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Chapter 1 : Chapters in books

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Cloud computing challenges are numerous and thorny, to be sure. In the RightScale State of the Cloud Report , 96 percent of IT professionals surveyed said their companies were using cloud computing services, and 92 percent were using the public cloud. On average, organizations are running about 40 percent of their workloads in the cloud, and that percentage is growing. As companies move more applications to the cloud, the cloud market is booming. The infrastructure as a service IaaS market is growing particularly fast. This segment alone could grow However, numerous surveys are finding that organizations still have concerns about cloud computing. While IT leaders are embracing the cloud because of the benefits it offers, they continue to face very significant cloud computing challenges, including the following: Cloud Computing Challenge 1: In the RightScale survey, it was the number one challenge cited by respondents, with 77 percent saying that cloud security is a challenge, including 29 percent who called it a significant challenge. A Crowd Research Partners survey found that 90 percent of security professionals are concerned about cloud security. More specifically, they have fears about data loss and leakage 67 percent , data privacy 61 percent and breaches of confidentiality 53 percent. Interestingly, though, security concerns appear to be waning as time passes, particularly among companies that have been using the cloud longer. The RightScale report noted, "As companies become more experienced with cloud, the top challenge shifts. Security is the largest issue among cloud beginners, while cost becomes a bigger challenge for intermediate and advanced users. Vendors offer a myriad of solutions for dealing with cloud security threats. In addition, the Crowd Research Partners survey found that enterprises are relying on training and certification of their IT staff 57 percent and the security tools offered by public cloud vendors 50 percent to reduce their risk. Managing Cloud Spending As previously mentioned, the RightScale report found that for some organizations managing cloud spending has overtaken security as the top cloud computing challenge. By their own estimates, companies are wasting about 30 percent of the money they spend on the cloud. Organizations make a number of mistakes that can help drive up their costs. Often, developers or other IT workers spin up a cloud instance meant to be used for a short period of time and forget to turn it back off. And many organizations find themselves stymied by the inscrutable cloud pricing schemes that offer multiple opportunities for discounts that organizations might not be utilizing. Multiple technological solutions can help companies with cloud cost management challenges. For example cloud cost management solutions, automation, containers, serverless services, autoscaling features and the many management tools offered by the cloud vendors may help reduce the scope of the problem. Some organizations have also found success by creating a central cloud team to manage usage and expenses. Cloud Computing Challenge 3: Nearly three-quarters 73 percent of respondent listed it as a challenge with 27 percent saying it was a significant challenge. While many IT workers have been taking steps to boost their cloud computing expertise, employers continue to find it difficult to find workers with the skills they need. And that trend seems likely to continue. The Robert Half Technology Salary Guide noted, "Technology workers with knowledge of the latest developments in cloud, open source, mobile, big data, security and other technologies will only become more valuable to businesses in the years ahead. Many companies are hoping to overcome this challenge by hiring more workers with cloud computing certifications or skills. Experts also recommend providing training to existing staff to help get them up to speed with the technology. Cloud Computing Challenge 4: Governance Governance and control were fourth in the list of cloud computing challenges in the RightScale survey with 71 percent of respondents calling it a challenge, including 25 percent who see it as a significant challenge. In this case, one of the greatest benefits of cloud computing â€” the speed and ease of deploying new computing resources â€” can become a potential downfall. Many organizations

lack visibility into the "shadow IT" used by their employees, and governance becomes particularly challenging in hybrid cloud and multi-cloud environments. Experts say organizations can alleviate some of these cloud computing management issues by following best practices , including establishing and enforcing standards and policies. And multiple vendors offer cloud management software to simplify and automate the process. Cloud Computing Challenge 5: Among those surveyed by RightScale, 68 percent cited compliance as a top cloud computing challenge, and 21 percent called it a significant challenge. Interestingly, one aspect of the GDPR law may make compliance easier in the future. The law requires many organizations to appoint a data protection officer who oversees data privacy and security. Assuming these individuals are well-versed in the compliance needs for the organizations where they work, centralizing responsibility for compliance should help companies meet any legal or statutory obligations. Cloud Computing Challenge 6: According to the RightScale findings, 81 percent of enterprises are pursuing a multi-cloud strategy, and 51 percent have a hybrid cloud strategy public and private clouds integrated together. In fact, on average, companies are using 4. Multi-cloud environments add to the complexity faced by the IT team. To overcome this challenge, experts recommend best practices like doing research, training employees, actively managing vendor relationships and re-thinking processes and tooling. Cloud Computing Challenge 7: Migration While launching a new application in the cloud is a fairly straightforward process, moving an existing application to a cloud computing environment is far more difficult. A Dimensional Research study sponsored by Velostrata found that 62 percent of those surveyed said their cloud migration projects were more difficult than expected. In addition, 64 percent of migration projects took longer than expected, and 55 percent exceeded their budgets. More specifically, many of the companies migrating applications to the cloud reported time-consuming trouble-shooting 47 percent , difficulty configuring security 46 percent , slow data migration 44 percent , trouble getting migration tools to work properly 40 percent , difficulty syncing data before cutover 38 percent and downtime during migration 37 percent. To overcome those challenges the IT leaders surveyed said they wished they had performed more pre-migration testing 56 percent , set a longer project timeline 50 percent , hired an in-house expert 45 percent and increased their budgets 42 percent. Cloud Computing Challenge 8: For both analysts and enterprise IT leaders, this raises the specter of vendor lock-in. In a Stratoscale Hybrid Cloud Survey , more than 80 percent of those surveyed expressed moderate to high levels of concern about the problem. Cloud Computing Challenge 9: Immature Technology Many cloud computing services are on the cutting edge of technologies like artificial intelligence, machine learning, augmented reality, virtual reality and advanced big data analytics. Part of the problem, cited by 49 percent of respondents, was immature or low-performing technology. And unfortunately, the only potential cures for the problem are to adjust expectations, try to build your own solution or wait for the vendors to improve their offerings. Cloud Computing Challenge Integration Lastly, many organizations, particularly those with hybrid cloud environments report challenges related to getting their public cloud and on-premise tools and applications to work together. In the Teradata survey, 30 percent of respondents said connecting legacy systems with cloud applications was a barrier to adoption. Similarly, in a Software One report on cloud spending , 39 percent of those surveyed said connecting legacy systems was one of their biggest concerns when using the cloud. This challenge, like the others mentioned in this article, is unlikely to disappear any time in the near future. Integrating legacy systems and new cloud-based applications requires time, skill and resources. But many organizations are finding that the benefits of cloud computing outweigh the potential downside of the technology. Look for the trend toward cloud adoption to continue, despite the potential cloud computing challenges.

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Chapter 2 : Topic Report: Grand Challenge Problems

Toward Teraflop Computing and New Grand Challenge Applications: February , Louisiana State University: Proceedings of the Mardi Gras '94 Conference Hardcover - January 1, by Rajiv K. Kalia (Editor), Priya Vashishta (Editor).

HPE takes teraflop computing to space â€" and beyond 28th of September Imagine a future where astronauts aboard a spaceship, or exploring Mars, can leverage supercomputing power to conduct simulations, run artificial intelligence AI applications, collect, analyse and then transmit data back to Earth, in real time, clearly and without delays. A future where space exploration missions can use high performance, commercial off-the-shelf computers that offer teraflop speeds according to WhatIs. Imagine a future where a space-bound parent can call their Earth-bound child in real-time, on their smartphone, to wish them for their birthday. In fact, computers have fundamentally changed and advanced space travel over the years. However, in the past, engineers would spend a considerable amount of time, resources and money to ruggedise and harden the computer enough to withstand the harsh environments of space that by launch time, the machine is usually already obsolete. Think radiation, solar flares, subatomic particles, micrometeoroids, unstable electrical power, irregular cooling and a host of other environmental factors. Even without traditional ruggedising, our system still passed the safety tests and certifications in order to be NASA-approved for space. Though there are no hardware modifications to these components, HPE created a unique water-cooled enclosure for the hardware and developed purpose-built system software to address the environmental constraints and reliability requirements of supercomputing in space. During this mission, HPE Apollo servers will continuously run compute- and data â€" intensive HPC benchmark tests in the changing environmental conditions and monitor factors such as power consumption. Engineers will then compare the performance, runtime, and results of these machines with the output of two identical earth-based systems; both the twin to Spaceborne. This will allow HPE to determine the effects of harsh environmental factors like radiation on HPC machines and adapt them in real-time. The objective is to enable the launch of the latest COTS supercomputers â€" as is â€" for use on long-range space voyages. What will it do? The goal of this powerful collaboration is to provide interplanetary missions with the latest supercomputing capabilities that support simulation, AI and real-time data collection and analysis, while reducing the latency and expense of transmitting data back to distant Earth. Since the Spaceborne Computer is designed to address the in-situ needs of astronauts, and potential eventual space settlers, for experimental and other data processing capabilities, HPE will be running internationally recognised benchmark tests to simulate the wide variety of possible processing required. Today, most of the calculations needed for space research projects are still done on Earth, due to the limited computing capabilities in space creating a challenge when transmitting data to and from space. While this approach works for space exploration to the moon or in low Earth orbit LEO , when astronauts can be in near real-time communication with Earth, the further they go, the larger the communication latencies become. This means it could take up to 20 minutes for communications to reach Earth, and then another 20 minutes for responses to reach astronauts. The long communication lag makes any on-the-ground exploration missions challenging and potentially dangerous, especially if astronauts are met with any mission critical scenarios where immediate communication with Earth is absolutely essential. By sending a supercomputer to space, HPE is taking the first step in that direction. Should the mission prove successful, the experiment will highlight that HPE equipment will be well-suited for any terrain, environment or project back home, on Earth. This dramatically shortens typical communication times and, with real-time analytics, could open up a world of possibility for disaster predictions, and can even mean the difference between life and death. How does HPE fit in? This mission cements that relationship, with the provision of Spaceborne. We were the first to build industry standard servers for the market.

Chapter 3 : What is a Teraflop? - Definition from Techopedia

Impacts and Challenges in Oil Palm Cultivation and Downstream Applications of Biomass Fire and the Sword: Understanding the Impact and Challenge of Organized Islamism.

I have not concentrated on one specific area. Instead I have worked in a number of theoretical areas and several application that are related. The topics include multigrid, numerical simulation of flames, domain decomposition, numerical linear algebra, iterative methods, or esoteric computing methods. The papers are in chronological order. Books and Procceedings Books 1. Ao, Oscar Castillo, C. Online version Tutorial 1. Powell, Dynamic data-driven application systems: Oden et al, Simulation-Based Engineering Science: Douglas, Multi-grid algorithms for solving elliptic partial differential equations, Ph. Schoenstadt, editors, Academic Press, New York, , pp. Douglas, A multigrid optimal order solver for elliptic boundary value problems: Miranker, Generating parallel algorithms through multigrid and aggregation-disaggregation techniques, in Computational Acoustics: Algorithms and Applications, D. Miranker, Some nontelescoping parallel algorithms based on serial multigrid-aggregation-disaggregation techniques, in Multigrid Methods, S. Mandel, The domain reduction method: Douglas, A note on a statistical model of computation for parallel, distributed, or serial computers, in Proceedings of the Copper Mountain Conference on Iterative Methods, T. Douglas, A variation of the Schwarz alternating method: Miranker, The multilevel principal applied to sorting, BIT, 30 , pp. Douglas, Parallel multigrid, domain decomposition, and projection methods are all similar, Transactions of the American Nuclear Society, 62 , pp. Miranker, Beyond massive parallelism: Douglas, An almost assumptionless convergence theory for the full approximation scheme or multiple coarse space multigrid algorithms, in Multigrid Methods: Augustin, Germany, , pp. Douglas, A tupleware approach to domain decomposition methods, Applied Numerical Mathematics, 8 , pp. Douglas, The effect of interpolation on the rate of convergence in two level algorithms for elliptic partial differential equations, in Proceedings of the Second Copper Mountain Conference on Iterative Methods, Volume 1, T. Mandel, A group theoretic approach to the domain reduction method, Computing, 48 , pp. Douglas, Some remarks on completely vectorizing point Gauss-Seidel while using the natural ordering, Advances in Computational Mathematics, 2 , pp. A family of abstract multigrid or multilevel solvers, Computational and Applied Mathematics, 14 , pp. Schultz, A rigorous analysis of time domain parallelism. Parallel Algorithms and Applications, 6 , pp. Smooke, Detailed chemistry modeling of laminar diffusion flames on parallel computers, International Journal of Supercomputer Applications and High Performance Computing, 9 , pp. Douglas, Caching in with multigrid algorithms: High performance computing and numerical simulation of flames ZAMM, 76 , pp. Douglas, A sparse matrix approach to abstract multilevel solvers on serial and parallel computers. ZAMM, 76 , pp. Smooke, Multigrid solution of flame sheet problems on serial and parallel computers, Parallel Algorithms and Applications, 10 , pp. Schultz, A characterization of mapping unstructured grids onto structured grids and using multigrid as a preconditioner, BIT, 37 , pp. Weiss, Cache optimization for structured and unstructured grid multigrid, Elect. State of the Art, Z. PDE, 17 , Iskandarani, An acceleration procedure for the spectral element ocean model formulation of the shallow water equations, Contemporary Mathematics, , pp. Mathematical and Numerical Treatment, Z. Thorne, A note on cache memory methods for multigrid in three dimensions, Contemporary Mathematics, , pp. Iskandarani, An additive Schwarz preconditioner for the spectral element ocean model formulation of the shallow water equations, Elec. Reitzinger, Special solution strategies inside a spectral ocean element model, Math. M3AS , 13 , pp. Douglas, Preconditioned multigrid simulation of an axisymmetric laminar diffusion flames, Mathematical and Computer Modeling, 38 , pp. Haase, Algebraic multigrid and Schur complement strategies within a multilayer spectral element ocean model, Contemporary Math. Also, in Current Trends in Scientific Computing: Tuminaro, Cache aware multigrid for variable coefficient elliptic problems on adaptive mesh refinement hierarchies, Numerical Linear Algrebra and Applications, 11 , pp. Lazarov, Dynamic data driven simulations in stochastic environments,

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Chapter 4 : Top 10 Cloud Computing Challenges

2. Toward teraflop computing and new grand challenge applications: proceedings of the Mardi Gras '94 Conference: February , , Louisiana State University 2. 3. Toward teraflop computing and new grand challenge applications: proceedings of the [2nd] Mardi Gras '94 Conference: February

General Information About The Author: Box Lexington, VA Comments: Grand Challenge Problems The High Performance Computing and Communication HPCC defines a grand challenge as "a fundamental problem in science and engineering with broad economic and scientific impact, whose solutions can be advanced by applying high performance computing techniques and resources. A common theme in parallel computing, and in grand challenges in particular, is the use of the computer simulation paradigm. Computer simulation involves the use of a mathematical model to simulate a real world situation or problem, and then using computers to calculate the results of these mathematical models. Often the use of a simulation has many characteristics that make it much more desirable than actually performing an experiment in the real world. For example, a computer is now be constructed to perform computer simulations of nuclear weapons explosions. Obviously the ability to avoid actually testing the nuclear weapons provides considerable savings in terms of environmental as well as monetary costs. Many computer simulation problems are inherently parallel, especially the grand challenge problems. Our goal is to provide accurate solutions to these computer models in a reasonable period of time. A reasonable period of time can range from several days in certain models to several hours if weather prediction is the goal. Obviously the weather prediction is no good if it is available only after the day it is predicting is already over! In addition to computer modeling, a new set of grand challenge problems has arisen in the field of real time simulation. These involve the need to instantaneously perform a large number of calculations in order to provide real time data to researchers. For example, astronomers want radio telescope images to appear in real time so that they can use these images to point the instruments more accurately. Another application is to use virtual modeling techniques to allow more accurate controls of scanning electron microscopes. To solve these grand challenge problems requires performance in the teraflop range trillion floating point operations per second , and very large gigabyte memories. We have nearly reached our limit as to how fast a single proccessor can run, due to physical restrictions of the silicon used in the manufacture of computer chips as well as the speed of light. Faster speeds are being obtained using massively parallel machines as well as using very fast networks of machines. The United States government issues grants yearly to new supercomputing projects across the country. Grand Challenge Awards represent some of the most current work in the grand chellenge feild of computing. Some of the current research involves:

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Chapter 5 : SCS Home Page - Publications

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Pinterest0 Kena Setshogoe, Managing Director for South Africa at HPE Imagine a future where astronauts aboard a spaceship, or exploring Mars, can leverage supercomputing power to conduct simulations, run artificial intelligence AI applications, collect, analyse and then transmit data back to Earth, in real time, clearly and without delays. A future where space exploration missions can use high performance, commercial off-the-shelf computers that offer teraflop speeds according to WhatIs. Imagine a future where a space-bound parent can call their Earth-bound child in real-time, on their smartphone, to wish them for their birthday. In fact, computers have fundamentally changed and advanced space travel over the years. However, in the past, engineers would spend a considerable amount of time, resources and money to ruggedise and harden the computer enough to withstand the harsh environments of space that by launch time, the machine is usually already obsolete. Think radiation, solar flares, subatomic particles, micrometeoroids, unstable electrical power, irregular cooling and a host of other environmental factors. Even without traditional ruggedising, our system still passed the safety tests and certifications in order to be NASA-approved for space. Though there are no hardware modifications to these components, HPE created a unique water-cooled enclosure for the hardware and developed purpose-built system software to address the environmental constraints and reliability requirements of supercomputing in space. During this mission, HPE Apollo servers will continuously run compute- and data â€" intensive HPC benchmark tests in the changing environmental conditions and monitor factors such as power consumption. Engineers will then compare the performance, runtime, and results of these machines with the output of two identical earth-based systems; both the twin to Spaceborne. This will allow HPE to determine the effects of harsh environmental factors like radiation on HPC machines and adapt them in real-time. The objective is to enable the launch of the latest COTS supercomputers â€" as is â€" for use on long-range space voyages. What will it do? The goal of this powerful collaboration is to provide interplanetary missions with the latest supercomputing capabilities that support simulation, AI and real-time data collection and analysis, while reducing the latency and expense of transmitting data back to distant Earth. Since the Spaceborne Computer is designed to address the in-situ needs of astronauts, and potential eventual space settlers, for experimental and other data processing capabilities, HPE will be running internationally recognised benchmark tests to simulate the wide variety of possible processing required. Today, most of the calculations needed for space research projects are still done on Earth, due to the limited computing capabilities in space creating a challenge when transmitting data to and from space. While this approach works for space exploration to the moon or in low Earth orbit LEO , when astronauts can be in near real-time communication with Earth, the further they go, the larger the communication latencies become. This means it could take up to 20 minutes for communications to reach Earth, and then another 20 minutes for responses to reach astronauts. The long communication lag makes any on-the-ground exploration missions challenging and potentially dangerous, especially if astronauts are met with any mission critical scenarios where immediate communication with Earth is absolutely essential. By sending a supercomputer to space, HPE is taking the first step in that direction. Should the mission prove successful, the experiment will highlight that HPE equipment will be well-suited for any terrain, environment or project back home, on Earth. This dramatically shortens typical communication times and, with real-time analytics, could open up a world of possibility for disaster predictions, and can even mean the difference between life and death. How does HPE fit in? This mission cements that relationship, with the provision of Spaceborne. We were the first to build industry standard servers for the market.

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Chapter 6 : Unlocking Wind's Potential: Supercomputing's Grand Challenge

@INPROCEEDINGS{Chong95multiprocessorruntime, author = {Frederic T. Chong and Shamik D. Sharma and Eric A. Brewer Z and Joel Saltz X}, title = {Multiprocessor Runtime Support for Fine-Grained, Irregular DAGs}, booktitle = {In Rajiv K. Kalia and Priya Vashishta, editors, Toward Teraflop Computing and New Grand Challenge Applications}, year.

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Chapter 7 : HPE takes teraflop computing to space â€“ and beyond - Connect-World

Toward Teraflop Computing and New Grand Challenge Applications Toward Teraflop Computing & New Grand Challenge Applications Proceedings Of The Mardi Gras '94 Conference, February , Louisiana State University.

Multi-precision Laplace transform inversion, Int. Optimizing compilers for modern architectures: A note on the vectorization of scalar recursions. A distributed packed storage for large dense parallel incore calculations, Tech. Toward memory-efficient linear solvers, Lecture Notes in Computer Science, , s. Near optimal Cholesky factorization on orthogonal multiprocessors, Information Processing Letters, 84, s. On the numerical evaluation of linear recurrences, J. On the parallel evaluation of a sparse polynomial at a point. Solving linear lecurrences with loop raking, Journal of Parallel and Distributed Computing, 25, s. The impact of multicore on math software, Lecture Notes in Computer Science, , s. Solving linear recurrence systems on mesh-connected computers with multiple global buses, Journal of Parallel and Distributed Computing, 8, s. The formal derivation of parallel triangular system solvers using a coordination-based design method. Time and parallel processor bounds for linear recurrence systems. Practical parallel band triangular system solvers, ACM Trans. UPC Language Specifications, A set of level 3 basic linear algebra subprograms, ACM Trans. Block reduction of matrices to condensed form for eigenvalue computations, J. Solving banded systems on parallel processor, Parallel Computing, 5, s. An Introduction to Parallel Computing: Design and Analysis of Algorithms, Addison Wesley, Efficient parallel algorithms for linear recurrence computation, Inf. New generalized data structures for matrices lead to a variety of high performance algorithms, Lect. High-performance linear algebra algorithms using new generalized data structures for matrices, IBM J. Three algorithms for Cholesky factorization on distributed memory using packed storage, Lecture Notes in Computer Science, , s. Hendrickson, et al, eds. The complexity of parallel evaluation of linear recurrences. Solving narrow banded systems on ensemble architectures. Analiza numeryczna, WNT, Warszawa An overview of cache optimization techniques and cache-aware numerical algorithms, Lecture Notes in Computer Science, , s. Rownania rekurencyjne, PWN, Warszawa A comparison of asymptotically scalable super-scalar processors, Theory of Computing Systems, 35, s. A Parallel block iterative method for interactive contacting rigid multibody simulations on multicore PCs, Lecture Notes in Computer Science, , s. Review of general and Toeplitz vector bidiagonal solvers. A new method for solving triangular systems on distributed-memory message-passing multiprocessors. A simple parallel algorithm for polynomial evaluation. A parallel algorithm for evaluating general linear recurrence equations. Creating Science-driven Computer Architecture: Optimal algorithms for parallel polynomial evaluation, J. Netwok Computer Services Inc.: Parallel solution of linear recurrence systems, Z. Introduction to Parallel Processing: Algorithms and Architectures, Plenum Press, Pipeline interleaving and parallelism in recursive digital filters, part ii: Parallel solutions of triangular systems of equations, Parallel Comput. Solving triangular systems on a parallel computer. Parallel algorithms for solving linear recurrence systems, Lecture Notes in Computer Science, , s. Parallel Cholesky factorization on orthogonal multiprocessors, Parallel Computing, 18, s. Efficient data-parallel algorithms for computing trigonometric sums, Ann. A new message passing algorithm for solving linear recurrence systems, Lecture Notes in Computer Science, , s. Fast parallel algorithm for polynomial evaluation, Parallel Algorithms and Applications, 18, s. Fast solver for Toeplitz bidiagonal systems of linear equations, Ann. Mariae Curie-Sklodowska Informatica, 1, s. Evaluating recursive filters on distributed memory parallel computers, Comm. New data distribution for solving triangular systems on distributed memory machines, Lecture Notes in Computer Science, , s. Evaluating linear recursive filters using novel data formats for dense matrices, Lecture Notes in Computer Science, , s. Bailey, et al, eds. The accurate numerical inversion of Laplace transforms, J. Vectorization of linear recurrence relations. A parallel method for tridiagonal equations.

Chapter 8 : Toward teraflop computing and new grand challenge applications (Book,) [calendrierdelascien

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Chapter 9 : TERAFLOP - Definition and synonyms of teraflop in the English dictionary

HPE takes teraflop computing to space - and beyond. run artificial intelligence (AI) applications, collect, analyse and then transmit data back to Earth, in real time, clearly and without.