

## The Study of Services Management Based on the Network Environment

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### Abstract

*Service-Oriented Architecture (SOA) constructs applications by publishing services in an open network environment. In network environment individual service changes highly dynamically, it is required the system based on services to adapt to this change. But the current service management in network environment doesn't have a good, unified management mode, management mechanism, service and quality control system, and lacks of theoretical foundation to express formal service system. In this paper, a service management framework is designed. A mechanism and method based on strategy and dynamic network environment service management are proposed. The method can effectively solve the problem of dynamic service management in network environment, and is widely used in dynamic service management based on Web services.*

**Keywords:** *Computer Network, service management, management system*

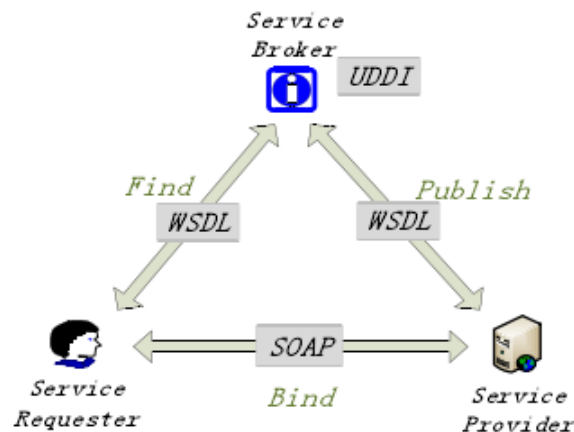
### 1. Introduction

In recent years, more and more enterprises and academic institutions involved in the management of research resources among services expand research and other services management standards and technologies. In the mobile Internet environment, most of the services are rendered in the form of the Web Service, in describing aspects of service resources, Web Service technology has many advantages. The purpose of the mobile Internet resources management is the effective integration of service resources, therefore, how the rational combination of services and select a service management focus, which has been attached great importance to the academic and industrial community. As the global economy continues to develop, information and gradually evolved into a major force in the economic development of the whole society, "information technology to stimulate industrialization, promote information technology" and "Two of integration" Our strategic approach has been listed as an important launch approach. Therefore, the modern enterprise, its ability to promote information technology and operational standards in IT is an important factor can thrive. From the current overall situation of China Telecom IT point of view, in the Chinese telecom enterprise information strategy planning (ITSP) guidance, China Telecom IT in recent years, evolving construction, has been the traditional independence of the system a little bit messy integration of specification can focus on arrangements and the data can be shared system of CTG-MBOSS systems. In this fusion of the mobile Internet environment, service management platform from independent resources toward integration, in this process, there is the traditional carrier-class business management system a lot of questions, including: network independent, difficult to integrate business systems; the need more effective business support environment to support the introduction of new services and frequent release; repeat part platform capabilities, lack of unified planning, resulting in inconsistent

user experience consequences; resource sharing can not do these questions have to be through the establishment of a sound IT service management system, gradually resolved.

## 2. The New Service-oriented Architecture SOA Technology

Web Service is a new SOA (Service Oriented Architecture) technology, web services are an online application service issued by the company, you can accomplish a specific business needs, self-packaging, and other advantages of loose coupling and platform independence. According to the definition of the W3C, Web Service should be a machine to support interoperability between different network software system, its interface is defined by the XML standard, using the HTTP, SOAP, WSDL, UDDI and other protocols, including service provider (Service Provider), service registration Center (Service Broker), the service requester (Service Requester) three roles, release (Publish), Find (Find), bind (Bind) three operations. Service providers publish services through a service registry, and respond to request services; service registry service providers publish services described where the requester in the registry can find the required services and access to relevant information and services; after the service requestor in the registry to get the interface and location information services, through binding operation, call the required service. web services architecture shown in Figure 1:



**Figure 1. Web Service Architecture Diagram**

Web Service technology can mask the underlying implementation details of the service, so that service managers can not concern specific implementation services, and related information, such as interfaces and parameters can only know the service to facilitate service integration and data reuse, we use Web services standards the mobile Internet services are published as Web Service, to achieve a unified description and management services.

## 3. Property Management Service Resources

The main title (on the first page) should begin 1 3/16 inches (7 picas) from the top edge of the page, centered, and in Times New Roman 14-point, boldface type. Capitalize the first letter of nouns, pronouns, verbs, adjectives, and adverbs; do not capitalize articles, coordinate conjunctions, or prepositions (unless the title begins with such a word). Please initially capitalize only the first word in other titles, including section titles and first, second, and third-order headings (for example, "Titles and headings" — as in these guidelines). Leave two blank lines after the title.

With the increase of mobile Internet service resources, especially when these services to achieve similar functionality, how to effectively and quickly select the service to be a need to focus on the problem, concerned only with the functional properties of the service and the service can not achieve effective selection, should also consider the quality of service attributes. Quality property management services, mainly for the price of the service, response time, availability, reliability, management and other QoS attributes, including a comparison of quality of service, such as updating each attribute. Reliability update policy discussions. Assumed that within a certain period of time  $t$ ,  $t = t_n - t_k > 0$  is called service has accumulated in the  $t_n$  period  $N$  times, where there are  $n$  call to be successfully executed, is called the cumulative period  $K$  times  $t_k$ , where there are  $k$  times the call is unsuccessful, the service call success rate in period  $t$ , ie reliability:

$$R=1-\frac{n-k}{N-K}$$

(1)

According to equation (1) can be dynamically calculated based on the service reliability of the results of the latest call, however, considering the service has just begun to be invoked,  $N$ ,  $K$  minimal,  $n$ ,  $k$  may even be zero, so that the reliability of the calculated 1, which is obviously unreasonable, and therefore need to be modified on the type [1-2]. Assuming the initial value of the reliability of the service registration is  $R_u$ , taking into account the effect of the initial value as described in (2), the corrected reliability calculation formula:

$$R=\frac{n-k}{N-K}\left(1-\frac{n-k}{N-K}\right)+\frac{U}{N-U}R_n$$

(2)

According to the above reliability updated policy, service response time is calculated as:

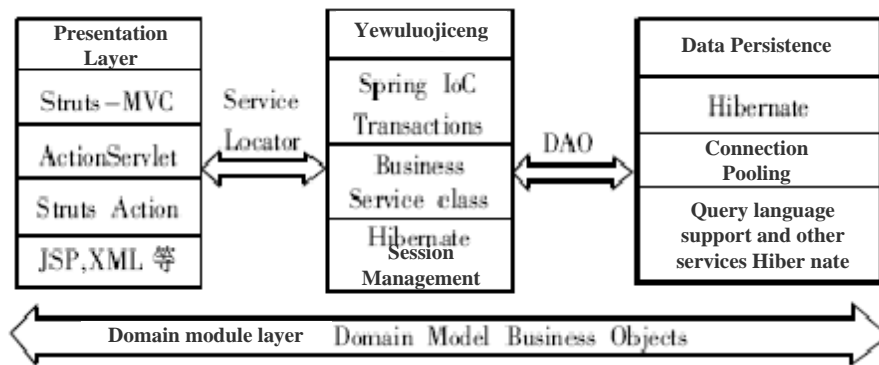
$$T=\frac{n-k}{N+U}\times\frac{\sum_{i=1}^N T_i}{N}+\frac{U}{N+U}T_n$$

(3)

Wherein,  $N$  is the total number of calls,  $U$  and formula (2) as the value,  $T_i$  is the response time  $t$  of each execution period,  $T_u$  is the initial value of the response time.

#### 4. Three-tier Technology in IT Event Management System to Achieve

Many current java web developer to Struts, Spring, Hibernate organically integrate the three frameworks, is called the SSH lightweight framework. SSH framework system is divided into four duties have presentation layer, business logic, data persistence layer and the module level, belong to different duties, the overall use of the infrastructure system as Struts, MVC separation performed, and the framework of the model part of the framework for the use of the Hibernate persistence layer support, use Spring for the business layer is indicated in Figure 1. The basic structure of the system for business processes: interaction through JSP pages, the presentation layer to achieve the transfer request and receive a response, and then through the Struts configuration file will accept container receives the request queue or delegated to conduct the corresponding processing [3-5]. The business layer management component provides a container for the behavior and the behavior of the component business model object data processing business logic.

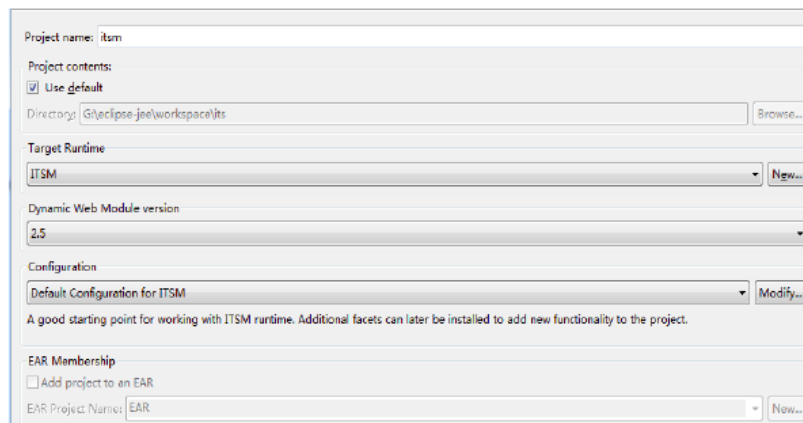


**Figure 2. General SSH Architecture System Architecture Diagram**

Provides event handling, buffer pools and other services in order to improve system performance optimization, and to ensure the integrity and security of data, but it is dependent on the object persistence layer mapping and data exchange HIBERNATE, and processes the request and returns the result.

Step One: Create a Web project named itsm, shown in Figure 3. Step two: Jar package required for the project are copied to WebRoot / WEB-INF / lib directory 1) struts2 required jar package:

- struts2-core-2.0.11.jar
- xwork-2.0.4.jar
- ognl-2.6.11.jar



**Figure 3. New Project Wizard**

- freemarker-2.3.8.jar
- commons-logging-1.0.4.jar
- struts2-spring-plugin-2.0.11.2.jar

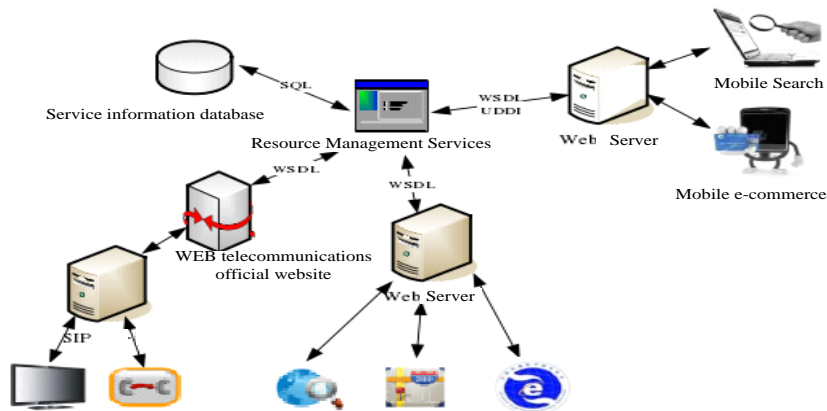
The third step: web.xml configuration. In order to properly use SSH, you need to be configured in web.xml for Struts and Spring. This completes the configuration work web.xml file in the project, implemented support for Spring, Struts's. Step Four: spring-context.xml file configuration. This file is spring core configuration file, which is equivalent to a facility that can be configured in the file, depending on the effectiveness of manually modify the configuration file, call different methods to achieve without modifying the source code and recompile the different effects you can achieve the purpose of . The physical structure of the database tables: a user table (users), as shown in Table 1.

**Table 1. User Table**

Column Name	Data Types	Could be empty
ID	varchar(32)	NOTNULL
Company_id	Int	NOTNULL
Login_id	varchar(10)	NULL
Password	varchar(100)	NULL
Name	varchar(100)	NOTNULL
Email	varchar(100)	NULL
Status	Int	NOTNULL
Mobile	varchar(100)	NULL
Name_py	varchar(100)	NULL
Phone	varchar(100)	NULL
Contact_type	varchar(100)	NULL
Gmt_update_pwd	varchar(100)	NULL

## 5. Network Topology

According to the overall framework of the network topology design services management platform, the platform is shown in Fig 4.



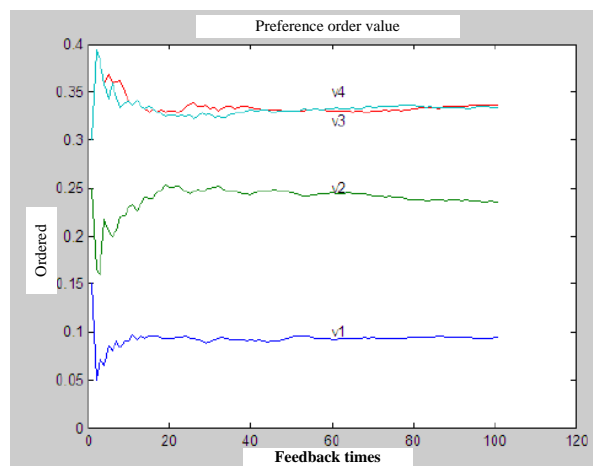
**Figure 4. Network Topology Service Resource Management Platform**

The system can effectively manage the resources of the mobile Internet services, to provide convenient, fast, scalable personalized portfolio services development environment. Web server: Document Information Service information needs to be published on the Internet and browse through the network, Web server can store not only the service document information, you can also respond to the service request after the user makes a request through the browser and to provide services, run the appropriate program . ISP Internet through a Web server publishing service can be registered directly to the service resource management platform, service resource management platform through a combination of Web server publishing services (such as mobile search, mobile e-commerce) can also be accessed directly by the user <sup>[6-8]</sup>. Services Resource Management: the field of telecommunications, unified access, classification management of the Internet in the field of heterogeneous services, and a combination of a new personalized service, to be described by the WSDL language, according to the UDDI specification published by the Web server for users to call or section tripartite

development. Service Information Management Library: Record all information management platform for all the atoms in the service information, as well as a combination of personalized service, managers increase data via SQL commands, modify, and delete queries.

## 6. Service Selection Assessment

Evaluation purposes: Depending on the application scenario this article service management system, primarily to assess the reasonableness of the service selection mechanism to verify the quality of service attribute order value calculation formula 
$$v(i, n) = \frac{O(i, n) \times v(i, n-1)}{\sum_{i=0}^n O(i, n) \times v(i, n-1)}$$
 can reflect user preferences. Experiment 1: Specifies the user type, to determine the quality of this type of service attribute order vector initial value, change the value of each property by order of each type of user feedback quality attributes default range. Select a quality of service attribute great importance to each rating of price priority, followed by response time, availability and reliability for the final user type, to determine the user's initial property type sequence is  $v_0 = \{0.15, 0.25, 0.3, 0.3\}$ . Emphasis of this type of each attribute conventions for user feedback: the price is important, the more important, in general randomly selected, the response time in the more important, in general, is not important in the random selection, availability and reliability in general, is not important in random selection. Calculated based on user feedback value changes each  $V_i$  in Figure 5, Which,  $v_1$  representative price preference order value,  $v_2$  representative response time preference order value,  $v_3$  representative usability,  $v_4$  representatives reliability.



**Figure 5. Type Default Value of Each Attribute Sequence Diagram Feedback**

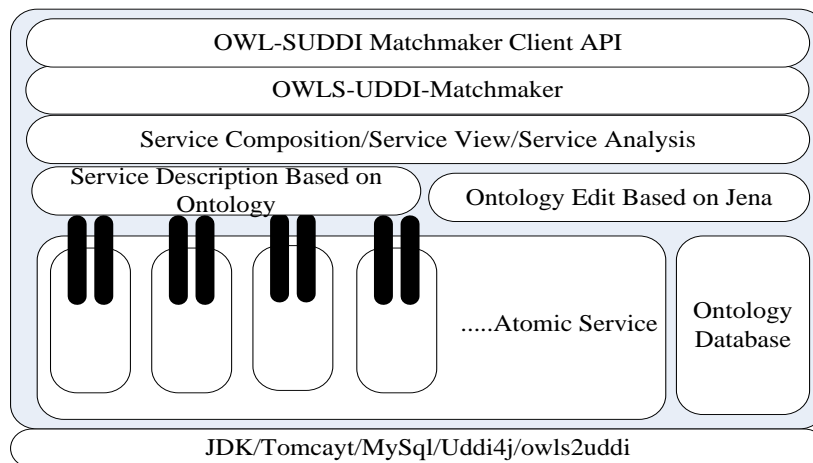
From the above chart shows that number has risen to 40 after user feedback, changes in the value of each quality attribute order is not big, and stabilized after 60 feedback, which in the actual usage of the system is entirely reasonable. After stabilization,  $v_1$  to converge to 0.1,  $v_2$  converges to 0.24,  $v_3$  converges to 0.33,  $v_4$  converges to 0.33, and is maintained in the process of change of the trend  $v_1 < v_2 < v_3, v_4$ , which is consistent with the user feedback each attribute constraints and maintaining the initial value of the magnitude relationship between the sequence.

Conclusion: According to the experimental results in a change of user feedback shows sequence values, user preferences may reflect the order value calculation formula given initial vector sequence when property values, property values as a result of user feedback program being adjusted accordingly, when some attribute great importance to upgrade the level of the property value within an acceptable sequence number of top-ranking feedback, and finally converge to fixed values. Results based on changes in the properties of the three sequence values shows that user

preference order value calculation formula can also reflect different sequence for the initial value of the user type in the user get the same feedback, order value of each property is mainly affected by the initial impact . Therefore, according to the determined type of feedback to the user based on the user QoS attributes of each sequence can be a good indication of the value of the user of the service quality attributes of subjective preference case, then, according to the formula to determine the value of property rights is not only reflected in the service itself the objective quality of the merits, but also reflects the user's preference for quality of service attribute, the thus selected out of a combination of services to the greatest extent possible to meet user expectations.

## 7. A Framework of Jena Based on Service Management Logic

We give a framework of developing an application of internet with Jena lib[9, 10]. Jena, which is which is developed by HP Labs Semantic Web Research Group, is a Java framework for building Semantic Web applications. It provides a programmatic environment for RDF, RDFS and OWL, SPARQL and includes a rule- based inference engine. It is written for the programmer who is unfamiliar with RDF and who learns best by prototyping, or, for other reasons, wishes to move quickly to implementation. Enterprise- scale data integrating, service discovery, knowledge managing, service-oriented architectures, all these are among many IT applications that could change dramatically through the introduction of internet technology. These IT architectures can be transformed by the metadata standards and flexible, open information systems of the internet technology. In this paper we only give a brief architecture of framework with Fig.6. We will expatiate on it in detail in other paper.



**Figure 6. Architecture of Framework**

We will give an example to demonstrate framework above. In network management field there are 6 sub systems: Network Config Service, Net Weather Service, Fault Management Service, Event Management Service and other Management Services. There are certain relations among there service. We have deployed these services in different nodes. We can depict it with OWL format as this:

```
<rdf: RDF
  xmlns: rdf="http://www.w3.org/1999/02/22- rdf- syntax- ns#"
  xmlns: xsd="http://www.w3.org/2001/XMLSchema#"
  xmlns: rdfs="http://www.w3.org/2000/01/rdf- schema#"
  xmlns: owl="http://www.w3.org/2002/07/owl#"
  xmlns="http://www.owl- ontologies.com/unnamed.owl#"
  xml: base="http://www.owl- ontologies.com/unnamed.owl">
<owl: Ontology rdf: about=""/>
```

```
<owl: Class rdf: ID="NM_Fault_Management">
  <rdfs: subClassOf>
    <owl: Class rdf: ID="Network_Management"/>
  </rdfs: subClassOf>
</owl: Class>
<owl: Class rdf: ID="NM_Event_Management">
  <rdfs: subClassOf rdf: resource="#Network_Management"/>
</owl: Class>
<owl: Class rdf: ID="NM_Flow_Management">
  <rdfs: subClassOf rdf: resource="#Network_Management"/>
</owl: Class>
<owl: Class rdf: ID="NM_Topology">
  <rdfs: subClassOf rdf: resource="#NM_Fault_Management"/>
  <rdfs: subClassOf rdf: resource="#Network_Management"/>
  <rdfs: subClassOf>
    <owl: Class rdf: ID="NM_Weather"/>
  </rdfs: subClassOf>
  <rdfs: subClassOf>
    <owl: Class rdf: ID="NM_Configuration"/>
  </rdfs: subClassOf>
</owl: Class>
<owl: Class rdf: about="#NM_Configuration">
  <rdfs: subClassOf rdf: resource="#Network_Management"/>
</owl: Class>
<owl: Class rdf: about="#NM_Weather">
  <rdfs: subClassOf rdf: resource="#Network_Management"/>
</owl: Class>
<owl: ObjectProperty rdf: ID="relationship2">
  <rdfs: domain rdf: resource="#NM_Event_Management"/>
</owl: ObjectProperty>
<owl: DatatypeProperty rdf: ID="nm_IP_Num">
  <rdfs: range rdf: resource="http://www.w3.org/2001/XMLSchema#string"/>
  <rdfs: domain>
    <owl: Class>
      <owl: unionOf rdf: parseType="Collection">
        <owl: Class rdf: about="#NM_Configuration"/>
        <owl: Class rdf: about="#NM_Topology"/>
      </owl: unionOf>
    </owl: Class>
  </rdfs: domain>
</owl: DatatypeProperty>
<owl: FunctionalProperty rdf: ID="relationship">
  <rdf: type rdf: resource="http://www.w3.org/2002/07/owl#ObjectProperty"/>
</owl: FunctionalProperty>
<owl: FunctionalProperty rdf: ID="NetManagementOntology_Slot_9">
  <rdf: type rdf: resource="http://www.w3.org/2002/07/owl#DatatypeProperty"/>
  <rdfs: range rdf: resource="http://www.w3.org/2001/XMLSchema#string"/>
</owl: FunctionalProperty>
<NM_Event_Management rdf: ID="NetManagementOntology_Instance_20">
  <relationship2>
    <NM_Topology rdf: ID="NetManagementOntology_Instance_18">
```



```
<nm_IP_Num rdf: datatype="http://www.w3.org/2001/XMLSchema#string"
>166.111.247.253</nm_IP_Num>
</NM_Topology>
</relationship2>
</NM_Event_Management>
<NM_Topology rdf: ID="NetManagementOntology_Instance_19">
  <nm_IP_Num rdf:datatype="http://www.w3.org/2001/XMLSchema#string"
  >166.111.247.254</nm_IP_Num>
  <nm_IP_Num          rdf:          datatype="http:
//www.w3.org/2001/XMLSchema#string"
  >1222</nm_IP_Num>
</NM_Topology>
</rdf: RDF>
```

Designing dynamic services composition must start with specifying abstract processes, which capture high level requirements of the process. This can be done with service logic modeling. Then with the help of Jena, we can query across service with certain modeling. And validation of the correctness, the operation between two services can be depicted through Service Algebra and Service Matrix.

## 8. Conclusion

With more and more mobile Internet service resources, service options and more difficult, people demand more and more complex services, managed services resources to get more and more attention to the researchers, the current research work focuses on in terms of category management services, quality management, service composition, etc., although these have put a lot of solutions, but the management and quality of service can rarely, classification, retrieval, and the combination as a whole to conduct research. This paper considers the needs of these management, functional and non-functional properties of the service attributes combine to achieve a classification query service, automatic composition and choice of services to provide an effective mobile Internet service resource management system. Based on the study on the basis of the relevant service management conducted a preliminary study, and achieved some results, however, due to the results of the mobile Internet service complexity, there are still many aspects need further study.

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## References

- [1] M. W. Kim and K. S. Kim, "Trial of Communication Services Based on Wireless Ubiquitous Network", *Computers and Industrial Engineering(CIE)*, (2010).
- [2] X. F. Qiu, J. W. Liu and P. C. Zhao, "Secure cloud computing architecture on mobile internet", *Artificial Intelligence, Management Science and Electronic Commerce (AIMSEC)*, (2011).
- [3] D. Benyamina, A. Hafid and M. Gendreau, "Wireless Mesh Networks Design- A Survey", *Communications Surveys & Tutorials*, (2012).
- [4] D. Qiang, "Network Service Description and Discovery in Ubiquitous and Pervasive Grids", *Globecom Workshops*, (2011).
- [5] X. L. Zhu and B. Wang, "Web Service Management Based on Hadoop", *Service Systems and Service Management (ICSSSM)*, (2011).
- [6] H. M. T. A. Ariyaratna and D. N. Ranasinghe, "JXTA Based Parallel Service Invocation Model for Peer to Peer Web Service Composition", *Industrial and Information Systems (ICIIS)*, (2012).
- [7] J. S. Perry and R. Denn, "Java Management Extensions", Sebastopol: O'Reilly Media Inc, (2012).

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