

Intel Tecnología de México, S.A. de C.V. GRANT AGREEMENT

1.0 PARTIES AND PERSONNEL.

1.1 Grantor:

- 1.1.1 Name: Intel Tecnología de México, S.A. de C.V.
- 1.1.2 Address: Av. Del Bosque #1001, Col. El Bajío, Zapopan, Jalisco, México, C.P. 45019

1.2 Grantee:

- 1.2.1 Name: Benemérita Universidad Autónoma de Puebla (BUAP)
- 1.2.2 Address: 4 sur 104 Centro Histórico, Puebla, Puebla C.P. 72000

1.3 Grantor's Primary Contact:

- 1.3.1 Name: Arturo García
- 1.3.2 Telephone: 52-33-3540-6000
- 1.3.3 Email: Arturo.garcia@intel.com

1.4 Grantee's Project Director and Primary Contact:

- 1.4.1 Name: Yalú Galicia Hernández
- 1.4.2 Telephone: 222 2995500 ext 7204
- 1.4.3 Email: ygalicia@cs.buap.mx

1.5 Grantor and Grantee may be referred to herein by their names, as Grantor or Grantee, as a Party or collectively as the Parties.

1.6 Status of Grantee: Grantee represents and warrants that its corporate form is one of the following: (i) an educational entity that is a tax-exempt political subdivision of a government that is a publicly funded and operated; or (ii) a not-for-profit non-governmental organization ("NGO") as evidenced by the government issued determination letter. Further, Grantee represents and warrants that it is NOT a private foundation or a for-profit corporation.

2.0 BACKGROUND AND TERM.

2.1 Project Description: The "Project" is defined as follows and is to be achieved with the funds set forth in Section 4:

- 2.1.1 Project Title: BUAP Software Specialization Program (Programa de Especialización Linux Intel – BUAP)
- 2.1.2 Location(s) where Project is to be conducted: Puebla, México.
- 2.1.3 Start and ending dates: October 10th, 2014 – April 30th, 2015
- 2.1.4 A detailed description of the Project's goals, activities and milestones must be included in Attachment 1 and Attachment 2 hereto, incorporated herein by reference.

2.2 Term: This Grant Agreement begins on October 10th, 2014 and expires on April 30th, 2015 ("Grant Term").

3.0 GRANT AGREEMENT DEFINED. This agreement is composed of these terms and conditions herein entitled *Grant Agreement*, and the attachments listed below (collectively, the "Grant Agreement"):

3.1 Attachments:

- 3.1.1 Project Narrative: Attachment 1.
- 3.1.2 Project Budget: Attachment 2.

3.2 Resolution of Discrepancies: If an inconsistency exists between these terms and conditions entitled *Grant Agreement* and the documents attached hereto, the former will take precedence and govern. Any such inconsistency discovered by Grantee must be brought to Grantor's attention for resolution.

4.0 FUNDING.

4.1 Amount: The total amount of the Grant is \$260,000 MXN, (referred to as the "Grant Funds").

4.2 Schedule of Payments and Reports: The Grant Funds will be paid in one or more payments as shown in the table below, provided that the conditions precedent for each payment are met by Grantee.

Payment Number	Amount	Due Date	Progress or Final Report	Report Due Dates
#1	260,000 MXN	Within 30 days after signing Grant Agreement and receipt of all forms required by Intel Accounting	Final	May 15 th , 2015
#2				
#3				
TOTAL	260,000 MXN			

4.3 Method of Payment: Grantor will deliver the Grant Funds to Grantee by check or electronic deposit based on the address or banking information provided to Grantor for its accounting system.

4.4 Conditions Precedent to Funding: Grantor will not issue any whole or partial payment of the Grant Funds until the following items have been timely received by Grantor and are, in Grantor's sole discretion, satisfactory.

- 4.4.1 Receipt of documents identified in Section 3.1;
- 4.4.2 Receipt of all documents required by the Intel Accounts Payable department to set up Grantee payments;
- 4.4.3 Receipt of progress reports as referenced in Section 5, with required content, before any subsequent payments are made; and
- 4.4.4 Evidence that satisfactory progress is being made toward achieving the goals of the Project.

4.5 Unexpended Funds:

- 4.5.1 "Unexpended Funds" Defined: Unexpended Funds may be identified during a Project or at the conclusion of a Project. Unexpended Funds include: (i) funds in excess of the funds necessary to complete the defined Project; (ii) funds that will not be used to support the Project because the Project failed or cannot be completed; and/or (iii) funds remaining at the end of a defined Project which Grantee has proposed to use in a particular way but which were unapproved by Grantor for such use.
- 4.5.2 Proposed Use of Unexpended Funds: Grantee may submit to Grantor a budget and proposal to use any Unexpended Funds on projects that are consistent with the original Project described in the Grant Agreement. Grantee agrees not to use or make commitments regarding any alternate proposed use of the Unexpended Funds until and unless approved in writing by Grantor. If Grantor does not approve the proposal, then Section 4.5.3 applies.
- 4.5.3 Return Unexpended Funds: Grantee agrees to repay/return Unexpended Funds within 30 days after receipt of a demand letter from Grantor.

5.0 REPORTS. Reports inform Grantor about the progress made in conducting the activities required to achieve the goal of the Grant. Progress reports will be required during the Grant Term on dates shown in the chart in Section 4.2, and must be received in a form that complies with the Grantor's requirements prior to and as a condition precedent to Grantor's proceeding with payments. The final report must be received to conclude the Grant Agreement. Failure to submit a final report will, at a minimum, disqualify the Grantee from receiving consideration for any future funding from Grantor.

6.0 GRANTEE ROLES AND RESPONSIBILITIES.

- 6.1 Performance: Grantee will perform and be responsible for the following:
- 6.1.1 Complete the Project activities described in this Grant Agreement and achieve the goals stated in Section 2.1;
 - 6.1.2 Use the Grant Funds received from Grantor solely for the Project described in this Grant Agreement; and
 - 6.1.3 Refrain from using Grant Funds (i) for a non-charitable or non-educational purpose, (ii) for any activities that concern (a) nuclear end uses, (b) chemical and/or biological weapons, (c) missile technology, or (d) terrorist activities, or (iii) in violation of Sections 8.3, 8.4, and/or 8.5 below.
- 6.2 Grantor's Approval Required: Grantee agrees to gain Grantor's approval in advance of any of the following:
- 6.2.1 Proposed change in the Project's activities or goals (including in response to an event of Force Majeure defined in Section 8.1);
 - 6.2.2 Proposed material change in Project budget or use of funds;
 - 6.2.3 Proposed change in schedule for the Project; and
 - 6.2.4 Proposed use of any Unexpended Funds under Section 4.5.

6.3 Notification Requirements: Grantee agrees to promptly notify Grantor of any of the events set forth below. Notice must be delivered to Grantor's Primary Contact identified in Section 1.

- 6.3.1 Change in key personnel for the Project;
- 6.3.2 Change in contact information for Grantee or Grantee's Project Director/Primary Contact;
- 6.3.3 Change of Grantee's name;
- 6.3.4 Change in tax status of Grantee;
- 6.3.5 Any event that would prevent the Project from progressing including an event of Force Majeure defined in Section 8.1 below.

6.4 Result of Non-Compliance: In addition to any other remedies available to Grantor,

- 6.4.1 Grant payments may be discontinued, modified, or withheld if, in Grantor's sole opinion, Grant Funds are used in a way that does not comply with the terms of this Grant Agreement or does not comply with laws applicable to Grantee and/or the activities conducted by Grantee. In addition, Grantor can terminate, at its own discretion, the Grant Agreement without incurring any liability.
- 6.4.2 If any of the Grant Funds are used in a way that does not comply with the terms of this Grant Agreement, Grantee agrees to refund to Grantor up to the total amount of Grant Funds issued to Grantee under this Grant Agreement, within 30 days after Grantor has issued a demand letter for such funds.

7.0 PUBLICITY.

7.1 No Permission to Use Grantor Logos: No right, title, or license to use any Intel logo is granted hereunder. If Grantee would like to use a Grantor logo in association with Grantor's funding of the Project, please contact your Grantor representative to engage in the appropriate permission process.

7.2 No Publicity: Except as set forth in Section 7.3 below, Grantee will not publicize its relationship with Grantor.

7.3 Public Acknowledgement: Grantee agrees to acknowledge Grantor's support for the Project in all press releases or other announcements regarding the Project. Grantee and Grantor agree that such public acknowledgement will be substantially in the following form and content, unless otherwise directed by Grantor:

- 7.3.1 If Grantor is the sole funding source for the Project: Intel Tecnología de México, S.A. de C.V. has provided funding for this Project."
- 7.3.2 If Grantor and Intel Foundation both contributed funding for the Project: Intel Tecnología de México S.A. de C.V. and Intel Foundation provided funding for this Project."
- 7.3.3 If Grantor was one of several funding sources for the Project: Intel Tecnología de México, S.A. de C.V., among others, provided funding for this Project" OR "Intel Tecnología de México, S.A. de C.V. and [names of others] provided funding for this Project."

8.0 MISCELLANEOUS.

- 8.1 Force Majeure Defined: Events that are considered to be "Force Majeure" and beyond the control of Grantee include: (i) fire, flood, earthquakes, lightning, hurricanes, explosions, unusually severe weather conditions for the area, or other Acts of God; (ii) national or regional or site labor disputes, strikes or riots; (iii) acts of governmental entities enjoining the Project from proceeding; or (iv) acts of war, civil disturbance, rebellion, insurrection, epidemic, terrorism, sabotage, riots, or violent demonstrations.
- 8.2 Legal Right and Authority: Grantee represents and warrants that it has the legal right and authority to enter into this Grant Agreement and to observe and fully perform its commitments set forth herein, and that its performance hereunder will not conflict with or violate any commitment, agreement, or understanding it has or will have to or with any other person.
- 8.3 Confidential Information: To the extent the Parties identify a need to exchange confidential information in relation to the Project, they will enter into an Intel Corporate Non-Disclosure Agreement ("CNDA"). The obligations contained in the CNDA shall survive the termination of this Grant Agreement.
- 8.4 Limitation of Liability: IN NO EVENT SHALL GRANTOR HAVE ANY LIABILITY TO GRANTEE OR ANY OTHER THIRD PARTY FOR ANY DIRECT, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THIS AGREEMENT, UNDER ANY CAUSE OF ACTION OR THEORY OF LIABILITY, AND IRRESPECTIVE OF WHETHER GRANTOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES. THESE LIMITATIONS SHALL APPLY NOTWITHSTANDING THE FAILURE OF THE ESSENTIAL PURPOSE OF ANY LIMITED REMEDY. ANY LIABILITY WHICH CANNOT BE EXCLUDED BY LAW IS LIMITED TO THE AMOUNT PAID BY GRANTOR UNDER THE GRANT AGREEMENT.
- 8.5 Compliance with Laws: Grantee represents and warrants that it will comply with any laws applicable to Grantee and any laws applicable to the Project.
- 8.6 Non-Discrimination: Grantee represents and warrants that Grantee's programs and services are offered without discrimination on the basis of race, color, religion, gender, national origin, ancestry, age, disability, medical condition, genetic information, veteran status, marital status, pregnancy, gender expression, gender identity, sexual orientation, or any other characteristic protected by federal, state or local law, regulation, or ordinance. Educational institutions or non-profit organizations which offer gender-based programs or have services designed to address the needs of other targeted populations, may not, in and of themselves, be considered discriminatory and will be considered for funding.
- 8.7 Compliance with anti-corruption laws: Grantee represents and warrants that it has not taken, and shall not take, any action that would cause Intel to violate any anti-corruption law, including but not limited to the United States Foreign Corrupt Practices Act, the United Kingdom Bribery Act, and all other applicable anti-corruption laws. Without limiting the foregoing, Grantee warrants that it, and its employees, agents, and representatives have not and will not, directly or indirectly,

offer, pay, give promise, or authorize the payment of any money, gift or anything of value to: (i) any Government Official (defined as any officer, employee or person acting in an official capacity for any government department, agency or instrumentality, including state-owned or -controlled companies, and public international organizations, as well as a political party or official thereof or candidate for political office), or (ii) any person while Grantee knows or has reason to know that all or a portion of such money, gift or thing of value will be offered, paid or given, directly or indirectly, to any Government Official, for the purpose of (i) influencing any act or decision of the Government Official in his official capacity, (ii) inducing the Government Official to do or omit to do any act in violation of the lawful duty of such official, (iii) securing any improper advantage, or (iv) inducing the Government Official to use his influence to affect or influence any act or decision of a government or instrumentality, in order to assist Intel in obtaining or retaining business.

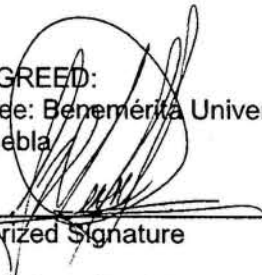
- 8.8 Exports: Grantee acknowledges that any hardware, software, technical data, servicing, support, and training provided under this Agreement (collectively "Product") is subject to export controls under U.S. and other applicable Government laws and regulations. Grantee shall comply with these laws and regulations governing export, re-export, import, transfer, distribution, use, and servicing of Product, and agree to obtain all required Government authorizations. Grantee shall not sell or transfer Product to any entity listed on a denial order published by Government, or subject to sanctions, without first obtaining a license or authorization. Grantee shall not use, sell, or transfer Product for purposes prohibited by Government, including, without limitation, the development, design, manufacture, or production of nuclear, missile, chemical or biological weapons, unless authorized by a specific license. For more details on your export obligations, please visit <http://www.intel.com/content/www/us/en/legal/export-compliance.html>.
- 8.9 Successors and Assigns. Grantor may assign its rights or delegate its obligations, or any part thereof under this Agreement, without prior consent from Grantee. Grantee may not assign, whether in conjunction with a change of ownership, merger, acquisition, sale or transfer of all, substantially all or any part of Grantee's business or assets or otherwise, either voluntarily, by operation of law or otherwise, any portion of this Agreement. Any attempt by Grantee to assign or delegate any rights, duties or obligations set forth in this Agreement without Grantor's prior written consent will constitute a material breach of this Agreement and will be null and void. This Agreement will extend to, inure to the benefit of, and be binding upon the parties hereto and their respective directors, officers, partners, proprietors, attorneys, agents, servants, employees, representatives, affiliates, subsidiaries, shareholders, predecessors, and permitted successors and assigns.
- 8.10 Waiver. The failure of either party at any time or times to demand strict performance by the other party of any of the terms or conditions of this Agreement will not constitute a permanent or continuing waiver or relinquishment thereof and each party may at any time demand strict and complete performance by the other of said terms and conditions.
- 8.11 Termination. Either party may immediately terminate this Agreement for breach by the other party upon written notice. Opportunity to cure the breach may be given, but is not required under this Agreement. Grantor may terminate this Agreement immediately with or without notice: (i) in the event of the direct or indirect taking over

or assumption of control of Grantee or of substantially all of its assets by any government, governmental agency, or other third party; (ii) if Grantee commits an act of bankruptcy, or files any petition under the bankruptcy or insolvency laws of any jurisdiction, country or place; (iii) if a receiver or trustee is appointed for the Grantee's business or property; or, (iv) if Grantee is adjudicated bankrupt or insolvent, or otherwise terminates its business operations.

- 8.12 No Purchase Obligation. If the Project activities under this Agreement include the purchase of computing products or services, Grantee has no obligation to purchase products or services from Grantor, its subsidiaries, or customers, or purchase products that contain components from Intel or its subsidiaries. Grantee will choose the product specifications, manufacturer and vendor of such products/services in its sole discretion, in accordance with its goals for the Project.
- 8.13 Relationship of the Parties. This Agreement is non-exclusive; each Party is free to carry out similar projects with third parties. No agency, partnership, joint venture or employment relationship is created between the Parties as a result of this Agreement. Neither Party is authorized to create any obligation, express or implied, on behalf of the other Party.
- 8.14 Governing Law and Jurisdiction. All matters arising out of or related to this Agreement, including without limitation all matters connected with its performance, shall be construed, interpreted, applied and governed in all respects in accordance with the laws of Mexico, without reference to conflict of laws principles. All disputes and litigation arising out of or related to this Agreement shall be subject to the exclusive jurisdiction of the courts of Mexico and of the Federal courts sitting therein. Each Party hereby irrevocably submits to the personal jurisdiction of such courts and irrevocably waives all objections to such venue.
- 8.15 Entire Agreement. This Grant Agreement represents the entire agreement between Grantor and Grantee covering the Project. The Grant Agreement supersedes all previous communications, either oral or written, between the Parties with respect to the Project.

SO AGREED:

Grantee: Benemérita Universidad Autónoma
de Puebla



Authorized Signature

Marcos González Flores
Printed Name

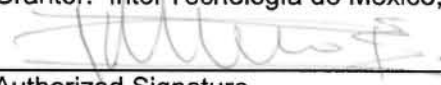
Director de la Facultad de Ciencias
Title

October 6, 2014
Date

Attachments:

1. Project Narrative
2. Budget

Grantor: Intel Tecnología de México, S.A. de C.V.



Authorized Signature

JESÚS PACOMINO
Printed Name

Title

October 7, 2014
Date

**Attachment 1 to Grant Agreement:
Project Narrative**

PROGRAMA DE ESPECIALIZACIÓN LINUX INTEL - BUAP

JUSTIFICACIÓN DEL PROGRAMA

El Centro de Diseño de Guadalajara (GDC) es el centro de ingeniería Intel más grande de Latinoamérica, se especializa en el diseño, prueba y validación de diversas plataformas de cómputo, así como en otras tecnologías de hardware y software. Durante los 14 años de presencia en el país, el GDC ha participado en más de 150 proyectos y cuenta con grupos de diseño de circuitos integrados, desarrollo de diversos tipos de software (BIOS, automatización, pruebas, aplicaciones, depuración, procesos en centros de datos y más), desarrollo y pruebas de plataformas, actividades de investigación y desarrollo, y varias funciones relacionadas a las Tecnologías de la Información. Para dar soporte al trabajo desarrollado, el GDC cuenta actualmente con más de 1000 personas, considerados los mejores y más brillantes profesionistas en sus respectivos campos.

Una de las acciones que ha emprendido exitosamente el GDC, para desarrollar talento en sus áreas de crecimiento, es implementar programas de especialización con las instituciones de educación superior, con el propósito de ofrecer, a los mejores alumnos, posiciones de trabajo en Intel. Los resultados obtenidos en estos programas han sido exitosos, ya que han contratado a más del 40% de los participantes.

Intel designa fondos económicos a las instituciones de educación superior, para que sean estas la encargadas de realizar la implementación del programa, realizando la selección de los aspirantes, asignando instructores, instalaciones, y coordinando la logística en general. Es importante destacar que el programa no tiene costo para los participantes, ya que todos gastos generados son cubiertos con el fondo económico proporcionado por Intel.

OBJETIVOS DEL PROGRAMA

Desarrollar un programa de especialización con apoyo de Intel, con el propósito de especializar a nuestros estudiantes en temas específicos relacionados con Linux y cómputo distribuido.

PARTICIPANTES EN EL PROGRAMA

Las capacitaciones estarán a cargo de los siguientes profesores:

- Dr. Luis Enrique Colmenares Guillén (100221911)
- M.C. Carlos Mauricio Ramírez Espitia (100420600)

CONTENIDO TEMÁTICO

Computer Architecture (Intel 64 and IA32)

Time: 20 hours

Expectations: Students being able to understand the basic concepts of Advance topics of IA necessary for OS understanding

- Interconnection Structure (QPI, PCI Express)
- Cache Memory
- Main Memory
- secondary memory
- CISC and RISC
- Superscalar processors
- Parallel processing
- Multiprocessors
- Hyper-Threading
- Symmetric multiprocessing
- Virtualization
- Vectorial Units (AVX)
- Super Computer

OS Architecture

Time: 40 hours

- Introduction to OS

Explain what operating systems are, what they do, and how they are designed and constructed. They discuss what the common features of an operating system are, what an operating system does for the user, and what it does for the computer-system operator.

- What is an Operating Systems
- Operating System Structure
- Operating System Operations

- Process Management

Describe the process concept and concurrency as the heart of modern operating systems

- Processes
- Threads
- CPU Scheduling
- Process Synchronization
- Deadlocks

- Memory Management

Deal with memory management during execution of a process

- Main Memory
- Virtual Memory

- Storage Management

Understand how the file system mass storage and I/O are handled in a modern computer system

- File System Interface
- File System Implementation
- Mass Storage Structure
- I/O Systems

- Protection Security

Discuss the processes in an operating system that must be protected from one another's activities.

- Distributed Systems

Deal with a collection of processors that do not share memory or a clock, a distributed system

- Distributed System Structures
- Distributed File Systems
- Distributed Coordination

- Special Purpose Systems

Deal with systems used for specific purposes, including real-time systems

- RTOS

Linux (Kernel Space) :

Time : 80 hours

Discuss concepts ,structures and implementation of the Linux kernel. At the end the student is capable of having a deeply understanding of the Linux Kernel. The student should be able to fully understand the architecture of the Linux Kernel and being able to create their components

- Tasks of the Kernel
- Implementation Strategies
 - Microkernels / Monolithic Kernels
- Elements on the Kernel
 - Processes, Task Switching and Scheduling
 - Address Spaces and Privilege Levels
 - Introduction Virtual and Physical Address Spaces
 - Page Tables
 - Allocation of Physical Memory
 - Slab Cache

- Introduction to Timing
- Introduction to System Calls
- Introduction to Drivers
 - Network Drivers
 - Block Drivers
 - Character Drivers
- Process Management and Scheduling
 - Process Life Cycle
 - Process management system calls
 - Implementation of the scheduler
- Memory Management
 - Organization in the (N) UMA Model
 - Page Tables
 - Initialization of Memory Management
 - Management of Physical Memory
 - Slab Allocator
 - Processor cache and TLB Control
- Virtual Process Memory
 - Virtual Process Address Space
 - Data Structures
 - Memory Mappings
 - Managing the Heap
 - Transfer data between Kernel Space and User Space
- Locking and IPC
 - Control Mechanism
 - Kernel Locking Mechanisms
 - System V Inter process Communication
 - Race conditions and Synchronization
 - Concurrency
 - Atomic operations
 - Spinlocks
 - Mutex
 - Semaphores
- Device Drivers
 - Types of Devices

- Modules
 - Exporting Symbols
 - Licensing
 - Automatic Loading/ Unloading Modules
 - Built in Drivers
- I/O Architecture
- Access to Devices
- Association with File system
- Character Devices
 - Major and Minor Numbers
 - Reserving Major and Minor Numbers
 - Accessing the device Node
 - Udev and HAL
 - File Operation Structure
 - File and inode structure
- Interrupt and Exceptions
 - Exceptions
 - Asynchronous Interrupts
 - MSI
 - Enabling/ Disabling Interrupts
 - IRQ data structures
 - Installing and interrupt handler
- Debugging techniques
 - Oops messages
 - Kernel Debuggers
 - Debugfs
 - Kprobes / jprobes
- Timing and Timers
 - Jiffies
 - Inserting delays
 - Dynamic Timers
 - Timer Implementation
 - High Resolution Timers
- IOCTLs
 - Driver entry points for IOCTLs
 - Locked and Lockless IOCTLs
 - Defining IOCTLs
- Unified Device Model and sysfs
- Memory management and allocation
 - Kmalloc

- Vmalloc
- Bootmem
- Transfer between user and kernel space
- USB Drivers
- Power Management
 - ACPI and APM

Linux (User Space) :

Time : 80 hours

You might be a developer already experienced with programming for the GNU/Linux system, and you want to learn about some of its advanced features and capabilities. This part does not provide a general introduction to GNU/Linux systems. We assume that you already have a basic knowledge of how to interact with a GNU/Linux system and perform basic operations in graphical and command-line environments.

At the end of this part the student is capable to create Advance applications for Linux Systems

- Programming
 - GCC Compiler (Full understanding)
 - Make files
 - Shell programming
 - Python
 - Interactive Shell
 - Flow Control
 - Data structures
 - Objects
 - Inline Assembly Code
- Processes
 - Looking at Processes
 - Signals
 - IPC
 - Pipes
 - Deamons
 - Sockets
 - RPC
 - Creating Process
- Threads

- Thread Creation
- Thread Cancellation
- Critical Sections
- GNU/Linux Thread Implementation
- Process VS Threads
- Proc file System
 - Extracting Information from /proc
 - Process Entries
 - Hardware Information
 - Kernel Information
 - Drives, Mounts, and File Systems
 - System Statistics
- Debug Tools
 - Perf, System tap, gdb
- Linux System Calls
- Instalations
 - Package creation
- Security in Linux
 - Users and groups
 - File System permission
 - Memory protection
 - Authentication Users
 - Sample Aplicación GNU/LINUX

SW development and Source Control

Time : 20 hours

Student is capable to understand how to use worldwide development methodologies and version control systems in and advance way not just a simple user but a user that can handle problems in a

Big Open Source collaboration project

- SW Dev Proc (Agile, scrum)
- Version Control (git)
- Open Source collaboration

Linux Boot Process

Time 40 hours

Student is capable of understand and create boot Linux Systems

- Linux boot process 20,000-foot view
- The Linux x86 boot protocol
- How is the kernel built?
- The Linux/x86 Boot Protocol
- Linux loader
- Loading the kernel – bzImage boot protocol >= 2.02
- 32-bit BOOT PROTOCOL
- zeropage
- Entering protected mode
- startup_32() Functions
- The start_kernel() function

Networks

Time 40 hours

Understand the basic concept of Network protocols (and their interactions with the Kernel and User space)

- TCP/IP protocols
- Type of Networks (infinity (Mellanox, true scale), Ethernet)
- Network Interfaces Configuration
- Firewall Administration

HPC

Time 20 hours

Student is able to understand, adapt and create HPC applications

- MPI
- OpenMP
- Provision and monitoring (Ganglia, Rocks, Bright, SLURM, etc)

**Attachment 2 to Grant Agreement
Project Narrative**

DESTINO DE LOS FONDOS ECONÓMICOS

Intel destinará la cantidad de \$ 260,000.00 (doscientos sesenta mil pesos 00/100 M.N.), los cuales serán distribuidos de la siguiente manera:

Concepto	Cantidad
Pago de Honorarios a instructores	120,000
Impuestos aproximados por pago de honorarios	32,000
Compra de Libros	15,000
Pago de viáticos para instructores externos	20,000
Compra de equipo de cómputo	68,000
Servicios varios	5,000
Total	260,000

Los recursos aportados por Intel cubren a 13 alumnos. A discreción de la BUAP, el programa se extendería hasta 20 alumnos.