



# **Silent Configuration for Broadcom Advance Server Program (BASP)**

**Revision 6.1.7 • Date July 18, 2006**

**Prepared by:**  
Su-Lan Wang

Copyright © 2002-2006 Broadcom Corporation  
All Rights Reserved

No part of this document may be reproduced, in any form or by any means, without permission in writing from Broadcom Corporation.

Broadcom Corporation reserves the right to make changes to the products or information contained in this document without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such products or information.

Epigram, InsideLine, and iLine10 are trademarks of Broadcom Corporation.

**Broadcom Corporation**  
**16215 Alton Parkway**  
**Irvine CA 92619**  
**[www.broadcom.com](http://www.broadcom.com)**

CONFIDENTIAL

<b>1</b>	<b>REVISION HISTORY .....</b>	<b>3</b>
<b>2</b>	<b>INTRODUCTION.....</b>	<b>5</b>
<b>3</b>	<b>REQUIREMENTS.....</b>	<b>6</b>
<b>4</b>	<b>IMPLEMENTATION .....</b>	<b>7</b>
4.1	Command Line Input Parameters.....	7
4.2	Configuration File .....	11
4.3	Exit Codes .....	13

CONFIDENTIAL

## 1 Revision History

Version	Date	Author	Changes
6.1.7	07/18/06	Su-Lan Wang	For incremental version control, no document changes.
6.1.6	04/25/06	Su-Lan Wang	Added optional parameter -livelink_vid for live link team configuration. Updated 'Command Line Input Parameters', and 'Examples' sections.
6.1.5	09/22/05	Su-Lan Wang	Added administrator privilege to 'Requirements'. Modified 'Examples' in Section 4.1 and Section 4.2. Appended error code 560 in Section 'Exit Codes'.
6.1.4	05/11/05	Su-Lan Wang	For incremental version control, no document changes.
6.1.3	05/06/05	Su-Lan Wang	Changed input unit for -freq and -retry_freq from seconds to milliseconds. Updated 'Command Line Input Parameters', and 'Examples' sections for BaspSCfg release 6.1.3.
6.1.2	04/12/05	Su-Lan Wang	Updated 'Requirements', 'Command Line Input Parameters', and 'Examples' sections for BaspSCfg release 6.1.2.
1.4	04/07/05	Su-Lan Wang	Modified examples for live link feature.
1.3	04/01/05	Su-Lan Wang	Added options and requirements to support live link feature.
1.2	09/28/04	Daniel Tran	Modify the requirements section.
1.1	09/21/04	Daniel Tran	Add new options: -restore, -remove, and -save and exit codes.
1.0	09/16/04	Daniel Tran	Update the options list.
0.9	03/18/04	Daniel Tran	Add new error code.
0.8	02/02/04	Daniel Tran	Add watermark and convert to PDF file.
0.7	01/22/04	Daniel Tran	Add -wsp and -wss options. The options allow to set IP addresses for Primary and Secondary WINS Servers.

0.6	10/16/03	Daniel Tran	Add –gw and –dns options
0.5	02/28/03	Daniel Tran	Add more information in Requirements and Implementation sections.
0.4	02/10/03	Daniel Tran	Added more exit codes, -snic option for standby physical adapter, and examples.
0.3	02/06/03	Daniel Tran	Modified exit codes and –pnic option.
0.2	01/30/03	Daniel Tran	Added exit codes and revision page
0.1	12/27/02	Hao-Yang Feng	Created

CONFIDENTIAL

## 2 Introduction

Broadcom Advance Server Program (BASP) is a Load-Balance/Fail-Over driver that offers fault tolerance capability to users. BASP allows users to choose different load balancing algorithms (Smart Load Balancing, FEC/GEC and 802.3AD) as well as VLAN tagging.

Due to the rich set of features offered by BASP, configuration is always a complicated task for users. This issue also becomes a difficult problem for an OEM that wishes to have a simple deployment method for their dual LOM (LAN-On-Motherboard) machines.

To alleviate the problem, a silent configuration utility (BaspSCfg.exe) is provided to help the OEM overcome the difficulty. The utility is a Win32 Console Mode executable that takes parameters as teaming configuration options to construct a team and no user interaction is required. OEMs can wrap the utility into their own configuration software to achieve their deployment purposes.

CONFIDENTIAL

### 3 Requirements

The silent configuration utility (BaspSCfg.exe) will conform to following requirements.

- Assume BASP is installed on the target system.
- The BMAPI dependency files will be packaged along with each BaspSCfg release and require to be installed as follows:
  1. Copy BASFND.sys to your windows\system32\drivers directory.
  2. Copy BMAPI.dll to your windows\system32 directory.
- Implement as a console mode program.
- Take parameters as configuration options.
- Make no interaction with users.
- Exit with a pre-defined error code to help the caller (that invokes the utility) to determine the result.
- Use MAC address or PCI information to identify a NIC. The format for the PCI information is “%02x:%02x.%01x”, e.g. 03:0c.1, as shown in linux lspci.
- Will have an option to take a plain text file that contains configuration information to all teams.
- Run on W2K, XP or later.
- Will configure ONLY static IP address/subnetmask, gateway, DNS, and WINS per virtual adapter. Allow multiple IP settings.
- Will create, remove, save and restore team(s)
- Will create only one team via command line, multiple teams can be created using configuration file
- Windows Management Instrumentation (WMI) service needs to be running for static IP configuration.
- Requirements for the live link feature implemented in BaspSCfg are defined in “BCM 5700 Software Release Version 7.7 Marketing Requirements, Revision 1.0g”.
- The ‘save’ and ‘help’ commands are available to all users, other commands for the teaming configuration are only available to the users with Administrator privileges.

## 4 Implementation

'BaspSCfg.exe' will be implemented as a Win32 Console Mode program to reduce the dependency on various Windows OS. 'BaspSCfg.exe' will use Broadcom Management API (BMAPI) to configure or remove BASP teams. Since the utility runs independently, the package of the utility will include BMAPI files (bmapi.dll and BASFND.sys).

### 4.1 Command Line Input Parameters

Command line options are defined as following. All options are case insensitive.

```
BaspSCfg { [-file CFG_file] |
            [-restore file_path_name] |
            [-remove [team_name]] |
            [-save file_path_name -nicid MACADDR|PCIINFO] |
            [-name team_name [-type team_type]
            [NO_LIVELINK_PARAMS|LIVELINK_PARAMS] [IP_CFG|VLAN_CFG]] |
            [-help|-h|-?]}

{}: The parameter must exist
[]: Optional option
-file CFG_file: CFG_file is the input configuration file
               name.
-restore file_path_name: Restore the configuration from the
                       parameter file_path_name.
-remove [team_name]: Remove a team specified by the parameter
                    team_name. If team_name is not specified
                    then all team(s) will be removed.
-save file_path_name -nicid MACADDR|PCIINFO:
      Save the current configuration to the
      parameter file_path_name. MACADDR and
      PCIINFO simply tells BASPSCfg to save the
      NIC ID by MAC address or PCI bus:dev.func
      information. The NIC identification of a
      NIC will be saved in the format of MAC
      address (as MAC_Address) or PCI ID format
      (06:0D.1) as shown in linux lspci.
      The IP settings will be ignored if DHCP is
      enabled.
-name team_name: team_name is name of the team.
-type team_type: team_type is type of the team. Default is
               0.
               0: Smart Load Balance and Fail Over.
               1: Generic Trunking (FEC/GEC).
               2: Link Aggregation (802.3ad).
               4: SLB (Auto-Fallback Disable).
NO_LIVELINK_PARAMS: [ [PHY_NIC_SEL]
                    [-snic MAC_address|bus:dev.func] ]
PHY_NIC_SEL: -pnic MAC_address|bus:dev.func
              [PHY_NIC_SEL]
              -pnic: Specify primary NIC by using MAC
                    address of a 12 digit hex string or PCI
                    bus:dev.func information, e.g. 03:0C.0.
LIVELINK_PARAMS: [-target_ip ip1
                  [-target_ip ip2 -target_ip ip3 -target_ip
                  ip4]
                  [-retry retry_num] [-freq interval]
                  [-retry_freq retry_interval]
```



[LIVELINK\_PNIC\_SEL] [LIVELINK\_SNIC\_SEL] ]  
-target\_ip ip1 [-target\_ip ip2 -target\_ip ip3 -target\_ip ip4]:  
Up to 4 link targets can be specified. At least one ip is required for the live link feature.  
-retry retry\_num: The maximum number of retries before failing a team member. Default is 5.  
-freq interval: The frequency (in milliseconds) to send out a link packet. Default is 2000 milliseconds.  
Note: 1000 milliseconds = 1 second.  
Please check BACS for valid values.  
-retry\_freq retry\_interval: The frequency (in milliseconds) for sending a link packet after a dropped packet is detected. Default is 1000 milliseconds.  
Note: 1000 milliseconds = 1 second.  
Please check BACS for valid values.  
-livelink\_vid ll\_vid: VLAN ID (0-4094) for live link.  
One per live link team configuration.  
LIVELINK\_PNIC\_SEL: -pnic MAC\_address|bus:dev.func -livelink\_ip ll\_ip [LIVELINK\_PNIC\_SEL]  
-livelink\_ip ll\_ip: a static ip address is required for this primary NIC to support live link feature.  
LIVELINK\_SNIC\_SEL: -snic MAC\_address|bus:dev.func -livelink\_ip ll\_ip  
-livelink\_ip ll\_ip: a static ip address is required for this standby NIC to support live link feature.  
IP\_CFG: IP\_ADDR [GATE\_ADDR] [DNS\_ADDR] [WNS\_ADDR]  
IP\_ADDR: -ip IP\_address -smask subnetmask [IP\_ADDR]  
GATE\_ADDR: -gw gateway\_IP\_address [GATE\_ADDR]  
DNS\_ADDR: -dns DNS\_IP\_address [DNS\_ADDR]  
WNS\_ADDR: -wsp Primary\_WINS\_Server\_IP\_address [-wss Secondary\_WINS\_Server\_IP\_address]  
VLAN\_CFG: -vname VLAN\_name -vid VLAN\_id [IP\_CFG] [VLAN\_CFG]  
VLAN\_name: VLAN\_name is name of VLAN.  
VLAN\_id: VLAN\_id is the ID of VLAN and must be between 0 and 4094.  
-help: Print the usage.  
-h: Print the usage.  
-?: Print the usage.

‘PHY\_NIC\_SEL’ option allows selection of multiple physical network adapters.

‘-pnic’ option is for load balance adapters and ‘-snic’ is for standby adapter. Each Load Balance team allows only one standby adapter. FEC/GEC or 802.3ad team cannot have a standby adapter.

When ‘IP\_CFG’ is specified, user MUST set both IP and subnet mask or it will be ignored. At least one of the team members MUST have link as WMI is used to set the static IP address and requires link.

‘VLAN\_CFG’ option allows configuration for multiple VLANs. Each ‘-vname’ MUST couple with ‘-vid’ or the VLAN configuration will be ignored.

The default behavior of 'BaspSCfg.exe' (without any options) will grab all 'teamable' physical network adapters into a Smart Load Balancing (SLB) team without VLAN configured and the virtual adapter of the team will use DHCP. A NIC is 'teamable' or not will depend on the specific OEM. The default team name will be "SLBTeam".

If the -pnic option is omitted then BaspSCfg.exe will also grab all 'teamable' physical network adapters into a new team.

In addition, the following requirements are implemented to support the live link feature as documented in "BCM 5700 Software Release Version 7.7 Marketing Requirements, Revision 1.0g".

- Live link support is only for the SLB team type 0.  
0: Smart Load Balance and Fail Over
- '-target\_ip' is the target IP address that a link packet is sent to. Up to 4 link targets can be specified for each team. At least one IP address is required to enable the live link feature. All 'target\_ip' are required to be grouped together, otherwise, an error will be reported. When 'IP\_CFG' is specified with the live link feature, at least one of the team members MUST have link as WMI is used to set the static IP address and requires link.
- '-retry' is the maximum number of retries before failing a team member. It is an optional parameter. Default is 5.
- '-freq' is the frequency in milliseconds to send out a link packet. It is an optional parameter. Default is 2000 milliseconds. Note: 1000 milliseconds = 1 second. The supported values by BACS (in milliseconds) are: 500 (optional), 1000, 2000, 5000, 10000, 20000, 30000, and 60000.
- '-retry\_freq' is the frequency in milliseconds a link packet is to be sent after a dropped link packet is detected. It is an optional parameter. Default is 1000 milliseconds. Note: 1000 milliseconds = 1 second. The supported values by BACS (in milliseconds) are: 500 (optional), 1000, 2000, 5000, 10000, 20000, 30000, and 60000.
- '-livelink\_vid' is VLAN ID for live link. One per live link team configuration. It is an optional parameter with valid range from 0 to 4094.
- Once a '-target\_ip' is supplied to request the live link feature, every '-pnic' and '-snic' after the '-target\_ip' is required to specify '-livelink\_ip' as shown in 'LIVELINK\_PNIC\_SEL' and 'LIVELINK\_SNIC\_SEL'.
- If the live link feature is desired for a team, it is required to specify the team parameters following the 'LIVELINK\_PARAMS'. Otherwise, follow the 'NO\_LIVELINK\_PARAMS' to input parameters for a team without the live link feature.

Examples:

**BaspSCfg** will create a default Load Balance SLBTeam with all 'teamable' physical network adapters and configure SLBTeam with DHCP.

**BaspSCfg -name FGTeam -type 1 -pnid 00101801794D** will create a FEC/GEC FGTeam with one load balance physical adapter.

**BaspSCfg -name BRCMTeam -pnid 00101801794D -snid 01:0D.0 -vname VLAN100 -vid 100 -vname VLAN200 -vid 200** will create a Load Balance BRCMTeam with two VLANs and configure VLAN100 and VLAN200 with DHCP.

**BaspSCfg -name BRCMTeam -pnid 00101801794D -snid 00:0B.2 -vname VLAN100 -vid 100 -ip 172.16.8.100 -smask 255.255.255.0 -vname VLAN200 -vid 200 -ip 172.16.8.200 -smask 255.255.255.0** will create a Load Balance BRCMTeam with two VLANs and configure VLAN100 and VLAN200 with static IP address and subnet mask.

**BaspSCfg -name LiveLinkTeam -target\_ip 172.16.8.66 -target\_ip 172.16.8.77 -target\_ip 172.16.8.88 retry 3 -livelink\_vid 1234 -pnid 02:0A.1 -livelink\_ip 172.16.8.10 -snid 00101801794D -livelink\_ip 172.16.8.20 -vname VLAN100 -vid 100 -ip 172.16.8.100 -smask 255.255.255.0 -vname VLAN200 -vid 200 -ip 172.16.8.200 -smask 255.255.255.0** will create a SLB LiveLinkTeam supporting live link feature with two VLANs and configure VLAN100 and VLAN200 with static IP address and subnet mask.

**'BaspSCfg -file TeamConfig.txt'** will create team(s) from the input TeamConfig.txt configuration file.

**'BaspSCfg -restore RstConfig'** will create team(s) from the input RstConfig configuration file.

**'BaspSCfg -save SaveMac.txt -nicid MACADDR'** will save current teams' configuration with NIC address in the MAC address format into the designated file SaveMac.txt.

**'BaspSCfg -save SavePci -nicid PCIINFO'** will save current teams' configuration with NIC address in the PCI ID format into the designated file SavePci.

**'BaspSCfg -remove BRCMTeam'** will remove only the specified BRCMTeam if it exists.

**'BaspSCfg -remove'** will remove all teams found in the system.

## 4.2 Configuration File

The syntax plain text file is defined as following. The team parameters can be specified either using 'NO\_LIVELINK\_PARAMS' or using 'LIVELINK\_PARAMS'.

```
TEAM_CFG
[TEAM_CFG]
...
```

1. Each 'TEAM\_CFG' with NO\_LIVELINK\_PARAMS is defined as follows:

```
name: team_name
[type: team_type]
pnice: MAC_address
[pnive: MAC_address
...]
[snice: MAC_address]
[[ip: IP_address
smask: subnetmask]
| [vname: VLAN_name
vid: VLAN_ID
[ip: IP_address
smask: subnetmask]]
...]
```

2. Each 'TEAM\_CFG' with LIVELINK\_PARAMS is defined as follows:

```
name: livelinkteam name
[type: livelink_team_type]
target_ip: ip1
[target_ip: ip2
target_ip: ip3
target_ip: ip4]
[retry: 3]
[freq: 2000]
[retry_freq: 2000]
[livelink_vid: 1234]
[pnive: MAC_addresses | PCIINFO
livelink_ip: ll_ip
pnive: MAC_address | PCIINFO
livelink_ip: ll_ip
pnive:...]
[snice: MAC_address | PCIINFO
livelink_ip: ll_ip]
[[ip: IP_address
smask: subnetmask]
| [vname: VLAN_name
vid: VLAN_ID
[ip: IP_address
smask: subnetmask]]
...]
```

A configuration file **MUST** contain at least one team configuration.

'BaspSCfg.exe' will recognize 'name' as starting point of a team configuration section. All lines after 'name' will apply to the 'team\_name' until another 'name' or end of file is encountered.

Each team configuration **MUST** contain at least one physical network adapter or the configuration of the team will be ignored.

If 'type' is missing, the default is set to Smart Load Balancing (SLB).

If 'ip' is set, 'smask' must also be set or 'ip' will be ignored. If 'ip' is not set, DHCP will be used.

Team IP can be set if no VLAN are configured. If any VLAN is configured, the team IP will be ignored. Multiple VLAN configurations are allowed. Each VLAN configuration allows an optional static IP information. Each IP **MUST** be couple with 'smask' or will be ignored.

Please note that there must **at least one** white space or tab between the tag ('name', 'pnic', etc.) and the value pair ('team\_name', 'MAC\_address', etc.) in each line.

Example:

1. A sample of the TeamConfig.txt configuration file with NO\_LIVELINK\_PARAMS:

```
name: BRCMTeam
type: 1
pnic: 00101801794D
pnic: 00:0B.2
vname: VLAN2
vid: 2
vname: VLAN3
vid: 3
ip: 172.16.8.3
smask: 255.255.255.0
vname: VLAN4
vid: 4
ip: 172.16.8.4
smask: 255.255.255.0
vname: VLAN5
vid: 5
ip: 172.16.8.5
smask: 255.255.255.0
```

2. A sample of the TeamConfig.txt configuration file with LIVELINK\_PARAMS:

```

name: LiveLinkTeam
type: 0
target_ip: 172.16.8.66
target_ip: 172.16.8.77
target_ip: 172.16.8.88
target_ip: 172.16.8.99
livelink_vid: 1234
pnic: 00101801794D
livelink_ip: 172.16.8.10
pnic: 01:0D:0
livelink_ip: 172.16.8.11
snic: 02:03:0
livelink_ip: 172.16.8.20
vname: VLAN2
vid: 2
vname: VLAN3
vid: 3
ip: 172.16.8.3
smask: 255.255.255.0
vname: VLAN4
vid: 4
ip: 172.16.8.4
smask: 255.255.255.0
vname: VLAN5
vid: 5
ip: 172.16.8.5
smask: 255.255.255.0

```

### 4.3 Exit Codes

```

// No error
BASPSCFG_NO_ERROR                                0

// Not supported OS
ERROR_NOT_SUPPORTED_OS                            500

// Cannot allocate memory
ERROR_CANNOT_ALLOC_MEM                            501

// Team has no member
ERROR_TEAM_NO_MEMBER                              502

// Only one team is accepted from command line
ERROR_EXCEED_NUMBER_OF_TEAM_ALLOW                503

// Cannot create more than 64 VLANs

```

ERROR\_EXCEEDMAXVLAN 504

// Cannot open the input file  
ERROR\_CANNOT\_OPEN\_FILE 505

// No team to configure  
ERROR\_NO\_TEAM\_TO\_CONFIG 506

// BASP is not installed and cannot create any team  
ERROR\_BASP\_NOT\_INSTALL 507

// Cannot set static IP Address  
ERROR\_CANNOT\_SET\_IPADDR 508

// Wrong option flag  
ERROR\_WRONG\_OPTION\_FLAG 509

// Cannot create FECGEC or 802.3ad with a standby adapter  
ERROR\_CANNOT\_CREATE\_FECGEC\_8023AD 510

// Only Broadcom certified adapters are supported in VLAN  
ERROR\_ONLY\_BROADCOM\_NIC\_FOR\_VLAN 511

// Duplicate adapter physical MAC address or PCI ID  
ERROR\_DUPLICATE\_MAC\_ADDRESS 512

// '&' is not a legal character for the team name  
ERROR\_INVALID\_TEAM\_NAME 513

// Team already exists, please use a different team name  
ERROR\_TEAM\_ALREADY\_EXISTED 514

// Cannot match the MAC Address  
ERROR\_CANNOT\_MATCH\_MAC\_ADDR 515

// Duplicate VLAN name % or VLAN ID %d  
ERROR\_DUPLICATE\_VLANID 516

// Team not found, please use a different team name  
ERROR\_TEAM\_NOT\_FOUND 517

// Live link support only applied to SLB team type  
ERROR\_CANNOT\_CREATE\_LIVE\_LINK 518

// Live link support allows up to 4 Target IPs  
ERROR\_EXCEED\_MAX\_TARGET\_IP 519

// Duplicate OPTION  
ERROR\_DUPLICATE\_OPTION 520

// Missing parameter  
ERROR\_MISSING\_PARAM 521

// Invalid parameter type  
ERROR\_INVALID\_PARAM 522

// %s value %d is out of range (%d - %d)

ERROR_INVALID_RANGE	523
// Unrecognized parameter	
ERROR_UNRECOGNIZED_PARAM	524
// Duplicate IP address	
ERROR_DUPLICATE_IPADDR	525
// Invalid IP address	
ERROR_INVALID_IPADDR	526
// No link is present for Team %s to set IP addresses	
ERROR_NO_LINK_FOR_IP_CFG	527
// Invalid interval %d.	
ERROR_INVALID_INTERVAL	528
// Cannot initialize BMAPI	
ERROR_CANNOT_INIT_BMAPI	550
// Cannot check BASP status	
ERROR_CANNOT_CHECK_BASP_STATUS	551
// Cannot get all unassigned adapters data	
ERROR_CANNOT_GET_ALL_UNASG_NIC_DATA	552
// Cannot get adapter PCI information	
ERROR_CANNOT_GET_NIC_PCI_INFO	553
// Cannot create team	
ERROR_CANNOT_CREATE_TEAM	554
// Cannot get all unassigned adapters number	
ERROR_CANNOT_GET_ALL_UNASG_NIC_NUM	555
// Cannot get all created teams	
ERROR_CANNOT_GET_ALL_CREATED_TEAM	556
// Wrong BMAPI version	
ERROR_WRONG_BMAPI_VERSION	557
// Cannot get physical NIC information	
ERROR_CANNOT_GET_NIC_INFO	558
// Cannot remove team	
ERROR_CANNOT_REMOVE_TEAM	559
// Admin Privilege is required for this operation.	
ERROR_NO_ADMIN_PRIVILEGE	560