MESSAGE FROM THE EDITOR-IN-CHIEF

Plagiarism and Intellectual Property

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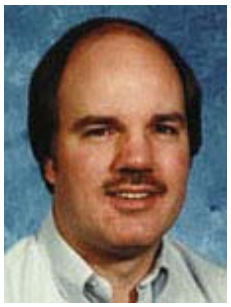

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Plagiarism is stealing and using the ideas or words of someone else's work in such a way as to make it appear as one's own, without crediting the source. When an author signs an IEEE Copyright Form, the author "represents and warrants that the work is original and that he/she is the author of the work, except possibly for material such as text passages, figures, and data that clearly identify the original source, with permission notices from the copyright owners where required."

On behalf of *IEEE Communications Magazine*, we are sorry to report the following unfortunate plagiarism incident. On pp. 100–106 of the May 2001 issue, there is an article entitled "Management of Service Level Agreements for Multimedia Internet Service Using a Utility Model," co-authored by Jong-Tae Park, Jong-Wook Baek, and James Won-Ki Hong, that has a serious problem. After publishing the issue, we received a message from Professor Eric G. Manning (University of Victoria, Canada) stating that the article contained many things copied from their work. However, the article did not list any of Professor Manning's papers in the references. Plagiarism is a very serious matter, so we requested Professor Manning to make a detailed comparison between the article and their work and to document the similarities carefully. We also consulted our IEEE Intellectual Property Rights Office. Finally, after careful investigation, we confirmed that this was indeed a case of plagiarism. Elsewhere in this issue please find the comparison to demonstrate the fact.

Articles published in *IEEE Communications Magazine* are peer-reviewed, but unfortunately we did not discover the problems with this particular article before publication. We are very sad and deeply sorry to Professor Eric G. Manning, Dr. Shahadat Khan, Professor Kin F. Li, Lei Chen, and all readers. *IEEE Communications Magazine* is a high-quality, honest publication with high standards, and we do not tolerate or condone plagiarism. We requested the authors of the article to write a formal apology letter (which appears after the comparison) and return proper

credit to the original authors. It is our strong intention to respect Professor Manning *et al.*'s research results and intellectual property.

Plagiarism is a dirty thing, that can kill people's innovative capability and hurt fair competition in research. In writing this message, we want to emphasize that *IEEE Communications Magazine* respects intellectual property rights and expects all authors to do likewise. In the research arena, respecting intellectual property helps protect authors' rights, achievements, and reputations, and stimulates the creation of new research results and innovative technologies that benefit our communications industry and readers of our magazine. In the future, we will continue to treat plagiarism as a serious matter so that *IEEE Communications Magazine* remains an honest and healthy journal, which can foster better research findings and technology advancements.

Similarities between "Management of Service Level Agreements for Multimedia Internet Service Using a Utility Model," published in May 2001 *IEEE Communications Magazine* and Our Work

Shahadat Khan, Eyeball Networks Inc.
Eric G. Manning and Kin F. Li, University of Victoria

Similarities with Singapore paper by Khan et al.

S. Khan, K.F. Li, and E.G. Manning, "The Utility Model for Adaptive Multimedia Systems" [1]	**"Management of Service Level Agreements for Multimedia Internet Service Using a Utility Model" [4]**
Section 3: "The Utility Model is a mathematical model for AMS based on the concepts of quality profile, quality-resource mapping, session and system utility, and system resource constraints."	**Page 5, last line, left column:** "The utility model is based on the concepts of quality profile, quality-to-resource mapping, resource constraints, and utility function."
Section 3.1: "The quality profile specifies the quality preferences of the user of a particular session."	**Page 5, 2nd paragraph, right column:** "The quality profile specifies the quality preferences of customers."
Section 3.1: "The quality profile of a session is a sequence of acceptable operating qualities in increasing order of preference (from minimum acceptable quality to highest desired quality)."	**Page 7, 6th paragraph:** "The quality profile is a sequence of acceptable operating qualities from the lowest acceptable to the highest acceptable operating quality."
Section 3.2 1st line: "We assume the existence of a mapping from an operating quality to the resources required to provide that quality."	**Page 5, 2nd paragraph, right column:** "We assume the existence of a mapping from an operating quality to the resources required to provide that quality."

Section 3.4 1st para: "for each resource, the sum of the quantities of the resource allocated to all the sessions cannot exceed the total available quantity of the resource."

Page 5, 2nd paragraph, right column: "For each resource related to the service, the sum of the quantities of the resource allocated to all the customers cannot exceed the total available quantities of the resource."

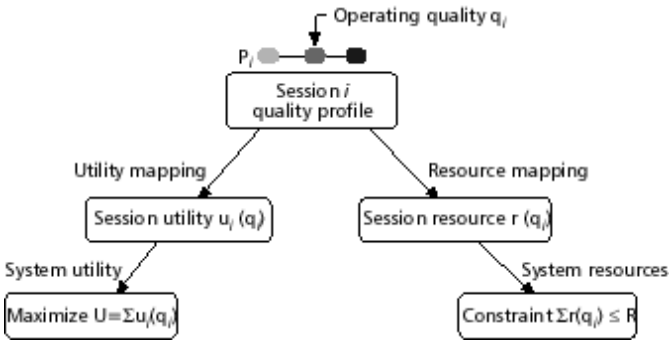


Figure 3.*The main concepts of the Utility Model.*

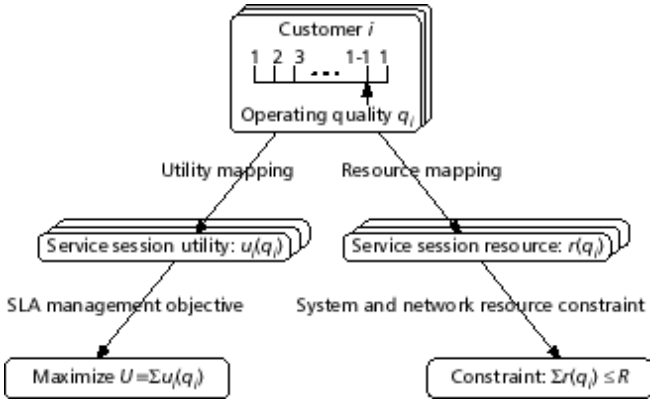


Figure 1.*The main concept of the utility model.*

Section 3.6: "Admission control is necessary for service with quality guarantees because the system has to ensure that enough resources are available at run-time to meet the minimum quality guarantee. Suppose the system currently has n sessions, and the current system utility is U_n. Now when a user requests a new session with a quality profile, the admission decision requires two steps:

1. The system checks whether any feasible solution of the AMP exists, that is whether there exists any solution where the $n + 1$ sessions can share the currently available resources. If such a solution does not exist the new session must be rejected.
2. If there exist one or more feasible solution(s) with $n + 1$ sessions, suppose the maximum system utility any feasible solution may achieve is U_{n+1}. If $U_{n+1} \leq U_n$, the new session should be rejected. Otherwise the session should be accepted."

Page 7, 2nd paragraph, right column:
"Admission control is necessary for service with quality guarantees because the system must ensure that sufficient resources are available at runtime to meet the minimum quality guarantee. Suppose the VoIP service provider currently has n sessions and the current total utility is U_n. When a customer requests a new session, the utility-driven admission control can be processed as follows:

- Step 1: The management system checks for a feasible solution of Eq. 1, where the $n + 1$ VoIP sessions can share the currently available resources. If such a solution does not exist, the new session must be rejected.
- Step 2: If a feasible solution with $n + 1$ sessions exists, suppose the maximum service utility of $n + 1$ VoIP sessions is U_{n+1}. If $U_{n+1} < U_n$ (i.e., no increase in service utility), the new session should be rejected as unprofitable; otherwise, the session should be accepted."

$$V = \text{maximize} \sum_{i=1}^{n} \sum_{j=1}^{l_i} x_{ij} v_{ij},$$

such that

$$\sum_{i=1}^{n} \sum_{j=1}^{l_i} x_{ij} r_{ijk} \le R_k, \qquad k = 1, \cdots, m,$$

$$\sum_{j=1}^{l_i} x_{ij} = 1, \qquad i = 1, \cdots, n,$$

$$x_{ij} \in \{0,1\}, \qquad i = 1, \cdots, n; \; j = 1, \cdots, l_i.$$

$$U = \sum_i \sum_j x_{ij} u_{ij}, \qquad (1)$$

where

$$\sum_i \sum_j x_{ij} r_{ij} \le R, \sum_j x_{ij} = 1 \text{ and } x_{ij} \in \{0,1\}.$$

Section 4.1, 1st paragraph: "The MMKP is one of the harder variants of the knapsack problem.[2] Since this is an NP-hard problem, we do not expect to have an algorithm which will find an optimal solution in less than exponential time."

Page 6, last paragraph, left column: "Since the problem is known to be NP-hard[10], the computation time exponentially increases in the worst case."

Section 5, 1st paragraph: "In the following we present three resource allocation policies: revenue maximization, fair share, and priority,..."

Page 7, 2nd to last paragraph, left column: "Resource allocation can be done by profit maximization, fair share policy, or priority policy."

Similarities with Puerto Rico paper by Chen et al.

Chen et al., "Building an Adaptive Multimedia System Using the Utility Model" [3]

"Management of Service Level Agreements for Multimedia Internet Service Using a Utility Model" [4]

Page 292, 1st paragraph: "It provides a unified and computationally feasible way to solve the admission problem for new multimedia sessions, and the dynamic quality adaptation and integrated resource allocation problems for existing sessions."

Page 5, last paragraph, left column: "This model provides a unified and computationally feasible approach to make session admission control, quality adaptation, and resource allocation decisions of an SLA management system for multimedia Internet service."

Page 292, 2nd paragraph: "The Utility Model is based on the concepts of quality profile, quality-resource mapping, session and system utility, and system resource constraints."

Page 5, last paragraph, left column and first para, right column: "The utility model is based on the concepts of aspects quality profile, quality-to-resource mapping, resource constraints, and utility function."

Page 292, 3rd paragraph: "The quality profile of a session is a sequence of acceptable operating qualities in an increasing order of preference (from minimum acceptable quality to highest desired quality)."

Page 7, 6th paragraph, left column: "The quality profile is a sequence of acceptable operating qualities from the lowest acceptable to the highest acceptable operating quality."

Page 292, 4th paragraph: "We assume the existence of a unique mapping from an operating quality to the resources required to provide that quality."

Page 7, 8th paragraph, left column: "The utility model assumes the existence of an operating-quality-to-required-resource mapping."

Page 293, 4th paragraph: "For each resource, the sum of the quantities of the resource allocated to all the sessions cannot exceed the total available quantity of the resource"

Page 5, 2nd paragraph, right column: "For each resource related to the service, the sum of the quantities of the resource allocated to all the customers cannot exceed the total available quantities of the resource."

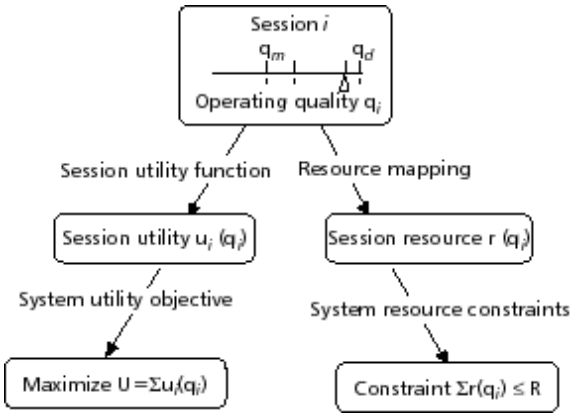


Figure 5.*The main concepts of the Utility Model.*

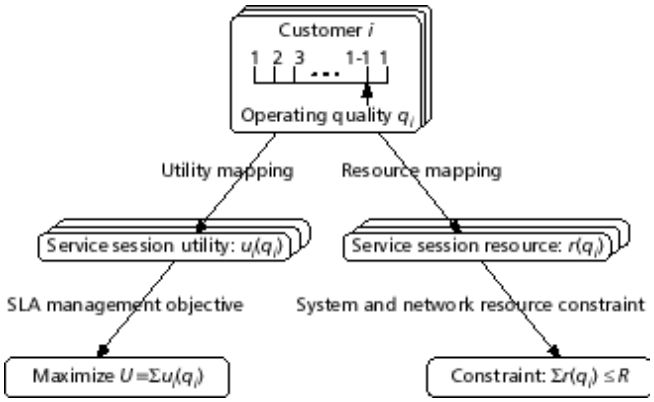


Figure 1.*The main concept of the utility model.*

Similarities with S. Khan's Ph.D. Thesis

S. Khan "Quality Adaptation in a Multisession Multimedia System: Model, Algorithms and Architecture" Ph.D. Dissertation, May 1998

"Management of Service Level Agreements for Multimedia Internet Service Using a Utility Model" [4]

Page 75, 1st line: "The Utility Model allows flexible management policies for service providers. The management policies of a service provider may either be expressed indirectly in the system utility function and parameters, or they may be expressed as additional system constraints."

Page 3: "The utility model also allows management policies to be expressed very flexibly by service providers. The management policies of a service provider can be expressed either indirectly in the service utility function and parameters or as additional system constraints."

Page 88, 1st line: Since MMKP is an NP-hard problem, the computation time for any optimal algorithm, such as BBLP, may grow exponentially with the size of the problem instance in the worst case. This may not be acceptable for time critical applications such as admission control and dynamic resource allocation in a multimedia system."

Page 6: "Since the problem is known to be NP-hard[10], the computation time exponentially increases in the worst case. This is not suitable for time-critical control and management, such as dynamic resource allocation and admission control for multimedia Internet services."

Page 63/64: "she specifies a quality profile which is a list of acceptable qualities arranged from minimum acceptable quality to maximum desired quality."

Page 7: "The quality profile is a sequence of acceptable operating qualities from the lowest acceptable to the highest acceptable operating

	quality."
Page 65: "The user must be able to specify her quality profile which expresses her QoS requirements. This can be achieved using a static table of acceptable qualities, or it may be automatically derived by profiling her usage history. For instance, Table 3.1 illustrates a simple quality profile for a session. It has only three discrete qualities: Bronze, Silver and Gold. The session's minimum acceptable quality is Bronze, and the maximum desired quality is Gold."	**Page 7:** "A VoIP service provider must be able to specify a quality profile that expresses QoS requirements. This can be achieved using a static table of acceptable qualities. For instance, a simple quality profile for a VoIP session may have three discrete qualities: bronze, silver, and gold. The VoIP session's minimum accept-able quality is bronze, and its maximum desired quality is gold."
Page 67: "In the following we discuss three resource allocation policies: revenue or profit maximization, fair share, and priority, ...	**Page 7:** "Resource allocation can be done by profit maximization, fair share policy, or priority policy."
Page 66: "The Utility Model assumes the existence of an operating-quality to required-resource mapping." "The quality-resource mapping may be obtained using off-line experimental evaluation. These evaluations are usually platform (both hardware and software) dependent,...	**Page 7:** "The utility model assumes the existence of an operating-quality-to-required-resource mapping." "Resource allocation may be obtained using offline experimental evaluation, but is dependent on the service provider's platform status."
Page 48: "This model provides a unified and computationally feasible approach to make session admission, quality adaptation and resource allocation decisions within a multisession multimedia system."	**Page 5:** "This model provides a unified and computationally feasible approach to make session admission control, quality adaptation, and resource allocation decisions of an SLA management system for multimedia Internet service."
Page 48: It is based on the concepts of quality profile, quality-resource mapping, session and system utility, and of system resource constraints.	**Page 5:** The utility model is based on the concepts of quality profile, quality-to-resource mapping, resource constraints, and utility function.
Page 54: "The main concepts of the Utility Model are illustrated in Figure 3.4."	**Page 5:** "The main concepts of the utility model for SLA management are illustrated in Fig. 1."

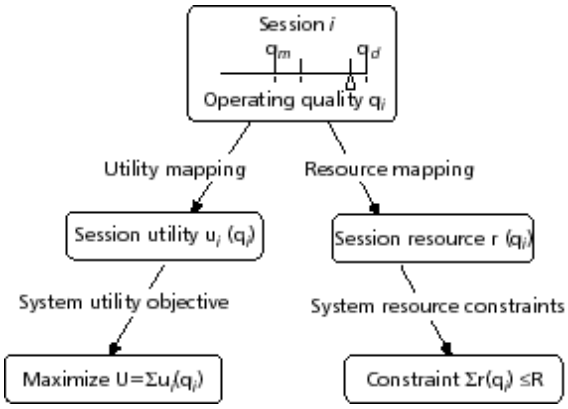


Figure 3.4.*The main concepts of the Utility Model.*

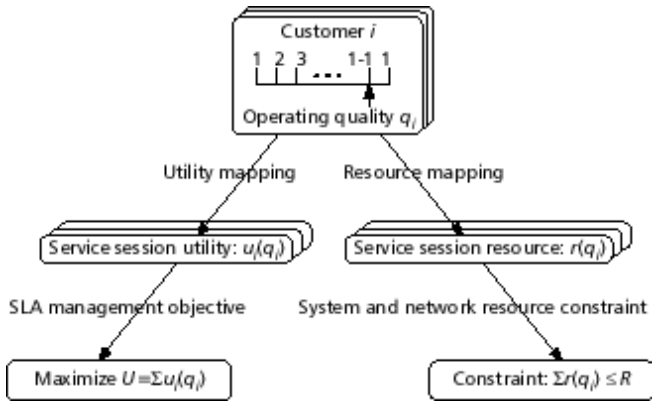


Figure 1.*The main concept of the utility model.*

Page 50: "The quality profile specifies the quality preferences of the user of a particular session."

Page 5: "The quality profile specifies the quality preferences of customers."

Page 54: "Each user specifies a quality profile which is the set of acceptable operating qualities for the session."

Page 5: "It is a set of acceptable operating qualities for the service..."

Page 51: "We assume the existence of a mapping from an operating quality to the resources required to provide that quality."

Page 5: "We assume the existence of a mapping from an operating quality to the resources required to provide that quality."

Page 54: "...for each resource, the sum of the quantities of the resource allocated to all the sessions cannot exceed the total available quantity of the resource."

Page 5: "For each resource related to the service, the sum of the quantities of the resource allocated to all the customers cannot exceed the total available quantities of the resource."

Page 88: "It starts with a solution where from each group the item with the smallest value (v_{ij}) is picked and iteratively improve the solution by gradually replacing items of smaller values with those of larger values as long as the solution remains feasible."

Page 6: "The heuristic solution starts with an operating quality that has the smallest utility in each customer and iteratively improves the solution by gradually replacing it with an operating quality that has a larger utility as long as the solution is feasible."

Page 90: "The main loop of the heuristic HEU tries to find a feasible upgrade (lines 3–19). If an upgrade is found, the solution is updated, and the heuristic starts another iteration."

- "Find a feasible upgrade involves the following steps:"
- "Find the extra aggregate resource ($\overline{\Delta}$ r) for all feasible upgrades."
- "If there exists at least one feasible upgrade which provides savings in aggregate resource (that is the extra aggregate resource computed for the upgrade is negative), then HEU

Page 67: "The main loop of the procedure HEURISTIC attempts to find a feasible upgrade (lines 310). If an upgrade is found, the solution is updated and the heuristic starts another iteration. The process of locating a feasible upgrade involves the following steps:"

- "Find the extra aggregate resources ($\overline{\Delta}$ r) for all feasible upgrades."
- "If there exists at least one feasible upgrade which provides savings in aggregate resources, procedure HEURISTIC chooses the upgrade that maximizes the savings in

chooses the upgrade which maximizes the savings in aggregate resource."

"However, if there does not exist feasible upgrade which provides savings in aggregate resource, then HEU chooses the upgrade which maximizes the value gain per unit of extra aggregate resource (p = v/ r)."

"If the heuristic fails to find a feasible upgrade in an iteration, it returns the current solution, and terminates."

aggregate resources."

- "However, if a feasible upgrade which provides savings in aggregate resources does not exist, procedure HEURISTIC chooses the upgrade that maximizes the utility gain per unit of extra aggregate resources (i.e., p = v/ r)."
- "If the heuristic fails to find a feasible upgrade in an iteration, it returns the current solution and terminates."

Page 58: "The system must check whether any feasible solution of the AMP exists, that is whether there exists any solution where the n+1 sessions can share the currently available resources. If such a solution does not exist the new session must be rejected."

"If there exist one or more feasible solution(s) with n+1 sessions, suppose the maximum system utility any feasible solution may achieve is U_{n+1}. If $U_{n+1} < U_n$, the new session should be rejected as unprofitable (i.e. no increase in system utility). Otherwise the session should be accepted."

Page 7: "Step 1: The management system checks for a feasible solution of Eq. 1, where the n+1 VoIP sessions can share the currently available resources. If such a solution does not exist, the new session must be rejected."

"Step 2: If a feasible solution with n+1 sessions exists, suppose the maximum service utility of n + 1 VoIP sessions is U_{n+1}. If $U_{n+1} < U_n$ (i.e., no increase in service utility), the new session should be rejected as unprofitable; otherwise, the session should be accepted."

References

[1] S. Khan, K. F. Li and E. G. Manning, "The Utility Model forAdaptive Multimedia Systems," International Conference on Multimedia Modeling, Singapore, November, 1997; Full text (50k compressed postscript) online at http://www.lapis.ece.uvic.ca/WWW_LAPIS/LapisPublications.html.

[2] S. Khan, "Quality Adaptation in a Multisession Multimedia System: Model, Algorithms and Architecture," Ph.D. Dissertation, May 1998; Full text (354k gzip"ed postscript) online at http://www.lapis.ece.uvic.ca/WWW_LAPIS/LapisPublications.html.

[3] L. Chen, *et al.*, "Building an Adaptive Multimedia System using the Utility Model" Parallel & Distributed Processing, Lecture Notes in Computer Science 1586, Springer Verlag, pp. 289–298, ISBN 3-540-65831-9; (Int"l Workshop on Parallel & Distributed Realtime Systems (WPDRTS 7), ACM/IEEE/US Navy Surface Warfare Center), San Juan PR, April 1999.

[4] J.-T. Park, J.-W. Baek and J. W.-K. Hong, "Management of Service Level Agreements For Multimedia Internet Service Using a Utility Model," *IEEE Commun. Mag.*, May 2001, vol. 39, no. 5.

Letter of Apology

Dear Prof. Manning, Prof. Kin Li and Dr. Shahadat Khan,

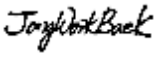
With regard to the article "Management of Service Level Agreements for Multimedia Internet Service Using a Utility Model," which appeared in the May 2001 issue of *IEEE Communications Magazine*, we are very sorry that a part of the article, including the concept and description of the Utility Model, the mathematical notation, the key diagram, and the heuristic algorithm, was reproduced without proper referencing or acknowledgement of the original work. The Utility Model was originally described in Shahadat Khan's Ph.D. thesis [1] and published in Khan *et al.* [2], using the allocation of resources in a multimedia server to illustrate its use. A UNIX-based implementation and some experimental data were given in Chen *et al.* [3], and a patent application has been filed by Manning *et al.* describing its application to SLAs.

We would like to deeply apologize to Prof. Eric Manning and Prof. Kin Li of the University of Victoria, and to Dr. Shahadat Khan, for the distress and anger they experienced when they read

the article published in the magazine.

Finally, we all confirm that both Jong-Tae Park and James Won-Ki Hong were unaware of this act of plagiarism, which was committed by Jong-Wook Baek.

Sincerely,



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[1] Shahadat Khan, "Quality Adaptation in a Multisession Multimedia System: Model, Algorithms and Architecture," Ph.D. dissertation, May 1998, University of Victoria, B.C., Canada.
[2] Shahadat Khan, Kin F. Li, and Eric G. Manning, "The Utility Model for Adaptive Multimedia Systems," International Conference on Multimedia Modeling, Singapore, November 1997.
[3] Lei Chen, Shahadat Khan, Kin F. Li, and Eric G. Manning, "Building an Adaptive Multimedia System Using the Utility Model," *Parallel and Distributed Processing*, Lecture Notes in Computer Science 1586, Springer Verlag, pp 289–98.