



SeaClouds Project

D5.2.2 – Final design of the User Interface

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Table of Contents

Table of Contents	3
Executive Summary	5
1 Introduction	6
1.1 Glossary of Acronyms.....	6
2 User Interface Design	7
2.1 Design principles	7
2.2 High-fidelity prototype.....	8
2.2.1 Projects view	8
2.2.2 Add new application wizard.....	8
2.2.3 Remove application wizard	13
2.2.4 Status view	15
2.2.5 Monitor view	15
2.2.6 SLA view	15
3 Usability testing.....	17
3.1 Plan and testing scenarios.....	17
3.2 University Beta Testing Program	18
3.3 Professionals Beta Testing Program	18
4 Conclusions	19
Annex A. SeaClouds – User Interface evaluation questionnaire	20
References	30

List of Figures

FIGURE 1: EXAMPLE OF A VIEW OF THE DESIGNER FOR THE APPLICATION STATUS IN SEACLOUDS.....	7
FIGURE 2: SEACLOUDS PROJECTS VIEW	8
FIGURE 3: ADD APPLICATION WIZARD, STEP 1.....	9
FIGURE 4: ADD APPLICATION WIZARD, STEP 2.....	10
FIGURE 5: CONFIGURING AN APPLICATION MODULE	11
FIGURE 6: ADD APPLICATION WIZARD, STEP 3.....	12
FIGURE 7: ADD APPLICATION WIZARD, STEP 4.....	13
FIGURE 8: REMOVE APPLICATION, CONFIRMATION	14
FIGURE 9: REMOVE APPLICATION, LOG.....	14
FIGURE 10: STATUS VIEW	15
FIGURE 11: MONITOR VIEW	16
FIGURE 12: SLA VIEW.....	16

List of Tables

TABLE 1: GLOSSARY OF ACRONYMS	6
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Executive Summary

This deliverable exposes a high-fidelity prototype of the final design of the SeaClouds User Interface, following the design principles outlined in D5.2.1, and refined in this document.

In order to test this prototype, a plan for a usability test is presented. To gather the results, several workshops will be organized, involving student and professional profiles. In these workshops, the developer must perform some tasks using the SeaClouds platform, and fill a questionnaire.

1 Introduction

In the context of the SeaClouds project, the SeaClouds User Interface constitutes the uppermost layer in the SeaClouds architecture. The high-level specification of this interface was defined in D2.4 [1], according to the requirements elicitation defined in D2.1 [2].

This deliverable presents a UI design discussed and tested among the partners of the consortium. For details about implementation technology, or the interactions of the Dashboard with the other components of the SeaClouds platform (including sequence diagrams and data flow), refer to Deliverable D4.5 [3].

The final design presented is based on the work documented in D5.2.1 [4] about the user interaction model. Deliverable D5.2.1 adopted a dashboard metaphor for the interface inspired by the Direct Manipulation principle and WIMP (Window, Icon, Menu, Pointing device) interfaces.

Section 2 of the deliverable contains the implemented high-fidelity prototype and a summary of the design principles that have driven this prototype.

Section 3 presents a plan for a Usability Testing of the User Interface, involving both university students and professional developers.

Annex 1 contains the questionnaire to be filled by the participants in the Usability Testing workshops.

1.1 Glossary of Acronyms

Acronym	Definition
(GUI)	(Graphical) User Interface
QoS	Quality of Service
QoB	Quality of Business
WIMP	Window, Icon, Menu, Pointing

Table 1: Glossary of acronyms

2 User Interface Design

We defined in D5.2.1 the design metaphor that our interface needed to implement, namely a dashboard. The choice was motivated by the fact that web dashboards are designed to layout large amounts of information into a single page so end-users can easily find, retrieve, understand and process all that information at a glance.

One important question that remained without decision in D5.2.1 was the use of an existing TOSCA solution like Winery [5] for modelling the application topologies, or implementing our own Topology Designer from scratch. The latter option was taken (see Figure 1, where a view of the designer for the application status is depicted), decision motivated by the SeaClouds objective to have a high-level and easy to use topology designer, while Winery was not fulfilling that requirement at the moment.

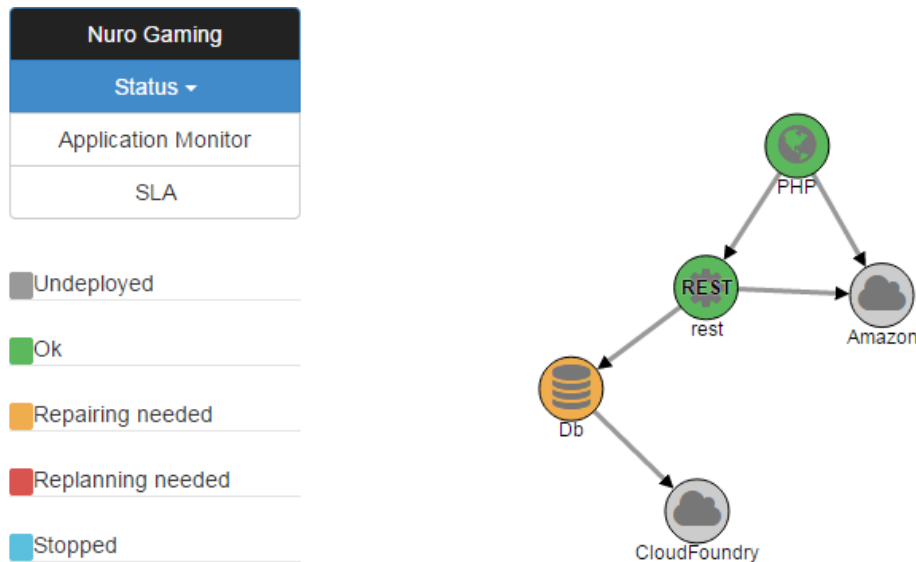


Figure 1: Example of a view of the designer for the application status in SeaClouds

2.1 Design principles

In D5.2.1, we presented common principles in the design of dashboards, some of them referenced in the literature [6]. These principles are:

- Avoid scrolling information. Keep useful data visible at once.
- Give context to data, required to understand information in its correct context.
- Avoid too detailed information. Provide just high level information to give quick overview.
- Choose the right measure and display to render the data (for instance, render long structure data in a chart bar, pie, etc., rather than in table).
- Avoid meaningless colour coding.

- Highlight important data.

Besides these principles, the design of the SeaClouds UI was focused around three fundamental ideas:

- The UI prioritizes functionality over look & feel.
- The Application Topology is the central and most important view of the UI.
- Use of wizards to facilitate the use of some operations.

2.2 High-fidelity prototype

In this phase of the project, we have implemented a high-fidelity prototype. A high-fidelity prototype uses the software packages to construct the user interface prototype and have a look and feel closer to the final implementation. The prototype is presented in this section.

2.2.1 Projects view

Once the user has logged into SeaClouds Platform, the dashboard shows the existing applications owned by the user, and an option to add a new application. This view is shown in Figure 2.

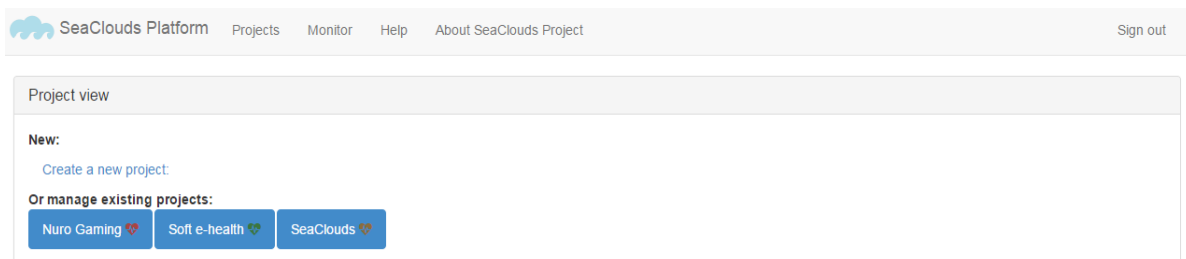


Figure 2: SeaClouds Projects View

2.2.2 Add new application wizard

This wizard allows the user to deploy a new application in one or several cloud providers. The intention of SeaClouds is that the application developer has to concentrate on the application itself, and not on cloud aspects or TOSCA terminology. As such, the developer models the application by means of describing the modules, their properties and requirements, and the relationships between them.

Then SeaClouds will suggest the ideal Cloud Providers and will provide a one-click solution to deploy the application.

The “Add application wizard” starts asking to the user the application name and some properties used to optimize the distribution of the application modules into cloud offerings. This view is shown in Figure 3.

Add new application wizard Design and deploy cloud software

1 Application properties 2 Design topology 3 Optimize & Plan 4 Configuration summary 5 Process Summary & Deploy

Application Name

Fill these properties if you want to optimize your application

Desired application response time (ms)

Desired application availability (%)

Maximum estimated cost (€/month):

Workload (number of requests / per hour)

PROOF OF CONCEPT - Work in progress

Figure 3: Add application wizard, step 1

Once the step 1 is completed, the user proceeds to graphically design the topology of the application (see Figure 4, step 2), where the user can add each of the modules that compose the application.

The objective of this Topology Designer is to be quite easy to use and understand. The user must depict a graph of the application, where:

- Each module is represented by a graph node. To add a node, the user must select the appropriate kind of module in the palette.
- A relationship between two modules A and B is represented by an arc from A to B, meaning “A depends on B”. To create a relationship, the user must select the “Link” tool and drag from node A to node B.

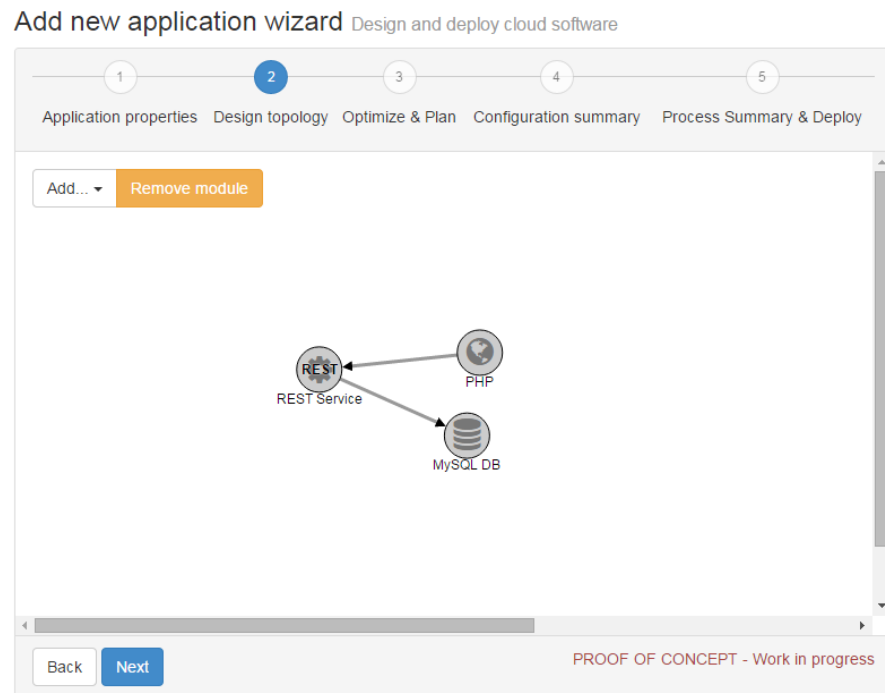


Figure 4: Add application wizard, step 2

The modules are configured through an individual interface (see Figure 5).

This configuration includes technological requirements (programming language, version...) and non-functional requirements, including information about the cost, location, reconfiguration policies and QoS constraints.

Once all this information is filled in, the user can keep adding more modules in the same way. When all application modules are configured, the Step 2 concludes.

Web application ×

Description ▾

Name

Label on screen

Technological Requirements ▾

Language

Non-functional Requirements ▾

Cost

Location

☐ None ☐ Static ☒ Dynamic

Policy

QoS

Metric name	Operator	Threshold	Actions
<input type="text" value="responseTime"/>	<input type="text" value="<"/>	<input type="text" value="1500 ms"/>	<input type="button" value="✕"/>
<input type="text" value="availability"/>	<input type="text" value=">"/>	<input type="text" value="99.99 %"/>	<input type="button" value="✕"/>
			<input type="button" value="⊕"/>

Provider Infrastructure ▾

Provider is

☐ None ☐ IaaS ☒ PaaS

Figure 5: Configuring an application module

The next step shows the distribution of modules into cloud providers, which is the outcome of the planner and optimizer (Figure 6, step 3).

A default distribution, considered optimal, is shown to the user. The user may select this or show up to four more suitable distributions, selecting one of all these.

Add new application wizard Design and deploy cloud software

1
Application properties
2
Design topology
3
Optimize & Plan
4
Configuration summary
5
Process Summary & Deploy

PHP → Amazon EC2 ✓

Amazon Elastic Compute Cloud (EC2) is a central part of Amazon.com's cloud computing platform, Amazon Web Services (AWS). EC2 allows users to rent virtual computers on which to run their own computer applications. EC2 allows scalable deployment of applications by providing a Web service through which a user can boot an Amazon Machine Image to create a virtual machine, which Amazon calls an "instance", containing any software desired. A user can create, launch, and terminate server instances as needed, paying by the hour for active servers, hence the term "elastic". EC2 provides users with control over the geographical location of instances that allows for latency optimization and high levels of redundancy.

Option summary

- Compute units: 5 Units
- Available RAM: 8 Gigabytes
- Bandwidth: 100 Megabytes/s
- Monthly costs: 100 USD

More information [Change target provider](#)

RESTEasy → HP ✓

MySQL → HP ✓

Back Next

PROOF OF CONCEPT - Work in progress

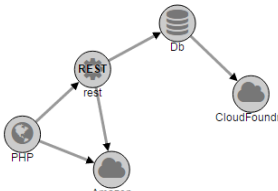
Figure 6: Add application wizard, step 3

The step 4 (Figure 7) is the last step of configuration, where the user can review the deployment just before the process starts: the selected providers, cloud resources, estimated costs and other key properties of the application. In this step, the user must enter the cloud provider credentials, the artefacts of each module, and any other information needed to generate the deployment descriptor. The user has also the possibility to manually modify the WS-Agreement SLA, which was automatically generated from the high-level input introduced in the previous steps.

The “Deploy” button starts the deployment of the application, and takes us to the “Status” view.

Add new application wizard Design and deploy cloud software

Your process is almost over, please just take a look before deploying your application



```

graph TD
    PHP((PHP)) --> REST((REST))
    REST --> Amazon((Amazon))
    REST --> Db((Db))
    Db --> CloudFoundry((CloudFoundry))
  
```

PHP

- Hardware overview:
 - Compute units:** 5 Units **Available RAM:** 8 Gigabytes
 - Bandwidth:** 100 Megabytes/s **Location:** Amazon EC2
 - Monthly Cost (Estimated):** 100 USD
- Reconfiguration Strategies:
 - Scale-up when Response Time is less than 120ms
 - Scale-down when Average CPU usage is less than 60%

RESTEasy

- Hardware overview:
 - Compute units:** 3 Units **Available RAM:** 2 Gigabytes
 - Bandwidth:** 100 Megabytes/s **Location:** Amazon EC2
 - Monthly Cost (Estimated):** 80 USD
- Reconfiguration Strategies:
 - None

MySQL

- Hardware overview:
 - Location:** CloudFoundry Pivotal **Monthly Cost (Estimated):** 150 USD
- Reconfiguration Strategies:
 - Migrate when Transactions per seconds are greater than 1000

Back Deploy

PROOF OF CONCEPT - Work in progress

Figure 7: Add application wizard, step 4

2.2.3 Remove application wizard

The remove application assistant is a very simple wizard. The first step of the wizard (Figure 8) shows the information about the application that the user wants to remove and asks for confirmation.

During the last step, the deletion process occurs and a log is shown with the result of the process (Figure 9).

Remove application wizard Expunge an existing application

1 Choose your application
 2 Confirm the removal
 3 Process Summary

Application to be removed

- **Name:** SeaClouds Website
- **Uptime:** 1 year 4 days 7 hours 54 minutes
- **Main url:** http://www.seacLOUDS-project.eu
- **Active SLA violations:** None
- **Last SLA violation:** March 07 2014
- **Modules:** 1
 - JBoss AS7 in Amazon EC2

You are going to **REMOVE** this application, this process is **IRREVERSIBLE** are you sure?

[Back](#)
[YES](#)

PROOF OF CONCEPT - Work in progress

Figure 8: Remove application, confirmation

Remove application wizard Expunge an existing application

1 Choose your application
 2 Confirm the removal
 3 Process Summary

Please hold on while we remove your application

100%

Process log

```

Deployer: Verifying exiting dependencies... Done
Monitor: Disabling Monitoring Agents... Done
Deployer: Stopping running entities... Done
Deployer: Removing instances... Done
Deployer: Everything done.
  
```

[Back](#)
[Go to home](#)

PROOF OF CONCEPT - Work in progress

Figure 9: Remove application, log

2.2.4 Status view

This is the view (Figure 10) where the application administrator can check at a glance the status of the deployed application, giving an idea of the status of the application through the colours that each node has. The start, stop and remove operations are triggered from this view.

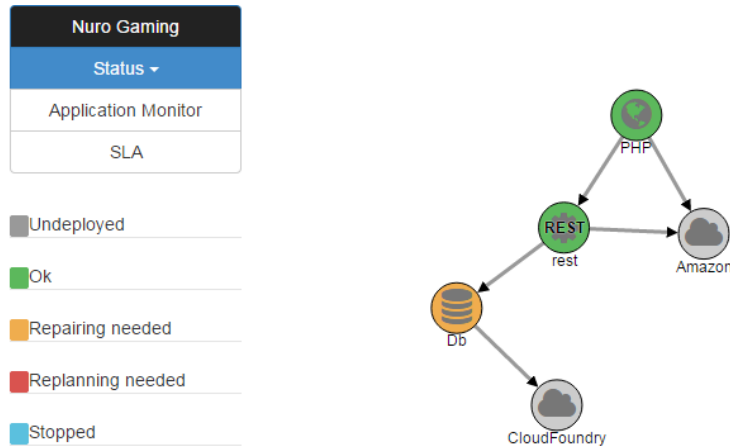


Figure 10: Status view

2.2.5 Monitor view

Once an application is deployed and running, the administrator is able to check the performance using the Monitor interface. Figure 11 shows an example where several metrics of an application are being monitored.

2.2.6 SLA view

The SLA view (Figure 12) details the current SLA accomplishment, allowing the administrator to check if the application has been fulfilling the QoS and QoB requirements specified at design time. It maintains a list of the occurred QoS violations and the list of penalties as consequence of the aforementioned violations.

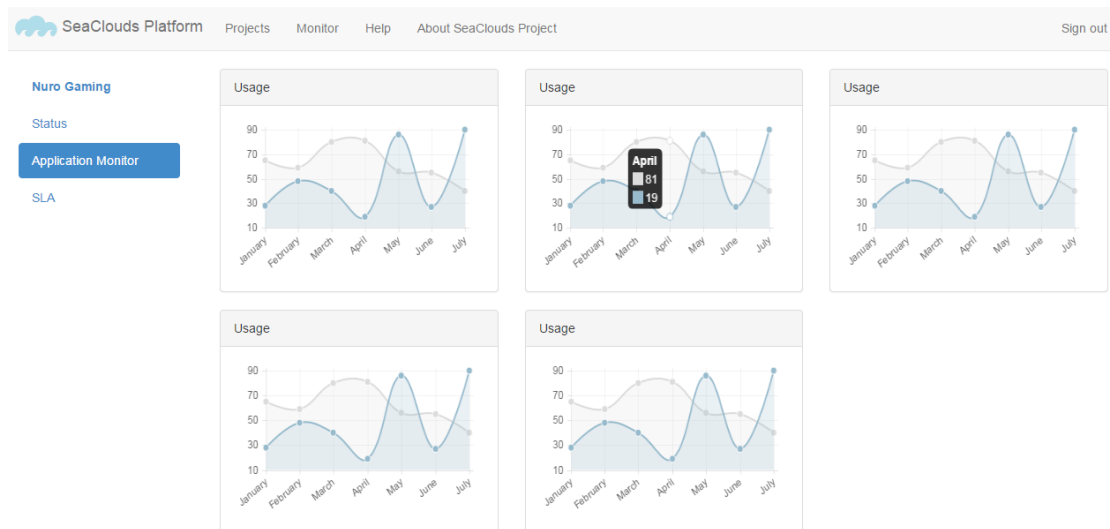


Figure 11: Monitor view

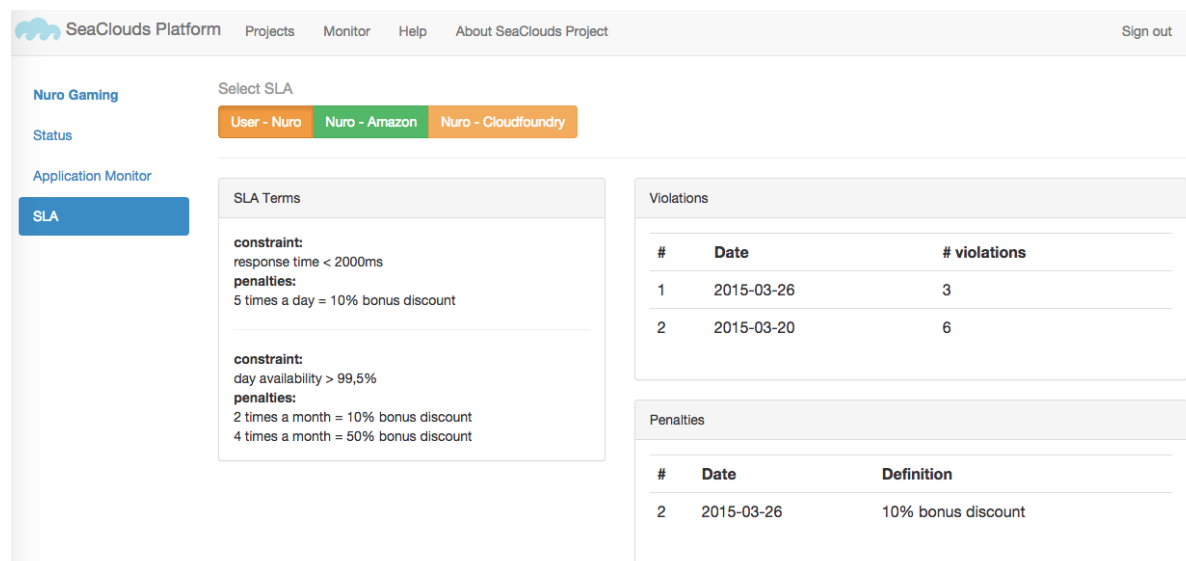


Figure 12: SLA view

3 Usability testing

In this section we describe our plan to test the usability of the SeaClouds GUI.

The preliminary result of the Usability testing will be included in the D6.4.2 “SeaClouds periodic evaluation reports”, which will be delivered on M24. While the final outcomes of the usability evaluation will be included in the deliverable D6.4.3 “SeaClouds periodic evaluation reports”, delivered on M28.

The proposed plan is to organize workshops where a small set of developers learn about SeaClouds, trying to execute some exercises using the platform. After the exercises, they have to fill a questionnaire with their experience about the usability of SeaClouds.

The questionnaire is composed of 3 sections: i) General questions about the person's experience, to help to categorize the data, ii) Questions about the difficulty to finish each of the tasks, and iii) Summary questions about the experience using the platform: Was it easy? Was it fast? Was it friendly?

There will be two rounds of workshops, each one with different profiles of developer.

A preliminary version of the questionnaire is provided in Annex 1. A final version will be prepared before the workshops take place, and will be delivered in the final evaluation documents D6.4.2 and D6.4.3.

3.1 Plan and testing scenarios

The plan includes two scenarios, covering the most of the operations that SeaClouds provides. Any testing user has to complete the tasks of the scenarios in order to have knowledge of the platform usage.

The two scenarios are:

- Design and deploy an application using the application wizard. The application to deploy is a 3-tier web application, with three modules: a PHP web application, a REST web services component programmed in Java, and a MySQL database. The tasks to perform in each step of the wizard are:
 - Fill application properties: the user must give a name to the application and fill some needed properties if the application wants to be optimized.
 - Design application topology: the user must model, in a graphical way, the modules that are compounding the application, and the relationships between them. The user must also enter the required constraints about Quality of Service.
 - Plan: the user must select one of the options that the planner has calculated as appropriate.
 - Configuration: the user must enter the credentials of the cloud providers, and the GitHub URLs where the sources of the application are hosted.

- Deploy: the user must run the deployment and check that the application is up and running.
- Manage a deployed application. From the SeaClouds home, the user must select the previously deployed application and perform the following tasks:
 - Check the application status: visualize in a graphical way the status of application, checking if the application is running according to the desired QoS.
 - Manage lifecycle: the user must stop the application and check the application is down. After this, the user must restart the application.
 - Monitor application: the user must access the Monitor Application view and monitor the response time and availability of the modules of the application.
 - Check SLA agreements: the user must access the SLA view and check if any guarantee term has been violated, and consult the raised violations and penalties.
 - Remove application: in this last step, the user must remove the application.

These scenarios have to be probably cheated in some way to deploy the application in "controlled" providers. Remember that not all providers offer free or trial accounts. The decision of the "controlled" providers has to be postponed to a time closer to the actual tests, because providers may change their offerings meanwhile.

3.2 University Beta Testing Program

The first round of the testing will be carried out by college students. The SeaClouds consortium already has the commitment of the three universities involved in the project, University of Málaga, Politecnico di Milano and University of Pisa, and they will organize a workshop in their dependencies.

The desired number of filled questionnaires is about 30, so it will suffice if each workshop holds 10 students.

3.3 Professionals Beta Testing Program

The second round of the testing will be carried out by professionals in the scope of cloud computing. A workshop, still to determine, will be organized. The contents of the workshop are the same as for the University Beta Testing Program.

The desired number of filled questionnaires is about 15.

4 Conclusions

In this deliverable we presented the final design of the SeaClouds User Interface, underlying the principles that have driven the design. These principles have been initially defined in D5.2.1 and refined in the present document. In Deliverable D4.5, can be found more details about implementation technology, or the interactions of the Dashboard with the other components of the SeaClouds platform

Since the release of D5.2.1, the consortium finally decided to implement a Topology Designer from scratch in order ensure the usability of that component.

When the platform will be distributed to real users, we will collect their feedback and examine whether the User Interaction we implemented needs to be revised. This is necessary since until now we could only test parts of the platform, and because the latter was still under development.

In order to collect the feedback from the users, a plan for a Usability Testing has been designed. The results of this testing will be delivered in deliverables D6.4.2 and D6.4.3.

Annex A. SeaClouds – User Interface evaluation questionnaire

SEAClouds - Usability Evaluation

The questionnaire consists of two parts: General Questions and Questions on system usability to sustain or refute the previously stated hypotheses.

The first part includes questions about age, gender and experience, which will help us to categorize the questionnaires results. The second part contains tasks and questions, which you can solve and answer while getting familiar with the system.

The SeaClouds website is available at the following URL:

<http://www.seaclouds-project.eu>

***Required**

General questions

1. Your Name

This is an optional field. The SeaClouds partners are kindly ask to identify themselves.

NAME

2. Your Company

This is an optional field. The SeaClouds partners are kindly ask to identify themselves.

COMPANY

3. Specify your age *

AGE

4. Select your gender below *

Mark only one oval.

☐

Male

☐

Female

☐

Don't want to disclose

5. Describe your occupation *

OCCUPATION

OCCUPATION

OCCUPATION

OCCUPATION

OCCUPATION

6. Describe your level of acquaintance with Web-development *

Mark only one oval.

- ☐ Beginner
- ☐ Intermediate
- ☐ Advanced
- ☐ Professional

7. How many years are you doing Web-development?

8. Describe your level of acquaintance with Cloud-computing

Mark only one oval.

- ☐ Never heard about it before
- ☐ Heard about it a couple of times
- ☐ I follow this topic
- ☐ Planning to test/use
- ☐ Testing
- ☐ Use it/Deployed in some production systems
- ☐ Use it intensively in many projects

9. Which IaaS/PaaS providers have you been using before?

i.e. AWS, HPCloud, Heroku, OpenShift, CloudFoundry, etc

Tasks & questions on system usability and performance

Scenario 1: Design and deploy an application

In this simplest scenario, user will design a basic application topology according to provided requirements and will perform the deployment of the application into the suggested cloud offerings by the planner.

10. Create new project and enter application properties *

Using SeaClouds web-interface, start the new project wizard and enter the application properties: name and needed properties for the optimizer.

Mark only one oval per row.

	Yes, without problems	Yes, with minor problems	Yes, with some complications	Yes, with someone's help	No
Was it easy to solve the task?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was the result/output easy to understand?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. What kind of difficulties you encountered (if any)?

12. Design the application topology *

Use the topology designer to create a web application composed of three modules: a Django frontend, a RESTful web services developed in Java, and a mysql 5.5 database.

Mark only one oval per row.

	Yes, without problems	Yes, with minor problems	Yes, with some complications	Yes, with someone's help	No
Was it easy to solve the task?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was the result/output easy to understand?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. What kind of difficulties you encountered (if any)?

14. Start a planning and select the desired plan *

Mark only one oval per row.

	Yes, without problems	Yes, with minor problems	Yes, with some complications	Yes, with someone's help	No
Was it easy to solve the task?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was the result/output easy to understand?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. What kind of difficulties you encountered (if any)?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

16. Enter needed properties in the configuration summary step *

Mark only one oval per row.

	Yes, without problems	Yes, with minor problems	Yes, with some complications	Yes, with someone's help	No
Was it easy to solve the task?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was the result/output easy to understand?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. What kind of difficulties you encountered (if any)?

[illegible]

18. Perform the deployment of the application *

Mark only one oval per row.

	Yes, without problems	Yes, with minor problems	Yes, with some complications	Yes, with someone's help	No
Was it easy to solve the task?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was the result/output easy to understand?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. What kind of difficulties you encountered (if any)?

20. **Ensure your application is up and running ***

Mark only one oval per row.

	Yes, without problems	Yes, with minor problems	Yes, with some complications	Yes, with someone's help	No
Was it easy to solve the task?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was the result/output easy to understand?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. What kind of difficulties you encountered (if any)?

Tasks & questions on system usability and performance

Scenario 2: The user manages a deployed application

In this scenario the user has created and deployed an application, and wants to explore the features offered by SeaClouds to manage, monitor and check the QoS fulfillment.

22. **Browse to management of deployed application ***

Mark only one oval per row.

	Yes, without problems	Yes, with minor problems	Yes, with some complications	Yes, with someone's help	No
Was it easy to solve the task?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was the result/output easy to understand?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

23. What kind of difficulties you encountered (if any)?

24. **Application life-cycle management ***

Stop the previously deployed application. Ensure the application is not serving requests at the corresponding URL. Start the application again. Ensure the application is serving requests again.

Mark only one oval per row.

	Yes, without problems	Yes, with minor problems	Yes, with some complications	Yes, with someone's help	No
Was it easy to solve the task?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was the result/output easy to understand?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

25. What kind of difficulties you encountered (if any)?

26. **Application life-cycle management ***

Stop the previously deployed application. Ensure the application is not serving requests at the corresponding URL. Start the application again. Ensure the application is serving requests again.

Mark only one oval per row.

	Yes, without problems	Yes, with minor problems	Yes, with some complications	Yes, with someone's help	No
Was it easy to solve the task?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was the result/output easy to understand?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

27. What kind of difficulties you encountered (if any)?

28. **Application monitoring using SeaClouds web-interface ***

Perform some basic monitoring of your application execution (figure out which metrics are available and how to interpret them) using SeaClouds web-interface.
Mark only one oval per row.

	Yes, without problems	Yes, with minor problems	Yes, with someone's help	Yes, with someone's help	No
Was it easy to solve the task?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was the result/output easy to understand?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

29. What kind of difficulties you encountered (if any)?

30. **Checking SLA contracts and violations ***

For the deployed application check the SLA contract (if specified) and check if it is violated. If you didn't specify SLA contract during deployment, please, re-deploy your app with SLA specification.
Mark only one oval per row.

	Yes, without problems	Yes, with minor problems	Yes, with some complications	Yes, with someone's help	No
Was it easy to solve the task?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was the result/output easy to understand?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

31. What kind of difficulties you encountered (if any)?

32. Comparing applications running on different clouds *

Deploy 2 applications on 2 different PaaS providers. Compare the monitoring metrics between them.

Mark only one oval per row.

	Yes, without problems	Yes, with minor problems	Yes, with some complications	Yes, with someone's help	No
Was it easy to solve the task?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was the result/output easy to understand?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

33. What kind of difficulties you encountered (if any)?

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840.

34. Configuration of SeaClouds deployment is not a substantial overhead over the direct deployment

Mark only one oval.

1 2 3 4 5

Strongly agree ☐ ☐ ☐ ☐ ☐ Strongly disagree

35. SeaClouds offers the same management experience for different providers

Mark only one oval.

1 2 3 4 5

Strongly agree ☐ ☐ ☐ ☐ ☐ Strongly disagree

Overall user experience rating for Web-interface

Please, provide your rating for your experience when interacting with SeaClouds system using web-interface.

36. Not understandable vs. Understandable *

Mark only one oval.

[illegible]

37. Easy to Learn vs. Difficult to Learn *

Mark only one oval.

[illegible]

38. Not Interesting vs. Interesting *

Mark only one oval.

[illegible]

39. Unpredictable vs. Predictable *

Mark only one oval.

| | | | | | | | | |
|---------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| unpredictable | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | predictable |

40. Fast vs. Slow *

Mark only one oval.

[illegible]

41. Obstructive vs. Supportive *

Mark only one oval.

1 2 3 4 5 6 7

obstructive ○ ○ ○ ○ ○ ○ ○ supportive

42. Good vs. Bad *

Mark only one oval.

[illegible]

43. Complicated vs. Easy *

Mark only one oval.

[illegible]

44. Usual vs. Leading Edge *

Mark only one oval.

[illegible]

45. Secure vs. Not Secure *

Mark only one oval.

secure 1 2 3 4 5 6 7 not secure

46. Meets Expectations vs. Does Not Meet *

Mark only one oval.

[illegible]

47. Clear vs. Confusing *

Mark only one oval.

[illegible]

48. Impractical vs. Practical *

Mark only one oval.

[illegible]

49. Organized vs. Cluttered *

Mark only one oval.

[illegible]

50. Friendly vs. Unfriendly *

Mark only one oval.

[illegible]

References

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- [6]. S. Few, Information Dashboard Design. O'Reilly, 2006, p. 211