In yet another embodiment, the mobile computing device 500 incorporates peripheral device port 540, such as an audio input (e.g., a microphone jack), an audio output (e.g., a headphone jack), and a video output (e.g., a HDMI port) for sending signals to or receiving signals from an external device.

[0059] Figure 5B is a block diagram illustrating the architecture of one embodiment of a mobile computing device. That is, the mobile computing device 500 can incorporate a system (i.e., an architecture) 502 to implement some embodiments. In one embodiment, the system 502 is implemented as a "smart phone" capable of running one or more applications (e.g., browser, e-mail, calendaring, contact managers, messaging clients, games, and media clients/players). In some embodiments, the system 502 is integrated as a computing device, such as an integrated personal digital assistant (PDA) and wireless phone.
One or more application programs 550 may be loaded into the memory 562 and run on or in association with the operating system 564. Examples of the application programs include phone dialer programs, electronic communication applications, personal information management (PIM) programs, word processing programs, spreadsheet programs, Internet browser programs, messaging programs, and so forth. The system 502 also includes a non-volatile storage area 568 within the memory 562. The non-volatile storage area 568 may be used to store persistent information that should not be lost if the system 502 is powered down. The application programs 550 may use and store information in the non-volatile storage area 568, such as e-mail or other messages used by an e-mail application, and the like. A synchronization application (not shown) also resides on the system 502 and is programmed to interact with a corresponding synchronization application resident on a host computer to keep the information stored in the non-volatile storage area 568 synchronized with corresponding information stored at the host computer. As should be appreciated, other applications may be loaded into the memory 562 and run on the mobile computing device 500.

The system 502 has a power supply 570, which may be implemented as one or more batteries. The power supply 570 might further include an external power source, such as an AC adapter or a powered docking cradle that supplements or recharges the batteries.

The system 502 may also include a radio 572 that performs the function of transmitting and receiving radio frequency communications. The radio 572 facilitates wireless connectivity between the system 502 and the "outside world," via a communications carrier or service provider. Transmissions to and from the radio 572 are conducted under control of the operating system 564. In other words, communications received by the radio 572 may be disseminated to the application programs 550 via the operating system 564, and vice versa.
The visual indicator 520 may be used to provide visual notifications and/or an audio interface 574 may be used for producing audible notifications via the audio transducer 525. In the illustrated embodiment, the visual indicator 520 is a light emitting diode (LED) and the audio transducer 525 is a speaker. These devices may be directly coupled to the power supply 570 so that when activated, they remain on for a duration dictated by the notification mechanism even though the processor 560 and other components might shut down for conserving battery power. The LED may be programmed to remain on indefinitely until the user takes action to indicate the powered-on status of the device. The audio interface 574 is used to provide audible signals to and receive audible signals from the user. For example, in addition to being coupled to the audio transducer 525, the audio interface 574 may also be coupled to a microphone to receive audible input, such as to facilitate a telephone conversation. In accordance with embodiments of the present invention, the microphone may also serve as an audio sensor to facilitate control of notifications, as will be described below. The system 502 may further include a video interface 576 that enables an operation of an on-board camera 530 to record still images, video stream, and the like.

A mobile computing device 500 implementing the system 502 may have additional features or functionality. For example, the mobile computing device 500 may also include additional data storage devices (removable and/or non-removable) such as, magnetic disks, optical disks, or tape. Such additional storage is illustrated in Figure 5B by the non-volatile storage area 568.

Data/information generated or captured by the mobile computing device 500 and stored via the system 502 may be stored locally on the mobile computing device 500, as described above, or the data may be stored on any number of storage media that may be accessed by the device via the radio 572 or via a wired connection between the mobile computing device 500 and a separate computing device associated with the mobile computing
device 500, for example, a server computer in a distributed computing network, such as the Internet. As should be appreciated, such data/information may be accessed via the mobile computing device 500 via the radio 572 or via a distributed computing network. Similarly, such data/information may be readily transferred between computing devices for storage and use according to well-known data/information transfer and storage means, including electronic mail and collaborative data/information sharing systems.

[0066] Figure 6 illustrates one embodiment of the architecture of a system for providing the functionality described herein across components of a distributed computing environment. Content developed, interacted with, or edited in association with the applications described above may be stored in different communication channels or other storage types. For example, various documents may be stored using a directory service 622, a web portal 624, a mailbox service 626, an instant messaging store 628, or a social networking site 630. The application 450 (e.g., an electronic communication application) may use any of these types of systems or the like for providing the functionalities described herein across multiple workloads, as described herein. A server 615 may provide the functionality to clients 605a-c and 105. As one example, the server 615 may be a web server providing the application functionality described herein over the web. The server 615 may provide the application functionality over the web to clients 605a-c and 105 through a network 112, 610. By way of example, a computing device 105 may be implemented and embodied in a personal computer 605a, a tablet computing device 605b and/or a mobile computing device 605c (e.g., a smart phone), or other computing device. Any of these embodiments of the client computing device may obtain content from the store 616.

[0067] Aspects of the present invention, for example, are described above with reference to block diagrams and/or operational illustrations of methods, systems, and computer program products according to embodiments of the invention. The functions/acts noted in the
blocks may occur out of the order as shown in any flowchart. For example, two blocks shown in succession may in fact be executed substantially concurrently or the blocks may sometimes be executed in the reverse order, depending upon the functionality/acts involved.

[0068] The description and illustration of one or more aspects provided in this application are not intended to limit or restrict the scope of the invention as claimed in any way. The aspects, examples, and details provided in this application are considered sufficient to convey possession and enable others to make and use the best mode of claimed invention. The claimed invention should not be construed as being limited to any aspect, example, or detail provided in this application. Regardless of whether shown and described in combination or separately, the various features (both structural and methodological) are intended to be selectively included or omitted to produce an embodiment with a particular set of features. Having been provided with the description and illustration of the present application, one skilled in the art may envision variations, modifications, and alternate aspects falling within the spirit of the broader aspects of the general inventive concept embodied in this application that do not depart from the broader scope of the claimed invention.
WE CLAIM:

1. A computer implemented method for monitoring and managing a progressive workflow, comprising:
   receiving an indication of a processing of a phase of a progressive workflow;
   reporting a progress status for the phase in response to the processing of the phase;
   generating a table control user interface for monitoring and managing the progressive workflow;
   displaying the status for the phase in the table control user interface; and
   displaying the table control user interface on a computer-enabled display.

2. The computer implemented method of Claim 1, wherein displaying the status for the phase includes displaying the status for the phase in a cell of the table control user interface corresponding to the phase of the progressive workflow.

3. The computer implemented method of Claim 2, further comprising:
   receiving an update to the status for the phase in response to a subsequent processing of the phase of the progressive workflow; and
   updating a display of the status for the phase in the cell of the table control user interface corresponding to the phase of the progressive workflow.

4. The computer implemented method of Claim 2, wherein, in response to a selection of a cell in the table control user interface, displaying status information for a phase.
of the progressive workflow associated with the selected cell in a progress pane displayed in the table control user interface.

5. The computer implemented method of Claim 4, further comprising providing an annotation field in the progress pane for receiving one or more user annotations for the progressive workflow phase for which information is presently displayed in the progress pane.

6. The computer implemented method of Claim 2, wherein displaying the status of the phase includes displaying a workflow identifier and a workflow phase for the phase.

7. The computer implemented method of Claim 2, wherein displaying the status of the phase includes displaying a phase start time and end time for the phase.

8. The computer implemented method of Claim 2, wherein displaying the status of the phase includes displaying a phase completion success or failure for the phase.

9. The computer implemented method of Claim 2, wherein displaying the status of the phase includes displaying a color-coded progress bar indicating a nature of the processing of the phase.

10. The computer implemented method of Claim 2, wherein displaying the status of the phase includes displaying a scope indicator indicating a progress of the processing of the phase.
11. The computer implemented method of Claim 2, wherein displaying the status of the phase includes displaying a percent completion indicator for indicating a progress of the processing of the phase.

12. The computer implemented method of Claim 2, wherein displaying the status of the phase includes displaying an activation/deactivation control for allowing selective activation or deactivation of the processing of the phase.

13. A system for providing a table control user interface for managing a progressive workflow, comprising: one or more processors; memory storing one or more modules that are executable by the one or more processors, the one or more modules comprising:

   a progressive workflow reporting and control module operative to
   receive an indication of a processing of a phase of a progressive workflow;
   report a progress status for the phase in response to the processing of the phase;
   generate a table control user interface for monitoring and managing the progressive workflow, the table control user interface comprising one or more cells, each of the one or more cells containing a status control for displaying status information about the phase or a functionality control for applying a management functionality to the phase; and
   display the table control user interface on a computer-enabled display.
14. The system of Claim 13, the progressive workflow reporting and control module being further operative to display the status for the phase in a cell of the table control user interface corresponding to the phase of the progressive workflow.

15. The system of Claim 14, the progressive workflow reporting and control module being further operative to

   receive an update to the status for the phase in response to a subsequent processing of the phase of the progressive workflow; and

   update a display of the status for the phase in the cell of the table control user interface corresponding to the phase of the progressive workflow.

16. The system of Claim 14, the progressive workflow reporting and control module being further operative to

   display status information for a phase of the progressive workflow associated with the selected cell in a progress pane displayed in the table control user interface in response to a selection of a cell in the table control user interface; and

   provide an annotation field in the progress pane for receiving one or more user annotations for the progressive workflow phase for which information is presently displayed in the progress pane.
17. The system of claim 14, the progressive workflow reporting and control module being further operative to display in the cell of the table control user interface corresponding to the phase of the progressive workflow one or more of:

- a workflow identifier and a workflow phase for the phase;
- a start time and end time for the phase;
- a completion success or failure for the phase;
- a color-coded progress bar indicating a nature of the processing of the phase;
- a scope indicator indicating a progress of the processing of the phase;
- a percent completion indicator for indicating a progress of the processing of the phase; and

an activation/deactivation control for allowing selective activation or deactivation of the processing of the phase.
18. A computer readable medium containing computer executable instructions which when executed by a computer perform a method of monitoring and managing a progressive workflow, comprising:

- receiving an indication of a processing of a phase of a progressive workflow;
- reporting a progress status for the phase in response to the processing of the phase;
- generating a table control user interface comprising one or more cells, each of the one or more cells containing a status control for displaying status information about the phase or a functionality control for applying a management functionality to the phase; and
- displaying the table control user interface on a computer-enabled display.

19. The computer readable medium of Claim 18, further comprising:

- receiving an update to the status for the phase in response to a subsequent processing of the phase of the progressive workflow; and
- updating a display of the status for the phase in the cell of the table control user interface corresponding to the phase of the progressive workflow.

20. The computer readable medium of Claim 19, wherein, in response to a selection of a cell in the table control user interface, displaying status information for a phase of the progressive workflow associated with the selected cell in a progress pane displayed in the table control user interface.
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**FIG. 2A**
Start 302

Begin Progressive Workflow 310

Report Status of Progressive Workflow 315

Build and Display Table Control 320

Receive Updated Workflow Status 325

Update Display of Table Control Cells for Updated Status 330

Display Percent Completion Data 335

Display Scope Control 340

Display Stop Control 345

Display User Defined Color Bars for Enhanced Status Reporting 350

Receive Selection of Table Control Selectable from Functions 355

Command Workflow Changes 360

Display Resulting Workflow Status Changes 365

END 395

FIG. 3
FIG. 4
FIG. 5B
INTERNATIONAL SEARCH REPORT

PCT/CN2015/073490

A. CLASSIFICATION OF SUBJECT MATTER

G06Q 10/06(2012.01)i

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)

G06Q

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)

CNABS; CNKI; VEN: state, work, display, status, display, table, flow, workflow

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C. See patent family annex.

Date of the actual completion of the international search 30 November 2015

Date of mailing of the international search report 17 December 2015

Name and mailing address of the ISA/CN

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Form PCT/ISA/210 (second sheet) (July 2009)
### INTERNATIONAL SEARCH REPORT

**Information on patent family members**

**PCT/CN2015/073490**

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